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A REGIONAL GEOGRAPHY

PART II

AFRICA

A REGIONAL GEOGRAPHY

FOR HIGHER CERTIFICATE AND INTERMEDIATE COURSES

BY

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LECTURER IN GEOGRAPHY, LONDON SCHOOL OF ECONOMICS

AND

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SIR ERNEST CASSEL, READER IN ECONOMIC GEOGRAPHY IN THE
UNIVERSITY OF LONDON

PART II

AFRICA

WITH 117 MAPS AND DIAGRAMS

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PREFACE

THE publication of this book marks the completion of Dr. Stamp's *Regional Geography*, and a word of explanation may be necessary to account for its appearance so long after the rest of the series. As readers of the other volumes well know, it has always been Dr. Stamp's custom to obtain first-hand knowledge of, at any rate, parts of a continent before attempting to write an advanced geography. Circumstances having denied him access to the bulk of the African continent except the south and the extreme north, this volume was never written. When, in August 1933, Dr. Stamp was preparing to go to America for a year, the demand for the book was so insistent that he entrusted the work of writing it to me.

The information contained in this volume has been gleaned from an extensive reading of the most up-to-date descriptive literature and official reports in English and French, and in order to ensure accuracy most of the sections (noted in the text) have been submitted to official representatives of the African territories in London, or to other reliable authorities, for comment and criticism. The only part of the original *Intermediate Commercial Geography* which remains is the section on South Africa, which has been revised and brought up to date partly with the help of Mrs. Stamp, who visited the region in 1932. For the rest of the book, including all the illustrations, which with few exceptions are completely new, I accept entire responsibility, and trust that Dr. Stamp's high standard of accuracy and conciseness has been maintained.

S. H. BEAVER

LONDON SCHOOL OF ECONOMICS,
October, 1934.

NOTE TO THE NEW IMPRESSIONS

The statements in this book refer to conditions as they were before the outbreak of war in September 1939. It has not been found possible to record the rapidly fluctuating changes due to war conditions.

L. D. 8.

November, 1943.

SUGGESTIONS FOR FURTHER READING

APART from official reports, there is not a great deal of accessible geographical literature on Africa in the English language. The lack of an advanced text-book has just (summer, 1931) been remedied by W. Fitzgerald's *Africa* (Methuen, 16s.), which contains a good bibliography. The latest information concerning the general development of all the African territories (*i.e.* agriculture, industries, communications, trade, etc.) will be found in the reports of the *Department of Overseas Trade*, which are issued at irregular intervals. For certain of the British territories, the *Colonial Reports* (Annual) are often very helpful, whilst most of these territories issue an annual Handbook summarising all the essential facts and figures. Such are the Handbooks of the Union of South Africa, Nigeria, Gold Coast, Tanganyika (1930 only), etc. For the French territories, several good colonial geographies (in French) are available: *L'Afrique Equatoriale Francaise*, by G. Bruel (Paris, 1930); *L'Afrique Occidentale Francaise*, by C. Guy (Paris, 1929); *L'Algerie*, by A. Bernard (Paris, 1931); *Le Maroc*, by J. Celerier (Paris, 1931). *L'Afrique Noire*, by J. Weulersse (Paris, 1935), covers the whole of the continent. An excellent geography of Belgian Congo and Angola, published whilst the present volume was in the press, is M. Robert's *L'Afrique Centrale* (Paris, 1934). On Egypt and the Nile, a mine of information, with good maps and pictures, is *The Nile Basin, Vol. I*, by H. E. Hurst and P. Phillips (Cairo, 1931). A popular but illuminating description of parts of East Africa will be found in J. Huxley's *Africa View* (Chatto and Windus, 1931).

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AFRICA

SECTION I

GENERAL CONSIDERATIONS

Position and Size.—With an area of 11,000,000 square miles, Africa is the second largest continent, being next in size to Asia. Although occupying three times the area of Europe, Africa has only 19,000 miles of coastline—less than that of Europe. Much of

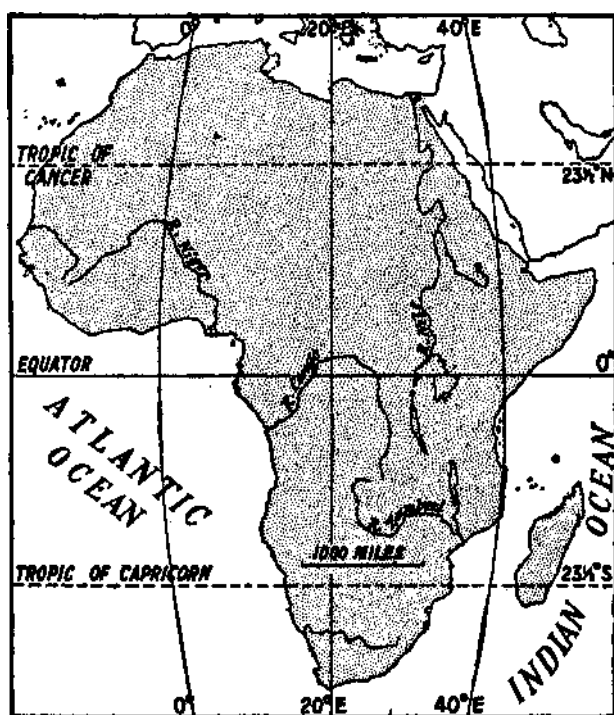


FIG. 1.—The position and size of Africa.

the continent is far from the ocean, for there are few deep bays or gulfs. Africa is the only continent which is almost cut in half by the equator. Rather more lies to the north of the equator **than to the south**, but the north **and** south coasts are almost **exactly**

equal distances (35°) from the equator. The position of the two Tropics and of the meridian of 20° E. should be noted.

Structure and Physiography.—Except for the Atlas region of the north-west, which really belongs to the European Alpine system of folded mountains, the whole of Africa is occupied by a plateau with only a narrow coastal plain separating the plateau from the encircling oceans. This plateau is composed for the most part of very ancient rocks—Archaean and early Palaeozoic. At a remote period of the earth's history it probably formed part of the great continent known as "Gondwanaland," of which the Deccan of India and the Brazilian Plateau are also remnants. It has remained above the level of the sea for an immense period of time, and thus only around its edges are deposits of Mesozoic and later ages, formed during periods of slight subsidence, to be found. Such deposits, very different from the hard sandstones and crystalline rocks of the plateau, are of especial importance on the east coast of Tanganyika and Portuguese East Africa, on the west coast from the Niger to Angola, and from Gambia to the Atlas, in a wide zone along the Mediterranean coast and also in South Africa.

The main mass of the continent has been subjected to sub-aerial erosion for so long a period that the surface of the plateau in the interior approximates to a peneplain, with only the harder rock masses standing out above the general level. In many areas the "solid" rocks are masked by accumulations of wind-blown sand and water-borne silt, as in the Sahara Desert and in the many swamp-lakes of the Kalahari. But the last uplift of the continent, which brought the newer rocks of the coastal region above the level of the sea, is so comparatively recent that the African rivers have not had time to grade their courses. Falls or cataracts occur where the streams descend from the hard rocks of the plateau to the narrow coastal plain, and the process of river-capture by energetic coastal streams has had considerable effect, in numerous areas, on the direction of the main drainage and on the size of some of the great inland lakes, many of which, like Ngami, Makarikari and Chad, are in process of drying up. The topography of the plateau edge, in other words, is "immature."

As Fig. 2 shows, the African Plateau is higher in the south than in the north. The higher portion of the plateau stretches nearly as far north as the equator, and is then deeply cut into by the basins of the Congo, Nile and Lake Chad, so that the high plateau, as it were, sends branches northwards, separating the river basins. The eastern limb is the broadest, and in many ways the most interesting. Here tensile stresses in the earth's crust have resulted in the formation of a series of rift valleys, and the outpouring of floods of volcanic material (*cf.* Fig. 74, p. 149). The western branch of the rift-valley system extends from south of Lake Nyasa, through

Lakes Tanganyika, Edward and Albert to the Upper Nile; the eastern branch, which is less continuous, is traceable from the northern end of Lake Nyasa to Lake Rudolf and across to the southern end of the Red Sea, which it follows into the Jordan Valley of Palestine. The faulting in the eastern branch has been associated with the formation of the volcanic highlands of Kenya, culminating in the huge cones of Kilimanjaro, Kenya and Elgon, and of the dissected basalt plateau of Abyssinia and Eritrea. The

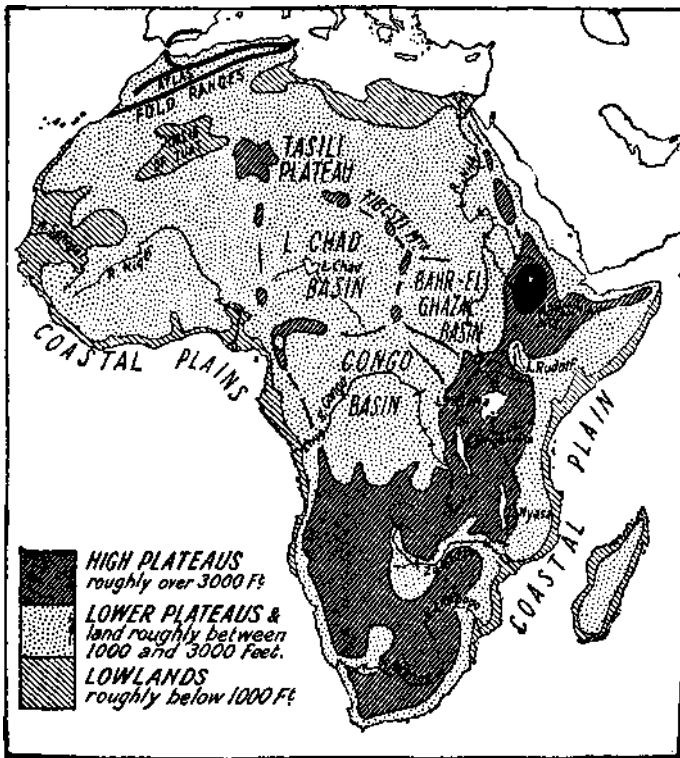


FIG. 2.—The main physical features of Africa.

large basin of Lake Victoria is merely a sag in the plateau surface, unconnected with the rift-valley system.

The central limb of the high plateau trends north-westwards across the Sahara as the Tibesti and Tassili Plateaus, the elevation of which is due to the resistance of the granitic rocks which compose them. The western limb follows the trend of the west coast round the Gulf of Guinea, forming the mountains of Cameroon and the interior highlands of West Africa, which, like the Saharan plateaus, are also largely made up of ancient crystalline rock. The volcanic

masses of Darfur in the central limb, and of Cameroon peak in the western limb, are witnesses of the same stresses that caused the rifting and vulcanism of East Africa.

Drainage.—The drainage system of Africa is a reflection of its plateau character. A third of the continent has no outlet to the sea at all. The largest inland drainage area comprises the greater part of the Saharan and Libyan Deserts together with the basin of Lake Chad; other areas are the eastern Kalahari, draining into Lake Ngami and the Etosha Pan, and a long section, centred on Lake Rudolf, of the eastern branch of the rift valley system. The rivers, apart from those flowing into the inland basins, are of two kinds :

(a) Many short streams flow swiftly down from the edges of the plateau ; these, owing to the heavy rainfall over much of the coastal highland, are rapidly eating their way back into the plateau and capturing the waters of some of the larger streams and inland basins. Thus the Niger is continually losing ground to the Senegal and other West African streams ; the Chad Basin and the Middle Congo are losing to the more powerful Benue and Ogowe rivers, which are fed from the highlands of Cameroon and Gaboon ; and the streams flowing eastwards from the Drakensberg are engaged in capturing the headwaters of the Orange and the Vaal.

(6) The major rivers of the continent, which have long courses from the interior to the coast, are usually characterised by the existence of a long navigable upper course on the surface of the plateau, followed by a swift descent, in a series of rapids and waterfalls, to the coastal plain. The bars across the rivers in Fig. 2 indicate the position of the principal rapids or falls. Thus few African rivers, either long or short, are navigable far inland from the coast, and this was one of the factors which hindered the exploration of the erstwhile " Dark Continent." The discovery of the navigable upper courses has facilitated later exploration and development. In some cases the falls and rapids are more widely separated, and the rivers descend from the plateau in a series of steps. This is particularly the case with the Nile.

The most important rivers of Africa are the Nile, which flows northwards into the Mediterranean Sea ; the Senegal, Niger, Congo and Orange draining into the Atlantic Ocean; and the Limpopo and Zambesi flowing into the Indian Ocean.

Climate.—The climates of any continent are a result of the combination of a number of physical phenomena, chief amongst which are atmospheric pressure systems and their resulting winds, the space-relationships of the land mass with the oceans and other land masses, the ocean currents which wash the shores, and the detailed physique of the continent.

Africa is characterised by the absence of those great relief barriers which play so large a part in the climate of the other continents. It is true that the outward-facing edges of the plateau are so disposed, if wind conditions are favourable, to attract a large rainfall, but they do not greatly hinder the inland spread of oceanic air and moisture. One very marked effect of the physique of the continent, however, is the modification of temperature produced by altitude—an amelioration of tropical conditions which frequently renders white settlement possible (Figs. 3 and 5).

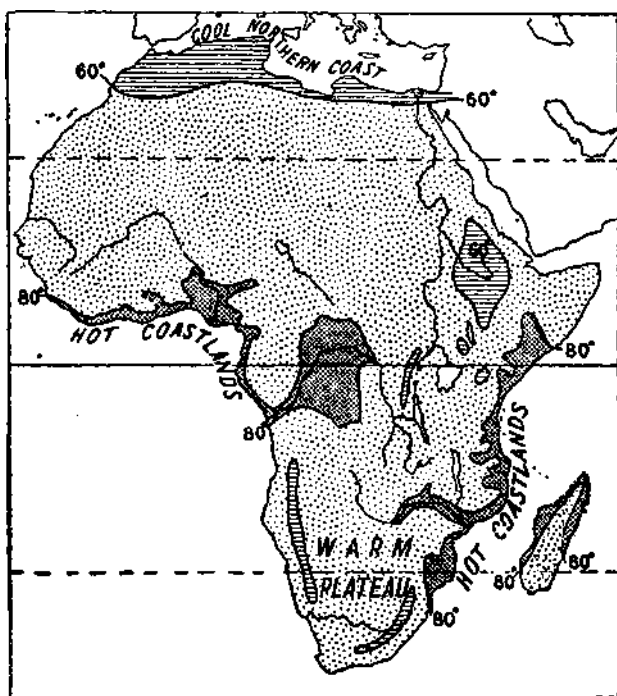


FIG. 3.—Climate : average surface temperatures in January.

Ocean currents exert considerable modifying effects upon the climate of parts of the African coast. On the west coast, the warm waters of the Gulf of Guinea can clearly exert little influence upon the already overheated equatorial coastlands ; but south and north of this region are two cool currents which are partly responsible for the existence of the coastal deserts of Mauritania and South-West Africa. The Canaries current is traceable from the Straits of Gibraltar to Cape Verde, flowing southwards. The temperature over the coast is sensibly lowered, fogs are frequent, and any on-shore breezes are blowing from the cold sea to the heated land, and thus drop no moisture. The Benguela current, flowing northwards

from Cape Town to the Congo mouth, exercises a similar influence over the climate of the south-west coast. In contrast with these cool currents, the coast of East and South-East Africa is washed by warm water from the equatorial currents of the Indian Ocean - the Mozambique current—and the warming effect is especially marked at those seasons when the prevailing winds blow from the north-east, i.e. over the warm water towards the land.

The main outlines of the climate of Africa are determined ultimately by the apparent movement of the overhead sun, which controls the relative positions of the permanent or oceanic, and fluctuating or continental, pressure belts. The "permanent" belts, which oscillate within only narrow limits, lagging considerably behind the overhead sun, are the high pressures of the North Atlantic (the Azores High), the South Atlantic, and South Indian Oceans. The fluctuating pressure systems are to be found occupying the two great bulges of the African continent north and south of the equator. In January, the relative coolness of northern Africa induces a high average pressure, whilst over southern Africa the heat derived from the overhead sun induces low pressure; in July these conditions are reversed. An additional complication is introduced by the extension of the great Asiatic monsoon over part of eastern Africa during the middle months of the year.

These pressure systems give rise to certain movements of air which are chiefly responsible for the distribution of rainfall over the continent. These air-streams are as follows :

(a) The Atlantic north-east Trade, blowing outwards from the Azores high-pressure system and its continuation over the Mediterranean or the Sahara. Over the Sahara these winds are known as the "Harmattan."

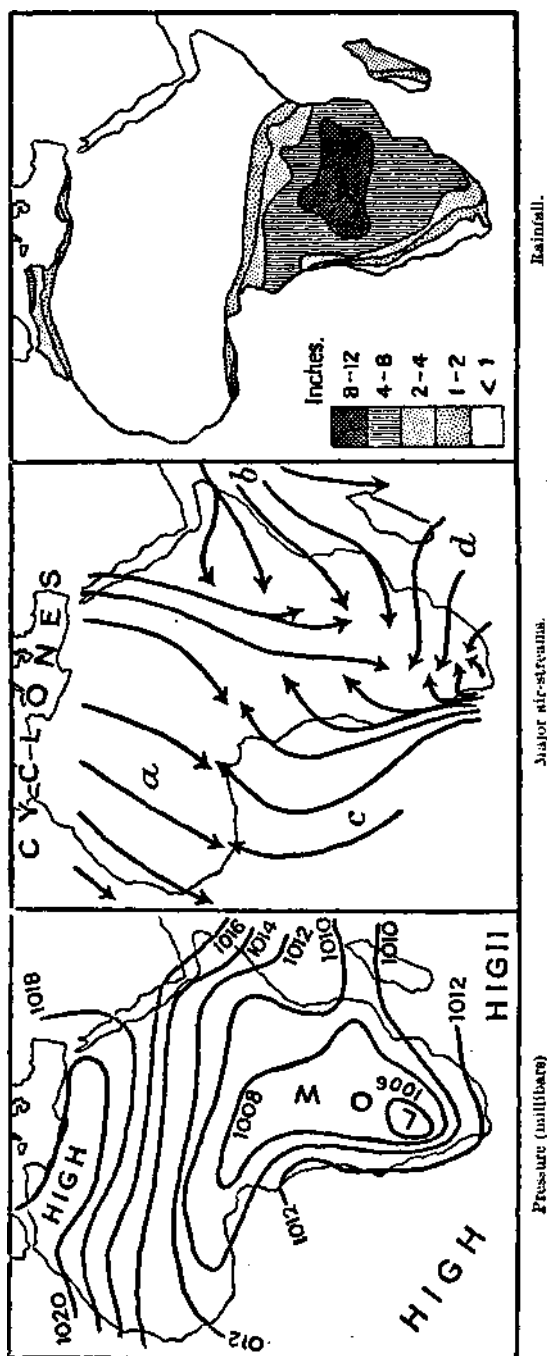
(b) The Arabian north-east Trade, blowing outwards from the high-pressure area of south-west Asia, over the Arabian Sea to East Africa. This system is completely obliterated during the northern summer by the monsoon.

(c) The Atlantic south-east Trade, blowing from the south Atlantic high-pressure region towards the equatorial low pressure. This air-stream is diverted on crossing the equator, becoming south-westerly.

(d) The Indian Ocean south-east Trade, blowing in response to the high pressure over that ocean, and crossing south-eastern Africa.

(e) and (f) The "westerly" winds of the cyclonic belt, affecting the extreme north and south of the continent only, of course at opposite seasons of the year.

It will be observed that all these air-streams are the result of major oceanic pressure systems. The important modifications introduced by the alternating high and low pressures of the continental mass are concerned mainly with differences in the relative



position of the air-streams, and the degree to which they penetrate the interior of the continent.

The conditions prevailing in January, during the middle of the northern winter, may be studied in Figs. 3 and 4. The oceanic pressure systems are now at their farthest north, and the Azores anticyclone sends a long tongue eastwards over North Africa, which except for a belt of lower pressure over the Mediterranean, is continuous with the main winter high-pressure belt of Asia. The summer heat of southern Africa results in the formation over that portion of the continent of a low-pressure area, which separates the two oceanic high-pressure areas on either side, and causes vital modifications in the wind systems.

The Mediterranean coastlands lie on the edge of the cyclonic belt, and so receive intermittent rains during the passage of depressions. The wind system (*a*) penetrates almost as far as the Guinea coastlands, but its eastern sector, blowing over Egypt, continues to flow southwards right into the heart of the South African low-pressure system. All this air is, of course, dry. The other air-streams all show, by their directions, the "pull" exercised by the southern low-pressure system. Thus (*6*), the Arabian north-east Trade, is drawn in across East Africa and drops much moisture in the interior, where it meets and rises over the Egyptian air-stream. The Indian south-east Trade (*d*) becomes an easterly wind over South Africa, and the Atlantic south-east Trade (*c*) is drawn in across the coast all the way from Cape Colony to Liberia, and again much rain ensues from the meeting of this air-stream and others in the interior. A remarkable feature about the rainfall of this season is that, despite the dominant on-shore direction of the winds, it is not generally greatest in the coastal areas, but in the interior (the Atlas lands, of course, excepted). This is partly due to the absence of coastal mountains, and partly to the fact that much of the actual precipitation is the result of the meeting of air-currents of different densities and temperatures. When such convergences occur, one current rides over the other, cools in the process and drops its moisture. A considerable amount of the rainfall, too, is of convectional origin, the result of local inequalities of heating, and the overturning of hot and cold air-masses.

Figs. 5 and 6 show the conditions prevailing in July, the middle of the northern summer. Pressure is now lowest over the Sahara, the Asiatic low-pressure area sending out a tongue in a westerly direction. The heat of the low-lying Congo Basin is responsible for a large southward bulge in this low-pressure system, from which pressure rises gradually to the South African anticyclone. A curious, and as yet not fully explained, area of high pressure exists over Abyssinia.

The most obvious effect of the Saharan low-pressure area is the

formation of a " monsoon " over West Africa. The South Atlantic south-east Trades are drawn across the equator and penetrate for a considerable distance, as south-westerly winds, into the heart of the Sudan, bringing exceptionally heavy rainfall to the south-west of West Africa and to the Nigeria-Cameroons region. The curious region of less rainfall along the Gold Coast is apparently due to the existence off that shore of a body of cold up-welling water, above which a mass of cool dense air accumulates, acting as a barrier to the warm oceanic winds. In the Sahara at this period most of the rainfall comes from violent tornadoes, the result of the meeting of

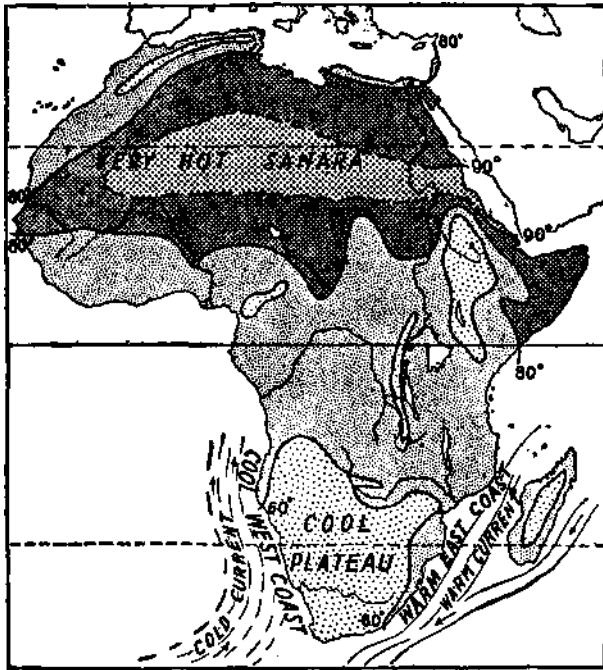


Fig. 5.—Climate : average surface temperatures in July.

the monsoon and Harmattan air-streams. The combined effect of the Congo low-pressure, the Abyssinian high-pressure, and the Asiatic monsoon is to give a complex wind movement and rainfall distribution over eastern Africa. The convergence of three air-streams, the diverted Atlantic south-east Trade, the Indian south-east Trade, and the Arabian Sea monsoon, upon the Abyssinian region results in a heavy rainfall over that area, which ceases almost suddenly near the Red Sea as soon as the influence of the dry Egyptian air-stream is felt. The drought of the Somali coast appears to be due to the winds blowing parallel to the shore, and

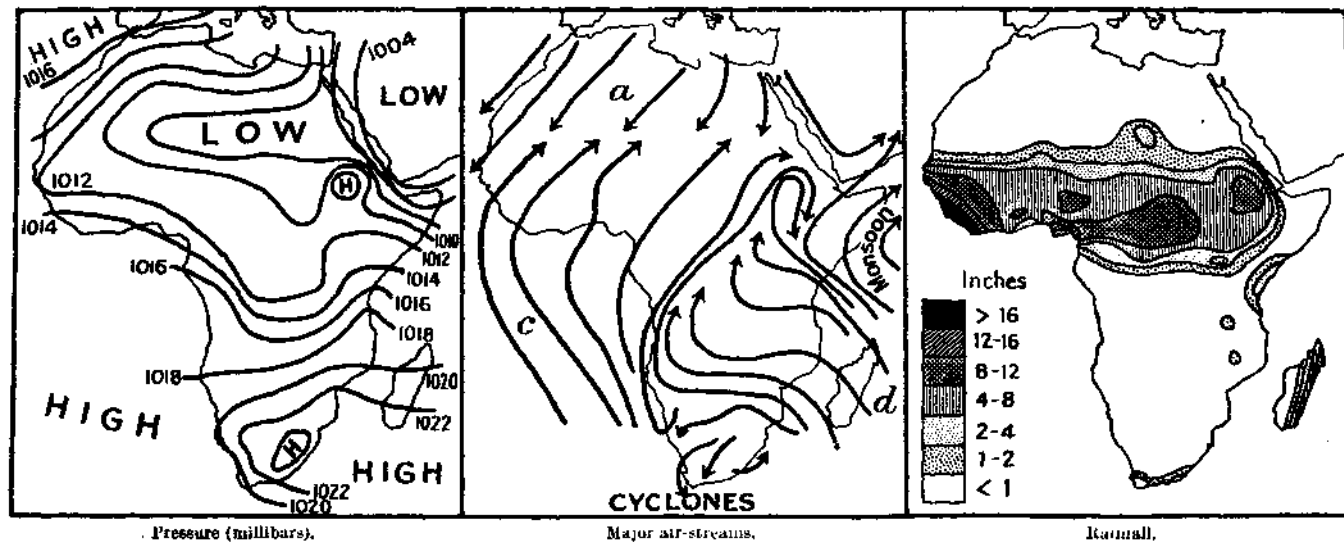


FIG. 6.—Climatic phenomena in July (after Brooks and Mirrlees).

the dryness of much of the east coast may be partly the "rain-shadow" effect produced by the island of Madagascar—which receives a very heavy rainfall on its eastern side—and partly due to the fact that the air-streams are here divergent—part of the air being drawn towards the north by the Congo low-pressure, and part towards the south under the influence of the South African high-

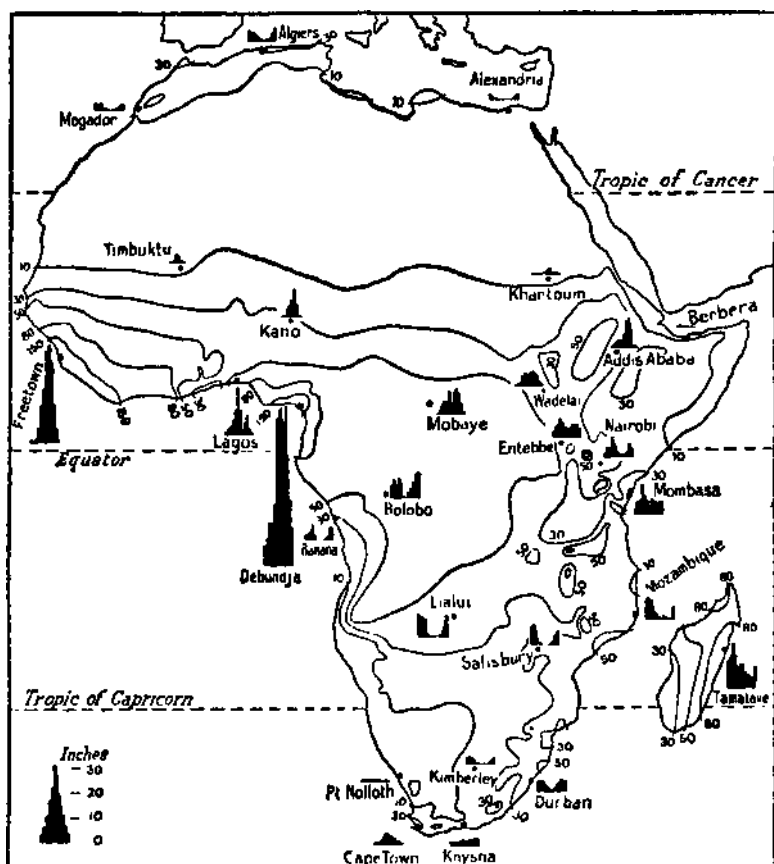


FIG. 7.—Mean annual isohyets (after J. B. Kincer) and graphs of monthly rainfall. Compare carefully with Fig. 8.

pressure system. The extreme south coast receives rain from occasional depressions which pass eastwards on the edge of the South Atlantic belt of "roaring forties."

The combined effect upon the rainfall of these two extreme seasonal pressure distributions, and of the intermediate transitional periods, is seen in Fig. 7, which shows mean annual isohyets and graphs of the rainfall regime of representative places in different

parts of the continent. These graphs should be carefully studied, for they form a basis upon which Africa can be divided into climatic regions.

Following the usual nomenclature for climatic regions, Fig. 8 shows a simple division of the African continent. These broad divisions are based upon considerations of temperature, total rainfall and rainfall regime.

The Equatorial Climate is found along the coast of West Africa, over

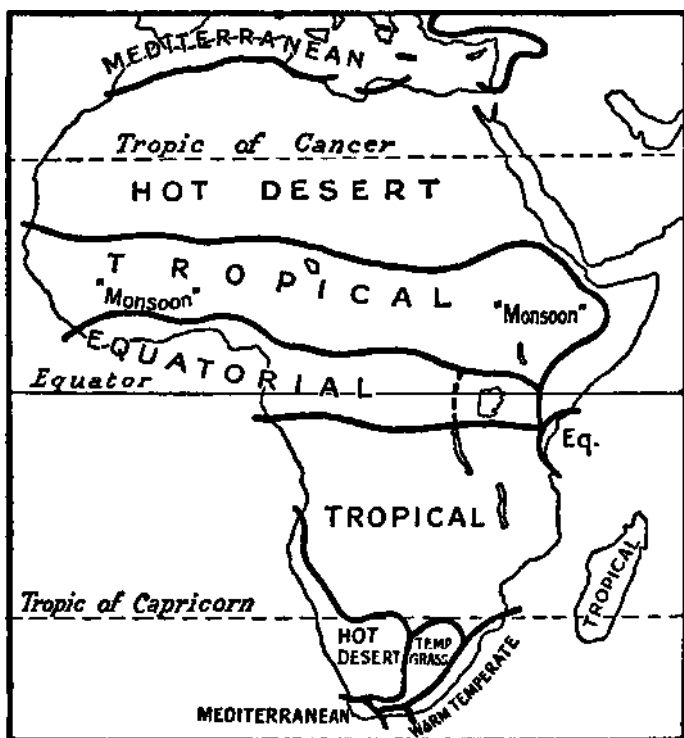


FIG. 8.—Division of Africa into broad climatic regions.
Compare with Figs. 7 and 9.

much of the Congo Basin, in the Kenya-Uganda highlands (modified), and along a small part of the east coast. It is characterised by constant high temperatures (annual average at sea-level 75° to 80° F. with a range seldom greater than about 6°), a heavy rainfall, and high humidity. In West Africa the rainfall is greatest during the northern summer when the monsoon is at its height, but two distinct maxima are apparent at the periods of the overhead sun. On the East African coast there is also a tendency for two rainy seasons to occur, separated by a short drier period about the middle of the

year. In the East African highlands conditions are complicated by the existence of mountainous topography in equatorial latitudes, and by the position of the area on the edge of several air-streams. But the rainfall regime is still equatorial in type and the temperature range is small (e.g. Nairobi, 58° to 65° F.).

The Tropical Climate, in various forms, occurs over a broad zone north and south of the Central African belt of equatorial climate. On the whole it shows a marked dry season during the cooler half of the year, and, in general, the rainfall decreases and the length of the dry season increases as one goes north and south of the equatorial belt.

The Hot Desert Climate occurs over a large area in northern Africa between the tropical belt and the Mediterranean coastlands, over the eastern horn of the continent, and in the south-west between the tropical zone and the "Mediterranean" fringe of the Cape. Both the Sahara and the Kalahari Deserts are straddled across the Tropics. Rainfall is very scanty, and falls mainly in thunder showers during the hottest part of the year. The range of temperature, especially between day and night, is considerable, clear skies and a virtual absence of vegetative covering being conducive to quick heating and quick radiation. The position of northern Africa with regard to the Asiatic land mass results in the coast-to-coast extent of the desert. In South Africa, the smaller width of the continent, and the vast expanse of ocean lying to the east, allow a belt of warm temperate climate to exist in the south-east. The desert of Somaliland is largely due to the prevailing winds for most of the year being parallel to the coast—north-east in the cooler season, south-west during the summer monsoon season.

The Warm Temperate type of climate is found on the south-east coastal belt, south of the Tropic of Capricorn. In common with regions of this type elsewhere in the world, it receives a fairly heavy trade-wind rainfall during the hot season. The counterpart of this region in the interior, where the average 3,000-foot elevation of the plateau considerably reduces the temperature, can be classified as the *Temperate Grassland* type, although it is in much lower latitudes than most of the areas so classified in other parts of the world. The rainfall regime resembles that of the coastal belt, but the amount decreases fairly rapidly towards the western semi-deserts.

The Mediterranean climatic type occurs on the Mediterranean coastlands and the northern slopes of the Atlas Mountains. It is characterised by winter cyclonic rainfall and an almost complete summer drought, the length of which increases rapidly as one proceeds eastwards from Tunis. The Atlas Mountains are high enough to attract occasional summer storms, but beyond their summits on the south the climate quickly approaches that of

the hot desert. The extreme south-western corner of Africa also experiences conditions akin to those of the Mediterranean as regards temperature and rainfall regime. The area having a real summer drought is very limited, however, and the south coast of the continent, experiencing a very even rainfall regime, deserves to be classified as a warm variety of the *Temperate Forest* type of climate.

Natural Vegetation.—The natural vegetation of Africa is in the main a reflection of the simple climatic division outlined above. It varies from absolute desert to luxuriant rain-forest, and in general is dependent upon the amount and seasonal distribution of the rainfall. In certain areas, however, altitude exercises an important control. Broadly speaking, it may be said that the "equatorial" type of climate corresponds to dense rain-forest, the "tropical" type to various forms of savana, the "warm temperate" type to forests, less dense and of a different type from the equatorial forests, and the other climatic types to the characteristic vegetation with which they are always associated—desert, temperate grassland and "Mediterranean." Superimposed upon this simple division we have the mountain vegetation belts of the East African and Abyssinian highlands and of the Atlas Mountains (Fig. 9).

The Equatorial Rain-Forest occurs along the west coast from Sierra Leone to the Congo mouth, and extends eastwards in a broad zone over much of the Congo Basin. A forest zone of similar type occurs on the windward (eastern) slopes of the mountainous Lackbone of Madagascar. The climate, lacking any marked period of drought (total rainfall over 60 inches) and characterised by evenness of temperature, allows of no seasonal period of rest for plants, and in consequence the dominant vegetation is a jungle of large trees, often with dense undergrowth inextricably intertwined by epiphytes and lianes, all at different stages in their reproductive cycle. On its outer edges, where the total rainfall decreases (about 35 to 60 inches, with three to four months' drought) and the seasonal distribution becomes more marked, that is, where the equatorial climatic type merges into the tropical, the forest decreases in density and gives place to high savana with deciduous trees.

The Savanas of Africa cover an enormous area—over 40 per cent. of the whole continent—and show great variety. They are all characterised, however, owing to the marked period of drought which coincides with the cool season, by the dominance of annual grasses, with trees occurring sporadically, either scattered or in clumps in the wetter parts, especially along the watercourses. With decreased water-supply, and a longer rainless period, the grasses become drier and less luxuriant, and the trees' fewer and of drought-resisting species. The *High Havana* referred to above occurs in a broad belt on the northern margin of the equatorial forests from Gambia to Uganda, and in a wide zone south of the forests in Belgian

Congo and Angola. East of the forests it is replaced by the mountain vegetation of the highlands bordering the Rift Valleys. It is composed of an open woodland with a ground vegetation of tall grasses, which grow rapidly at the beginning of the rainy season, and dry off and are usually burnt down naturally during the period of drought. With fewer trees, either in clumps or singly, the landscape becomes park-like in character.

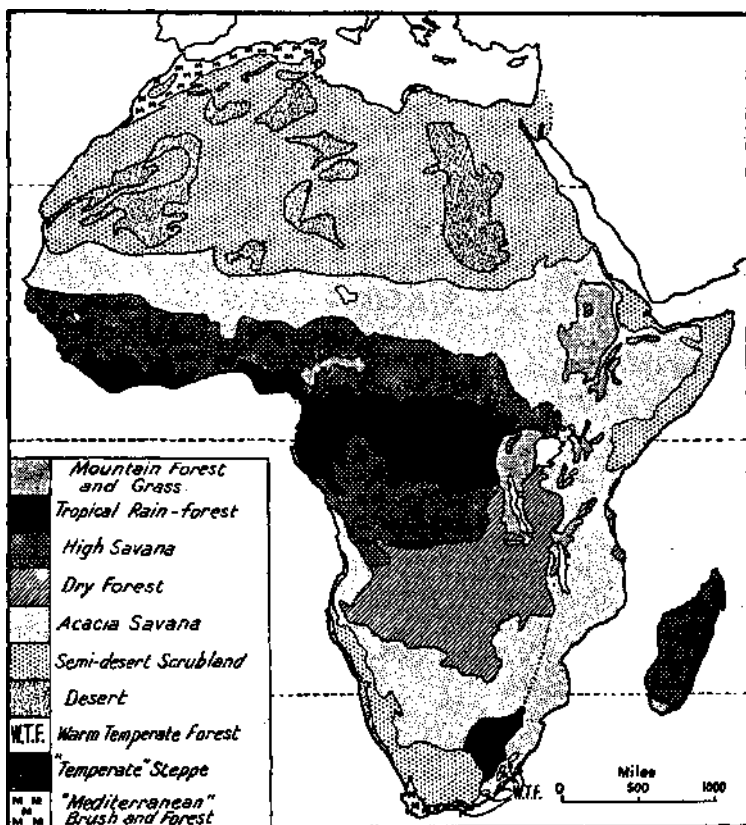


FIG. 9.—Vegetation of Africa (simplified from Shantz and Marbut).

The dotted line in the south-east divides the plateau from the coastal lowlands.

South and south-east of the southern zone of high savana is a broad zone, having a rainfall of between 30 and 40 inches and a four to six months' drought, extending through Angola and Northern Rhodesia to western Tanganyika, with a southern lobe stretching into Bechuanaland. Here the savana takes on the form of a *Dry Forest*, characterised by an abundance of small flat-topped trees in an open, park-like growth, with a floor covering of relatively tall grasses.

Beyond the great area occupied by all these vegetation regions occur a series of drier savanas, which merge gradually into the semi-deserts of the Sahara and Kalahari. The rainfall in these regions is light, ranging from 10 to 30 inches, and the long dry period is from five to eight months in length. This *Dry or Low Sabana* extends from Senegal to Somaliland, and from South-West Africa to Kenya. The grasses are from three to five feet high, and often quite luxuriant, and the trees are scattered and often fiat-topped and thorny. The acacia is the most widely-distributed genus of tree, and we might almost call this a zone of acacia-savana. With decreasing rainfall the trees become smaller and thorny and the grass drier, coarser and more tufty, leaving much bare soil; and in parts of East and South Africa the trees cease entirely, leaving only open grassland.

The Semi-Deserts.—With decreasing rainfall and a lengthening dry period, the savanas merge gradually into semi-desert, and finally into absolute desert. The semi-deserts assume a great variety of forms. In the wetter parts both shrubs and tufty grasses may be present, but with a smaller water supply the soil is mostly bare, and the only vegetation consists of scattered woody plants, like the "Karoo bush," or "succulents" (*i.e.* fleshy, water-storing plants) such as cacti. For the greater part of the year the vegetation, dominantly dark green, grey or brown in colour, looks all but dead, but after rain the plants and grasses will burst forth into new growth, and millions of wind-borne seeds will germinate and hurry through their life-cycle. Semi-desert vegetation of varying richness is found over an enormous area in northern Africa between the savanas of the Sudan and the Mediterranean coastlands, and it extends round the "horn" of the continent through Eritrea to the Somali coast and into Kenya. In southern Africa it is found in a narrow band between the dry savanas and the western coastal desert, and over the Karroo Plateau.

Deserts.—Absolute desert, a waste of sand, rock or soil, almost entirely devoid of vegetation except after one of the rare showers of rain, is confined to certain parts of the Sahara—where even camels cannot journey without carrying food and water supply—and to the coast of South-West Africa, called the Namib.

We have now traced the more or less symmetrical succession of vegetation belts from the equatorial rain-forest to the hot deserts. There remain for consideration the northern and southern marginal zones and the vegetation of the equatorial highlands.

Warm Temperate Forest.—The area occupied by these forests is quite small. The warmth derived from the Mozambique current and the Trade Wind rainfall are responsible for the existence of the "palm-belt" of Natal, which consists of coastal forests of distinctly tropical character, with palms, bananas and stinkwood (a species

of laurel), and lianes and epiphytes. At greater altitudes on the slopes of the Drakensberg, and in the centre of the south coast where the rainfall regime is very even (*cf.* Fig. 7), occur patches of forest more definitely allied to those of temperate latitudes, with deciduous and coniferous trees.

Landward of the region where the warm-temperate forests occur, in southern Transvaal and the Orange Free State, is an area which might have been considered as a variety of savana, but which, from its distinct resemblance to the drier parts of the North American prairies, can better be classed as "*Temperate*" *Grassland*. Although only just outside the tropics (lat. 26° to 32° S.), the elevation of the plateau (more than 3,000 feet, with parts over 6,000 feet) considerably reduces temperature, and the winter drought, from four to six months in length, hinders tree growth. The grasses form a continuous cover (contrast the dry savana) about three feet high. This area is known as the "High Veld," but it should be remembered that the term "veld" is applied in South Africa to many different kinds of vegetation and has no scientific significance.

Mediterranean.—The vegetation of the Atlas lands and the Cape region exhibits much variety, but the characteristic of drought-resistance is always present. On the slopes of the Atlas Mountains open forests of cedar and cork-oak are found. The most widespread type, however, is the "maquis," or temperate brush, consisting of a relatively luxuriant growth of bushes and small trees, such as the olive. In drier parts, such as sheltered valleys (*e.g.* the Plateau of the Shotts) grass predominates over stunted palms and bushes. The region of the Cape, where the summer drought is not so pronounced as in the Atlas lands, possesses a flora of great richness.

Mountain Vegetation.—The highlands of East Africa and Abyssinia, straddled across the equator, have a series of vegetation zones on their slopes, and variation in rainfall, temperature (*i.e.* altitude) and aspect combine to produce an immense variety of form in both forests and grassland. The forests are on the whole warm temperate in type, but are usually far denser even than the equatorial rain-forests, and contain a vast number of species of trees, epiphytes and climbing plants. In the drier parts, where the forest merges into some form of savana, open woodlands with cedar and wild olive occur; in wetter parts, dense jungles characterised by the abundance of the banana; at higher altitudes, cedar and podocarp (or yellowwood) predominate; whilst the upper edges of the forest belt may show dense thickets of bamboo. The densest forests lie between about 7,000 and 9,000 feet above sea-level. Over large areas, too, grasslands occur. A continuous cover two or three feet in height prevails, which, unlike the savana grasses, is green for most or all of the year. These mountain grasslands are the vital

parts of East Africa, the parts where agriculture can best be carried on, and where Europeans may dwell.

Forestry.—Forests, including the more densely-wooded portions of the savana lands, cover 12·6 per cent, of the surface of Africa. Nearly a half of this area (48 per cent.) comprises the dense forests of the equatorial zone, almost another half consists of the more open woodlands of the " Dry Forest " belt and other portions of the savanas, whilst the remaining 4 per cent. represents the temperate forests of the mountainous areas of eastern Africa and the extreme south, and the woodlands of the " Mediterranean " regions. Despite the existence of over a million square miles of forests, however, Africa as a whole exports but little timber ; many of the countries are not self-sufficing, and South Africa in particular imports large quantities. Except for some exploitation of the equatorial forests of West Africa for mahogany and other cabinet woods, there has been very little development of the timber resources, and the importance of the forest areas has lain rather in what might be termed by-products, such as palm-oil, rubber, gums, cork and dyes, and with cultivated tree-crops such as cacao and coffee. Africa labours under numerous disadvantages as a timber-producing region. The chief of these is the high cost of production and transport. Vast areas of valuable forest are not only hundreds of miles from the coast, but also far removed from any reasonable medium of transport, and rail charges on such a bulky commodity are high. The cost of logging is greatly increased, particularly in the tropical forests, by the large number of species of trees per acre, and the difficulty of getting large trees out of the jungle. Then, too, the comparatively recent opening-up of the continent has not allowed time for the qualities and properties of the vast array of tropical timbers to be properly examined, and it is difficult for unknown and untried woods to enter a market almost monopolised by such favourably situated producing areas as the West Indies and Central America. Finally, it must be remembered that tropical hardwoods, which make up the bulk of Africa's resources, only represent 2 per cent. of the world's trade in timber (the remaining 98 per cent. being made up by softwoods, mainly from the " Temperate Coniferous " zone—80 per cent., and temperate hardwoods from the " Temperate Deciduous " belt—18 per cent.).

(a) *Equatorial Forests.*—The most valuable timbers in these forests are mahogany and numerous other cabinet woods such as (bony, satinwood and rosewood. Just as, to the road engineer, all crystalline rocks are known as " granite," whatever their true geological name, so the hard, red wood of many different species of African trees is known commercially as mahogany. These valuable furniture woods are bulky and heavy, and are obtained chiefly from areas near to rivers on which the logs can be floated. The

coastal plain of West Africa, and the French portion of the lower Congo region, are the chief exploited areas, Gabon, Nigeria, the Gold Coast and the Ivory Coast being the countries concerned.

Mention may here be made of the economic importance of the narrow mangrove belt which fringes most of the estuaries and coastal swamps of West Africa, from Gambia to the Congo mouth, and of East Africa from Kenya to Natal. Mangroves only grow on the seashore within tidal limits, and they furnish two important products. Their timber is particularly hard and resistant to the attacks of ants and boring sea creatures, and so is sometimes employed in railway and harbour construction; and their bark can be used for the production of tanning material. Commercial production of mangrove poles and bark is almost confined to the east coast, Kenya and Portuguese East Africa conducting most of the industry and trade.

(6) *South African Forests*.—Less than 1 per cent, of the Union is forest-covered, and enormous quantities of European softwoods, and of Australian, American and West African hardwoods are imported. The Knysna area and a few others provide hardwoods from the ironwood, sneezewood and boxwood trees, and softwood from the yellowwood (*Podocarpus*) for local use, especially for the railways. Australian eucalyptus has been planted in many areas with great success. The bulk of the Union is, however, timberless.

(c) *East African Forests*.—Although not extensive in area (only about 2 per cent. of Kenya and Uganda are forested, and about 4 per cent, of Tanganyika) and lying far inland, the mountain forests of East Africa are locally valuable, especially near railway lines, for they produce fine timber and can be used for locomotive fuel. The camphor tree provides hardwood, and the coniferous cedar and podocarp are very useful constructional timbers, the former especially as being resistant to the ravages of ants. Distance from the coast must obviously prohibit any export of these timbers for a very long time to come.

(d) *Mediterranean Forests*.—About 5 per cent. of the French Atlas lands is forested, the principal trees being cork oak, Aleppo pine, cedar and juniper. There is comparatively little lumbering activity, however, and much constructional timber is imported. The outstanding product of the forest is cork—the bark of a species of oak tree—obviously of great value in a wine-making area such as the Mediterranean.

Agriculture—Native and Introduced.—The agricultural activities carried on in Africa to-day show a curious response to purely geographical conditions on the one hand, and to politico-economic influences on the other. Especially within the tropics, production for export is very localised, partly as a result of differences in political administration, and partly owing to the presence or

absence of railways, and large areas of potentially productive land are still almost unoccupied or are given over to shifting native agriculture. Maps of agricultural production thus tend to show concentration upon comparatively few areas, such as the extreme south and south-east, the East African highlands, parts of West Africa, the Nile Valley, and the Mediterranean coastlands of the Atlas region.

We can consider the products of the land under five heads :

1. Products of the tropical forest zone, including " collected " products such as rubber and palm oil. tree-crops such as cacao and coffee, and cultivated plants such as rice.
2. Products of the savana lands, such as maize and cotton.
3. Mediterranean crops—vine and fruit, and including the temperate cereals, wheat and barley.
4. Products of the desert oases—the date palm.
5. Animals, such as cattle, sheep, goats and camels.

(1) *Tropical Products*.—The equatorial forests yield numerous products, apart from timber, which have entered world commerce. The *oil-palmy Elaeis guineensis*, bears a fruit which yields an oil largely used in the manufacture of soap, margarine and certain high explosives. The kernel of the fruit also yields an oil which can be used as a substitute for olive oil. The West African coastal zone, within about a hundred miles of the sea, is the principal producing area, and the palms flourish wherever the rainfall exceeds 60 inches and the drought period is short. From Southern Nigeria, Sierra Leone and Dahomey palm kernels and oil are the principal export; they play a much smaller part in the trade of the Gold Coast and Ivory Coast. Much damage has been done to this industry, however, by the primitive methods of production employed, which appreciably lower the quality of the oil and thus its market value. Severe competition from plantations in Malaya and the East Indies has arisen, and the Belgian Congo is also producing. Moreover, much labour has been withdrawn from the palm-oil industry in certain areas by the demands of the cacao plantations.*

Rubber has been obtained in large quantities in the past from the tree *Landolphia* and the vine *Funtumia*, and at one period the Congo Basin and the Amazon Basin between them produced the bulk of the world's supply of rubber. Over-tapping, however, often amounting to complete destruction of the trees, and the competition of Asiatic plantation rubber have combined to depress the industry considerably. In the Congo Basin little is now collected and in West Africa the development of the plantations has greatly reduced the available labour supply. The export of wild rubber has now practically ceased, the world over-production of plantation rubber having rendered it uneconomic ; the output of a

few plantations of Brazilian trees in the West African countries and in the Belgian Congo, however, enters into commerce.

Kola nuts, containing the drug caffeine, and so chewed as a stimulant, are obtained mainly from the western portion of the equatorial forests of West Africa. Sierra Leone and the Gold Coast are the chief producing countries, but the Ivory Coast, Nigeria, and Cameroons also deserve notice. The kola nut trees are found, and locally cultivated also, in the forest zone lying inland of the oil-palm belt. In the Gold Coast this zone coincides with the area of cacao plantations, though the kola tree, being more hardy, will grow under more severe climatic and soil conditions than cacao.

Gum copal (or simply "copal"), used in the manufacture of varnishes, and sometimes employed as a substitute for amber, is obtained from an equatorial forest tree, found most abundantly in the Belgian Congo, but produced also in West Africa and in the coastal forests of Tanganyika.

Bananas, although unimportant from the -commercial point of view, are in many areas of the tropical forests the staple food. Enormous quantities must be produced and consumed annually, but as the fruit does not enter into trade it is impossible to give any estimate. The banana plant also provides fibre, a fatty sap, and the material for making native beer, whilst its huge leaves are used as roofing material; indeed the importance of the banana in the native economy would be difficult to over-emphasize. Bananas are found and grown over most of the West African and Congo areas, and also in Uganda and Kenya around Lake Victoria, in the coastal regions of Kenya and Tanganyika, and in the "palm belt" of Mozambique and Natal.

Of the cultivated products as opposed to those obtained by "collecting" from the forest trees, the most important is *cocoa* (Fig. 10). Half a century ago, much of the world's cocoa came from the Portuguese islands of Sao Thome and Principe, and the Spanish island of Fernando Po, in the Gulf of Guinea. These islands, especially Sao Thome, still possess large areas of cacao plantations, but the very rapid extension of plantations in the Gold Coast and later in other West African territories, has reduced their quota almost to insignificance. The cacao tree is a rather delicate plant; high temperature and humidity for the greater part of the year are required, but the drier ripening period (November to January) (*cf.* Fig. 7) is an asset, for it prevents mould from attacking the harvested pods. Acid soils must be entirely avoided; for this reason much of Southern Nigeria can never grow cacao; and the soil must be maintained in a state of high fertility—failure to do this having been responsible for much reduction of yield in the Gold Coast. Cacao plantation in West Africa has attained its greatest development in the Gold Coast. Here, in a broad zone lying behind

the oil-palm belt, and covering much of the northern part of the Gold Coast Colony and the southern part of Ashanti, about one half of the world's cocoa is produced. Plantations are extending also in the south-western part of Nigeria and in the Ivory Coast; and certain areas in the lower Congo region of the Belgian Congo and the Kabinda region of Angola are being developed.

Another tropical tree or shrub, which is extensively cultivated, not so much within the equatorial forest zone, but rather in the regions of mountain forests is *coffee* (Fig. 10). A species of coffee

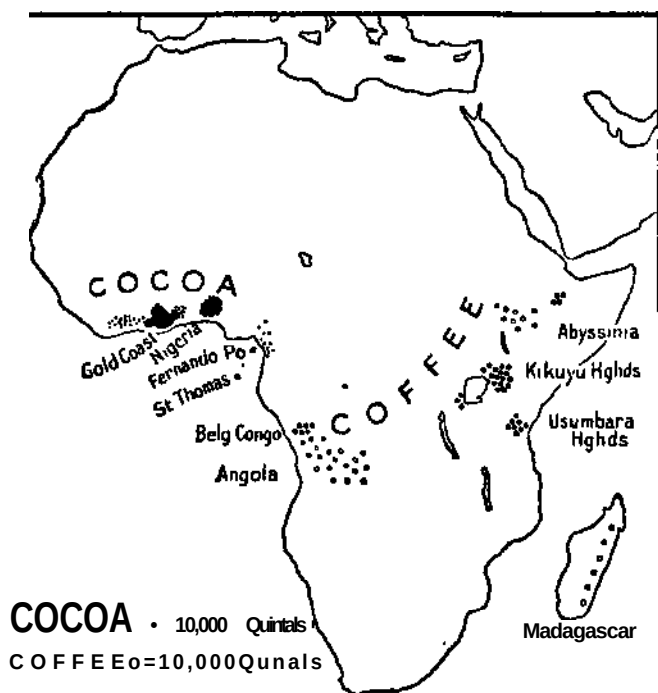
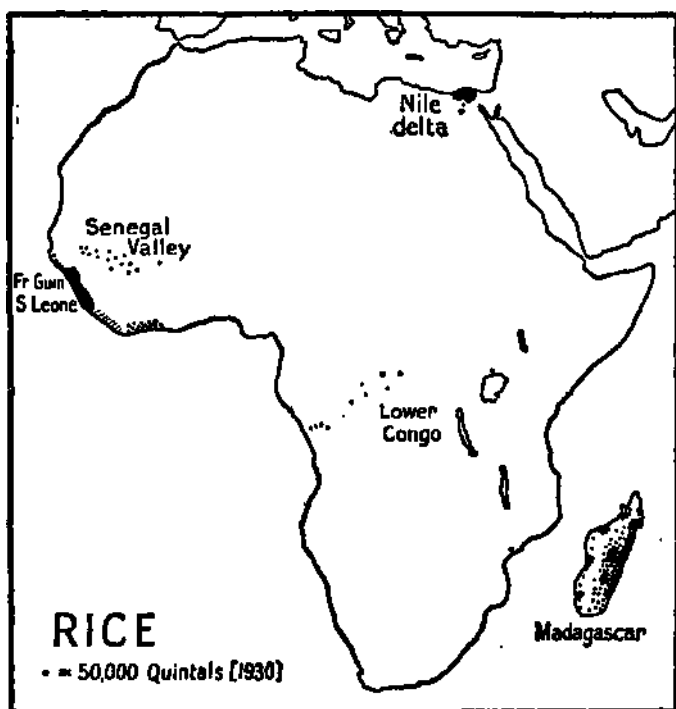


FIG. 10.—Distribution of cocoa and coffee

which can withstand equatorial heat and moisture is found growing wild in the forests of Liberia and in the Belgian Congo and Angola, but the principal cultivated varieties are better suited to cooler conditions. A rich, well-drained soil such as that found on the slopes of cleared forest land, is required ; protection from excessive sunlight is frequently afforded by planting some larger tree, such as the banana, and by pruning the coffee tree down to shrub-like proportions, about 8 feet in height. As considerable labour is required in the plantations, production is greatest in the more densely settled portions of the East African highlands. Much

wild coffee of the Arabian type is obtained in southern Abyssinia, but the chief plantations lie, usually at an elevation of 5,000-6,000 feet, in the Kikuyu highlands of Kenya and in eastern Uganda. Both natives and Europeans are engaged in the industry. Other coffee plantations flourish in the Usumbara highlands of Tanganyika Territory, in eastern Mozambique, and on the eastern slopes of the highlands of Madagascar. Plantations have also been established in northern Angola and in the Belgian lower Congo region.

An important cultivated plant in the tropical forest zone is



Fra. 11.—Distribution of rice.

rice (Fig. 11). Lowland or swamp rice is grown in the coastal deltas of western West Africa (Sierra Leone, French Guinea and Ivory Coast), of East Africa (Kenya and Tanganyika Territory), and of Madagascar, and in the swampy lowlands around Lake Victoria. Upland rice, however, is a product of the savana zone. It is grown in the western part of the Sudan, notably in floodable areas of the upper Senegal Basin, and in Madagascar. In addition, rice is grown under irrigation in the northern half of the Nile Delta.

(2) *Products of the Savana Lands.*—The trees of the savanas

yield two important products—gum arabic and shea nuts. *Gum arabic* is obtained by tapping from several species of acacia. It is found throughout the Sudanese savana zone, but production is almost confined to the two ends of this zone. The greater part of the output comes from the Kordofan region of the Anglo-Egyptian Sudan; at the western end Senegal also collects and exports a little. The *shea* tree is characteristic of the West African savanas, Northern Nigeria and the Northern Territories of the Gold Coast being the chief areas in which the collection of the nuts and the extraction of the oil are practised. A kind of butter (shea butter) is made from the oil.

The cultivated crops of the savana lands are, as one might expect, mainly shrubs like the cotton bush, small plants such as tobacco and the ground-nut, or grasses like maize and millet.

Although Africa contributes but little over 5 per cent, of the world's *cotton* crop, the cultivation of cotton has been steadily encouraged under British, French and Belgian guidance, and in addition to the long-famous Egyptian production, plantations of native and introduced varieties are now well established in a number of different regions within the savana zone, where the cotton plant, needing summer rainfall and a drier ripening period, is well suited to the climatic conditions (Fig. 12). The finest variety of cotton produced in Africa comes from the Nile Valley of Egypt. This is of long staple ($1\frac{1}{2}$ inches) and yields abundantly (about 450 lbs. per acre—*cf.* the American average of about 180 lbs.) under ideal temperature conditions and irrigation. The best quality of all, known as Sakellarides or Sakel, is grown in the delta region. In the Anglo-Egyptian Sudan, American varieties are grown in the floodable areas adjoining the Blue Nile and the White Nile, and Egyptian cotton in the Gezira, irrigated by perennial canals. More than half a million acres in eastern Uganda are planted with cotton, which provides the principal export, and great progress is being made in the savana regions of the Belgian Congo, north and south of the equatorial forests. In West Africa both native and American varieties are grown. The native cotton produces a rough, short-stapled lint, of little value to machine-spinners, but a long-stapled American variety has been acclimatised in several areas in both French and British territories. The floodable and irrigable areas of the upper Senegal basin form the most productive region, but Northern Nigeria is increasing its acreage in the area within reach of the railway. Cotton is also grown in parts of eastern Africa at intervals from Italian Somaliland, through Tanganyika to Mozambique, and numerous scattered plantations exist in Nyasaland, in Southern Rhodesia, and in Natal and the Transvaal; attempts are also being made to extend the cultivation of Egyptian cotton in Algeria. The cotton of Africa is produced mainly by

native smallholders rather than on plantations under European supervision.

Ground-nuts, known also as monkey-nuts and pea-nuts, are the fruit of a plant of the pulse class, the pod of which ripens underground. The nuts yield a valuable oil, which can be employed for the same purposes as olive oil; and as a result a considerable export takes place from West Africa, where the crop is mostly grown, to France and other Mediterranean countries. The plant

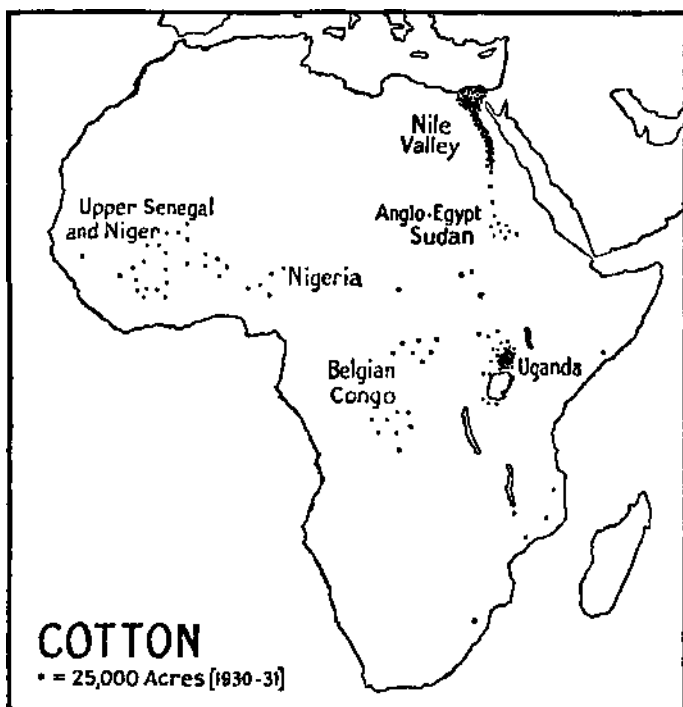


FIG. 12.—Distribution of cotton.

NOTE.—This map, which shows acreage under cotton, fails to emphasize sufficiently the overwhelming importance of Egypt, where the yield per acre is far greater than in any other region.

will thrive on comparatively poor soils, and so is much grown in those areas where conditions do not favour the more tender crops. The West African savana zone is the chief area, the plant having been introduced into this region from America by the Portuguese (Fig. 13). Over the western end of this region ground-nuts **are** the principal crop, forming the bulk of the exports from Gambia, Senegal and French Sudan. Good crops are also obtained in Northern Nigeria, whilst elsewhere in the **African savanas**, the

Anglo-Egyptian Sudan, Mozambique, Nyasaland, Southern Rhodesia and Madagascar have areas devoted to this crop.

Tobacco is another crop which was originally introduced from America into Africa by the Portuguese. It is a plant with a fairly wide latitudinal range of cultivation, being found in sub-tropical, "Mediterranean" and temperate zones, and in Africa it is cultivated in each of these three types of region (Fig. 13). Native tobacco cultivation is still very important in certain regions; in the Congo

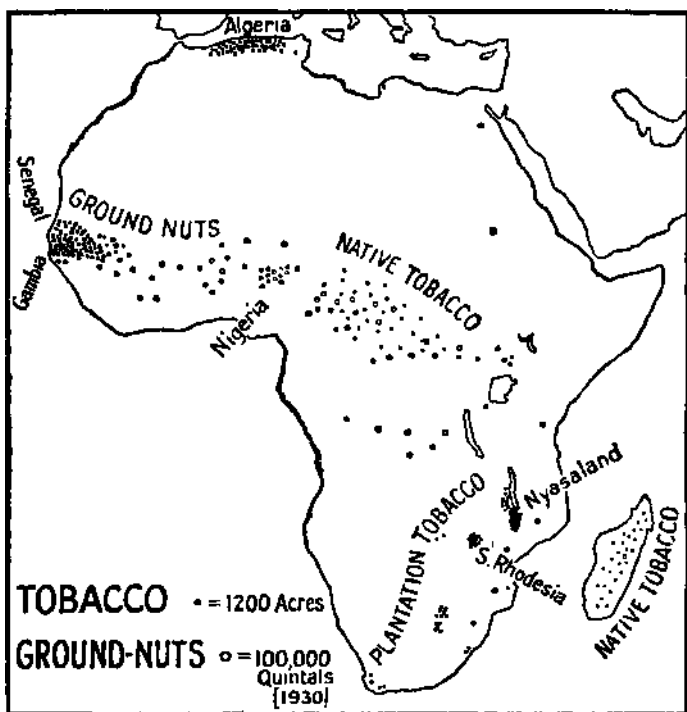


FIG. 13.—Distribution of tobacco and ground-nuts.

Note the dominance of "Senegambia" in ground-nut production, and the degree of localisation of the plantation tobacco.

savanas, for example, tobacco has been used as money, and in Belgian Congo and French Equatorial Africa it retains a great local value. Madagascar also has a large and increasing area under native-grown tobacco, but the crop has declined in Angola and Mozambique. More recent, however, is the introduction of new varieties, mostly used for the production of pipe-tobacco, and their cultivation under plantation conditions. Within the savana zone tobacco is of greatest importance in Nyasaland and the Rhodesias, in those parts where white settlement is fairly dense and railway transport available. In the "Mediterranean" zones,

the Cape Province, especially the Paarl region, has some important plantations, and cultivation is increasing in Algeria, which has the largest acreage of any single African province. In the "temperate" region of the south-east, tobacco is grown in the west and south-west of the Transvaal.

The principal grain crop of Africa is *maize*. This also was introduced by the Portuguese from America, and it has spread over many parts of the continent with surprising rapidity. As a crop needing heat and moisture at the same time, it is naturally well

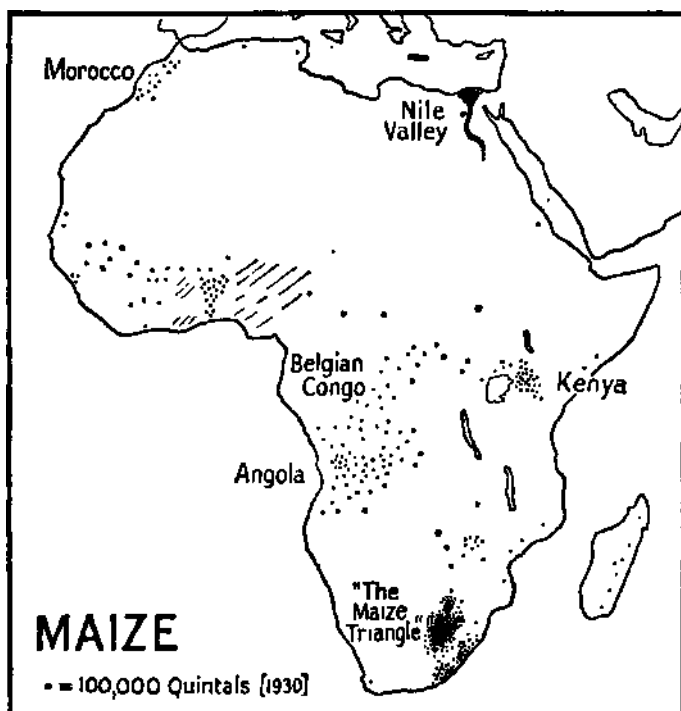


FIG. 14.—Distribution of maize.

Maize is the most widely cultivated cereal in Africa.

suited to the savana lands, where summer rainfall is general, and to that area of south-eastern Africa which we have referred to as of the temperate grassland type ; but it is also grown within the tropical forest region and in the Mediterranean lands (Fig. 14). Enormous quantities of maize, much of which is never recorded in the official statistics of production, are grown by the natives for food ; only a few areas of specially intense cultivation have a surplus available for export. In West Africa native maize cultivation is widespread, from Gambia to Nigeria in the savana zone, and it is also grown, usually as the only possible cereal, in the forest belt, where

two crops are often obtained within the year. Another area of importance is the highland region of East Africa, especially Kenya, which has a small export. Over the greater part of southern Africa maize, known generally as "mealies," is the staple food. Cultivation is widespread in Madagascar and in many parts of the South African savana zone in Nyasaland, Mozambique and the Rhodesias. Production reaches its maximum density, however, in the "temperate grassland" region of southern Transvaal and northern Orange Free State—often referred to as the "Maize Triangle"—and in the adjacent regions on the east and south-east—the native territories of Swaziland and Basutoland, and Natal. Much of the harvest is used for food by both natives and whites, and increasing quantities are being employed as cattle fodder; yet a considerable amount remains for export. Maize also looms largely in the agricultural economy of Egypt, where it is grown, with irrigation, for food. It is also cultivated to a certain extent in the wetter western part of the Atlas lands in Morocco.

Rather similar in distribution, but grown especially in the drier parts of the maize regions, are varieties of *millets*, cultivated for human food, for the production of a native fermented drink like beer, and sometimes in South Africa for cattle fodder. In the Anglo-Egyptian Sudan and in the drier parts of South Africa, millets replace maize as the staple food crop.

(3) *Products of the Mediterranean Regions.*—Mediterranean agriculture is associated particularly with tree-fruits and cereals, the hot summer sunshine, granted the availability of an adequate water supply, being favourable for the ripening of fruit and grain. In Africa the *olive* is confined to the Atlas region (although wild olive trees are found in the Eastern Horn), and since it is a drought-resisting tree, its importance increases from west to east, Tunis having twice as many trees as Algeria, and the latter several times as many as Morocco. Many kinds of *fruits* are grown also in the Atlas lands, sometimes with irrigation—oranges, lemons, figs, pomegranates, almonds, amongst others. In the Cape region oranges together with grapefruit, plums, and other stone fruit are most important. Some of these fruits are not confined to the "Mediterranean" regions but are grown also on the highlands of Kenya, and with irrigation in parts of south-eastern Africa. Oranges especially are becoming commercially important in Southern Rhodesia and in the Transvaal.

The *vine* is cultivated in both "Mediterranean" regions. In the north-west Algeria leads in wine production, and in the south-west the Cape region has an increasing wine and raisin output.

The principal cereals of the temperate zone, wheat and barley, are cultivated in Africa as winter crops, especially in the "Mediterranean" regions. In the Atlas lands these two cereals are of almost

equal importance, but elsewhere wheat takes first place. Wheat is grown in the Cape region, and also in certain parts of the savana lands, as in Southern Rhodesia, the rift valley of Kenya, and French Sudan ; it is an important food crop in Egypt.

(4) *Products of the Oases*.—The date palm is the characteristic tree of the Saharan oases, and it plays a similar part in the life of the oasis-dwellers to that of the banana in the tropical forest. It provides fruit, palm wine, leaves for matting and timber. Apart from the scattered oases of the central Sahara, the northern and

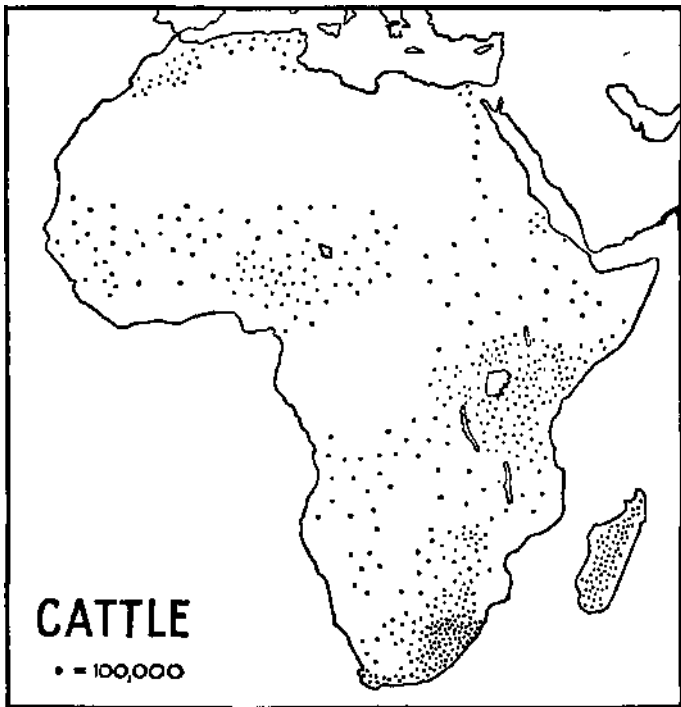


Fig. 15.—Distribution of cattle.

This map does not distinguish between native and European breeds. Cf. p. 30.

eastern fringes of the desert are the chief areas for date cultivation—southern Morocco and Algeria, central Tunis, the Nile Valley and the Egyptian oases, and the northern part of the Anglo-Egyptian Sudan.

(5) *Animals*.—Africa, containing such large areas of savana land, is naturally adapted for stock raising in various forms. The chief obstacles are diseases, notably that produced by the tse-tse fly

Cattle are widespread and are of two main kinds—native "zebu" or humped cattle, adapted for withstanding the long dry season of

the savanas, and introduced European varieties. In a general way one may say that tropical Africa has mostly native cattle, whilst in the Atlas lands and in South Africa the stock is largely mixed or of European origin (Fig. 15). In the Sudan many of the tribes are great cattlemen, and hides and skins are important articles of commerce. In East Africa and Madagascar the cattle are mainly native and of poor quality, being very subject to diseases, but in parts of Kenya the stock has been improved by foreign blood, and dairying is developing. In South Africa, a natural stock-raising

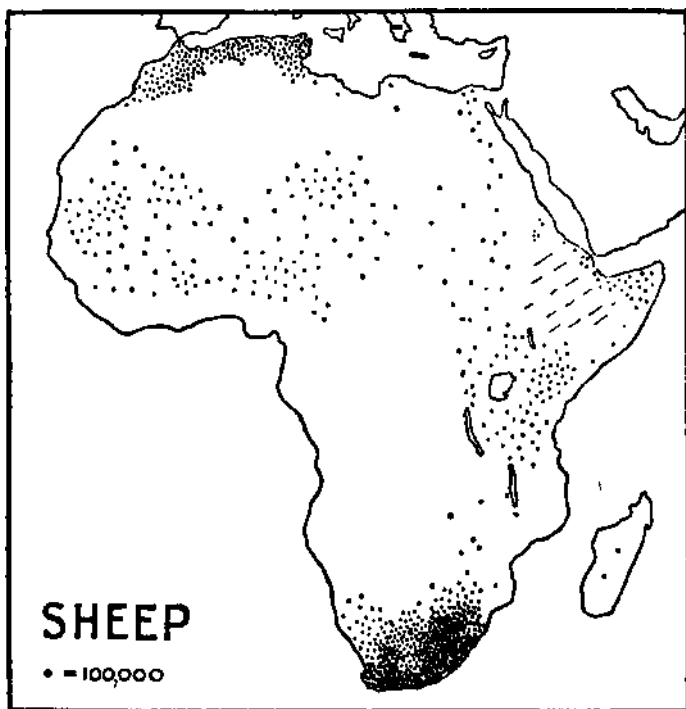


FIG. 16.—Distribution of sheep.

Note the dominance of the Union and the Atlas lands.

region, many fine herds have been built up, and the tse-tse and rinderpest considerably reduced by dipping. Both beef and dairy cattle are raised, and the importance of the maize crop for fattening should be noted. Oxen provide the principal means of transport over much of the veld. The cattle are noticeably concentrated in the wetter eastern half of South Africa, and are mostly up on the plateau away from the damp heat of the lowlands.

Sheep are also widely distributed, rather more widely, perhaps, than cattle, owing to their ability to live under drier conditions (Fig. 16). Thus about 16 million are found in the Atlas lands,

notably on the dry plateau of the Shotts. Seasonal movement to and from the mountains is here common. Large numbers of sheep are scattered all over the drier savanas of the Sudan and southern Sahara, and a considerable industry has been built up in British Somaliland. In East Africa the animals are mostly of poor native varieties. The Union of South Africa has 35-45 million sheep, mostly of European types, including the merino, upon which the important wool trade has been based. Although, as with cattle, the density of sheep population is greatest in the east (Orange Free State) ; huge flocks are reared also on the Karroo. The chief difficulty and obstacle to further outward extension of sheep farming is the lack of adequate water supply.

Goats are distributed over roughly the same areas as sheep. The goat is a characteristic animal of the Mediterranean, and the Atlas lands have some 8 millions. In South Africa the Angora goat has been introduced, and a considerable export of mohair takes place. The goats are particularly in evidence in the eastern Karroo, and the Union has usually between 7 and 8 million.

Camels, together with dates, form the basis of life in the Sahara Desert. They are beasts of burden, and supply milk, hair and skin.

The Native Races of Africa.¹—The native peoples of Africa comprise some half-dozen ethnic groups, which fall into three major classes : (1) the aboriginals, such as the Bushmen and Hottentots of the Kalahari, the Pygmies of the Congo forests, and the pure Negroes of West Africa; (2) the Hamites, a Caucasian or white race, coming originally from Arabia and the Near East, and occupying most of northern and north-eastern Africa; (3) the vast and varied group of peoples, occupying most of the continent south of the Sahara, which has resulted from the intermixture of the Hamites with the aboriginals (Fig. 17).

Aboriginals.—Three of the four aboriginal groups are of little importance at the present time and are slowly declining. The short, brown-skinned *Bushmen* formerly spread over the greater part of eastern and southern Africa, but are now confined to the Kalahari semi-desert, where they lead a primitive nomadic existence, living by hunting and gathering roots. Unaffected beneficially by contact with civilisation, they are rapidly decreasing in numbers. The *Hottentots*, probably a mixture of Bushmen with early Hamite invaders, have also retreated before the Hamitic advance into the desert of South-West Africa. Of slightly higher culture than the Bushmen, they are mainly pastoral people, only semi-nomadic. In Cape Province they have been largely absorbed by racial intermixture. The *Negritos*, or Pygmies, formerly fairly widely distributed, are now confined to the equatorial forests of Central Africa. Of low stature, only about 4 feet 6 inches, they live in small communities, hunting

¹ This section is based upon Professor Seligman's book "The Races of Africa."

and collecting food from the forest trees and plants. The *Negroes* are a much more important and widely distributed group. Negro blood is present over the whole of Africa south of the Sahara and of the Eastern Horn, but the purest type, scarcely affected by any intermixture occurs in West Africa from Senegal to Nigeria. These negroes are tall (average 5 feet 8 inches), with black skin and woolly hair. Some of the tribes formerly practised cannibalism. They are now settled agriculturists, growing their own food and keeping pigs, chickens and perhaps goats and cattle. The Kru people of the Liberian coast are seamen and fishermen. Much

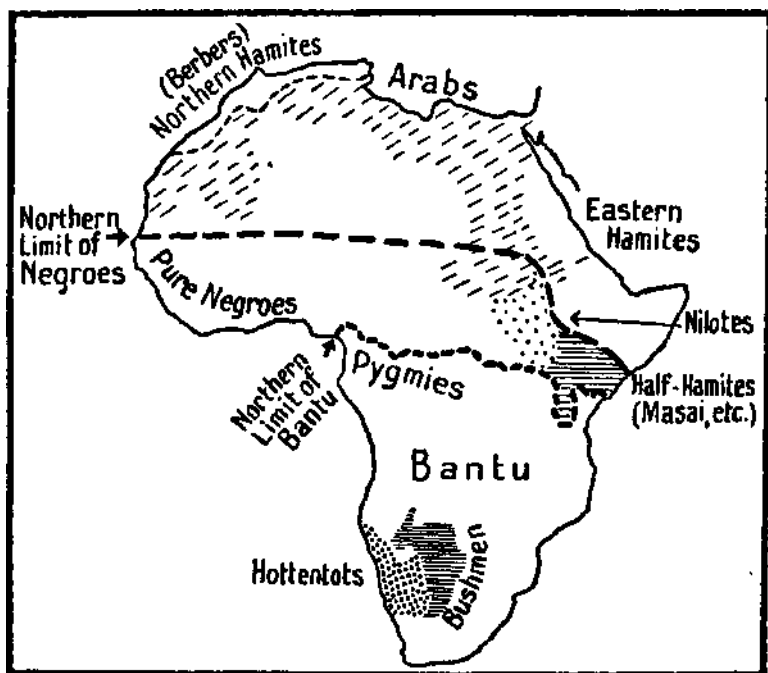


FIG. 17.—Simplified ethnic map of Africa.

For Madagascar, see p. 246.

intermixture with Hamitic peoples has taken place in the Sudanese country, and numerous tribes of tall, black people speaking Hamitic languages are found. Such are the stock-raising Hausa.

Hamites.—The Hamites are the dominant African stock, and the development of African civilization is largely the story of the spread of the Hamitic peoples and their interaction with the more primitive aboriginal stocks, the Negro and the Bushman. The true Hamites (as opposed to the Negro-Hamitic mixtures) fall into two large groups, an eastern and a northern. The eastern Hamites comprise the Egyptians, Nubians, Somalis, and a large section of the

Abyssinians. Diversity of geographical environment, from the fertile Nile valley and the Abyssinian highlands to the Somali and Egyptian deserts, and varying degrees of penetration of the Mohammedan and Christian religions, have resulted in a great variety of peoples in the group. The northern Hamites occupy a vast area covering the Atlas lands, the Sahara and parts of the Sudan. Several of the more important groups are well known. The Berbers, with a much lighter skin than most, are perhaps the result of a very early intermixture of Egyptian Hamites with southern Europeans. They are an agricultural and pastoral people, sometimes practising a transhumance which almost amounts to nomadism, and a number of interesting tribes remain in the remoter parts of the Atlas Mountains. The Tuareg are the tall camel nomads of the Saharan oases; and the Fulani in the Upper Niger region and in Northern Nigeria are a powerful group of cattle-raisers.

Negro-Hamitic Peoples.—The Hamites, entering Africa from the north-east at several different periods, spread gradually over the whole continent, and their contact with the aboriginal negroes has resulted in an immense variety of peoples, with varying proportions of Negro and Hamitic blood. These Negro-Hamitic peoples fall into three main groups, of which the last-named is of greatest importance : Nilotes, Half-Hamites and Bantu. The *Nilotes* are a group of tall tribes occupying the Nile Valley in the southern part of the Anglo-Egyptian Sudan. Their life is mainly dependent upon their cattle, although some agriculture is practised. The *Half-Hamites* are centred in Kenya, extending into Uganda and Tanganyika Territory. They are mainly dark-skinned, semi-nomadic pastoralists of fine physique, like the Masai. Amongst these people wealth is usually reckoned in head of cattle, and milk and blood are the chief items in the diet. Inter-tribal warfare was formerly their chief occupation. The *Bantu* are "a congeries of peoples belonging predominantly to central and southern Africa, named from and defined by the peculiar type of language that they speak." They may be subdivided into western, southern and eastern groups. The western Bantu occupy the Congo forests. There are many little-known tribes and much disturbance of the population has taken place in the past. Slave raids considerably upset the balance of population, especially in the southern part of the area in Angola, where the Bushongo are the chief group, whilst in the north the warlike Fang, of former cannibal "fame," have conquered many of the weaker tribes. "The southern Bantu, the most important of the three groups, have striking negro affinities, woolly hair and black skin being usual. Prominent groups are the Xosa, Zulu, Bechuana and Basuto. Settlements take the form of villages of the kraal type, with separate beehive houses ; occupations are sheep and cattle-raising and the cultivation of maize.

The eastern Bantu occupy the eastern highlands of Africa from Uganda to Nyasaland. In Uganda the Baganda are the chief group—a rather varied people who have quickly become attached to the white civilisation. In the highlands of Kenya are the Akamba and the Kikuyu, agriculturalists and cattle-keepers. In eastern Tanganyika are the Swahili, whose language has become the "lingua franca" over much of East Africa. In the highlands of Nyasaland are the Yao.

A last ethnic group comprises the *Semites*, or Arabs, of Caucasian origin, Mohammedan religion, and speaking Semitic language. Arabs are diffused over much of northern Africa, but the parent stocks are found in the north and north-east, much intermixture with negroes having occurred in the south and south-west. They occur as true camel nomads in the Sahara, as semi-nomadic cattle owners on the northern edge of the Sudan, and as cultivators in the oases, in Egypt and along the Mediterranean coast.

In many parts of Africa within the last century, the native civilisations have come almost suddenly face to face with white men and their culture, and the results, for better or worse, have been profound. In order to understand the different aspects of this native-white contact, we must first briefly examine the nature of the opening up of the African continent.

Exploration and Partition of Africa.—The effective penetration of the African continent began about 1850. Centuries before this, however, Arab traders—mainly slave traders—had exercised their influence over the coastlands and much of the interior of eastern Africa. Portuguese sailors had, by the early sixteenth century, acquired familiarity with the whole coastline from the Atlas lands to the Eastern Horn, in their efforts to find a new trade route to India; and British, Dutch and Portuguese vessels thereafter frequently rounded the Cape. Numerous trading stations were opened on both west and east coasts, dealing in slaves, gold and ivory (witness the names Gold Coast and Ivory Coast), and with the decline of Portuguese maritime power, British, Dutch and French influence began to be more felt. But the difficulty of the west coast forests and deserts, and the characteristic habit of the African rivers of presenting obstacles to navigation within a comparatively short distance from their mouths—a result of the plateau edge already alluded to—effectively prevented much exploration of the interior. Although Portuguese and Arab slave traders may often have made considerable journeys into the interior—a Portuguese party actually crossed the continent from west to east in 1806—their travels added little to the world's knowledge of Africa; and the greater part of Europe was too troubled by the upheavals of the Napoleonic wars and the Industrial Revolution to give much attention to foreign colonisation.

Only in the extreme south, where climatic conditions, owing to latitude and altitude, approached most nearly to those of Europe, had any considerable settlement taken place. Dutch colonists had settled at the Cape in the seventeenth century, and the advent of the British early in the nineteenth century started a feud, the repercussions of which have been reverberating through South African politics ever since. British settlers occupied the Cape region,



FIG. 18.—Political divisions of Africa.
For revised boundaries of Libya, see Fig. 102.

the environs of Port Elizabeth and Natal, and Dutch farmers spread north-eastwards into the Transvaal and Orange Free State.

Then during the latter half of the nineteenth century a series of scientific explorations by men of British and other European nationalities, revealed the hitherto unknown heart of the "Dark Continent," and opened up boundless possibilities for trade, development, and the spreading of a higher type of civilisation amongst the teeming populations of the forests and savanas.

The most famous British names in the history of African exploration are those of Livingstone, whose missionary journeys between 1841 and 1873 had an enormous influence in the Zambesi region; Stanley, who traced the course of the Congo after "discovering" Livingstone in 1871; Speke, Grant and Baker, who explored the East African lakeland in their search for the source of the Nile; and Mungo Park, who traversed much of inland West Africa; but too often it is forgotten that many Germans, French and Portuguese carried out journeys, surveys and pioneer work almost as monumental in character.

This revelation of the potentialities of the vast continent resulted in a movement on the part of European nations, culminating in a startling scramble during the 'eighties, to acquire territory. Britain, France, Germany, Portugal, Italy, Belgium and Spain were involved, and within a few years the greater part of the continent, large areas of which still remained unexplored, was partitioned between them. The possibility of future contention over the limits of the areas acquired was foreseen, and a series of international conventions between 1890 and 1894 delimited the spheres of influence of the various countries concerned.

Subsequent changes, apart from the acquisition of Libya by Italy from Turkey in 1912, and the establishment of a French Protectorate over Morocco in the same year, have been mainly the results of the Great War; after which the German territories were transferred, under mandate from the League of Nations, to British, French or Belgian control. The only areas which remain outside European control are the "Black" Republic of Liberia (formed in 1822 for freed American slaves), and Egypt.

The development of the acquired territories by their European holders has proceeded at different rates and on different lines, mineral wealth and the possibility of large-scale agricultural development having played important parts. At first, considerations of trade, and of the benefits which the mother country could derive from the exploitation of its new-found resources, were uppermost, and large slices of territory were leased to trading companies. Thus the Rhodesias were largely under the control of the British South Africa Company; Northern Nigeria was managed by the Royal Niger Company; Kenya and Uganda by the British East Africa Company; and Portuguese East Africa by the Mozambique and Nyasa Companies. It has been increasingly realised, however, that the exploitation of the resources is not the only object of European influence, and that the improvement of native standards of life and education—in fact, the development of "Africa for the Africans," should be considered of equal importance. In this connection the enormous amount of valuable work that has been done amongst the natives by missionaries of many denominations

and from various countries must be remembered. Indeed, the bulk of the educational work in tropical Africa is still in their hands.

Broadly speaking, apart from the independent states named above, European control of the African provinces has developed along three different lines :

1. The Union of South Africa and Southern Rhodesia are self-governing portions of the British Empire, no longer under European control.

2. Many of the territories are administered as colonies, that is, governed by a representative of the mother country. Such are the British areas of Sierra Leone (part), Gold Coast Colony, Nigeria, Northern Rhodesia, Nyasaland. etc., and most of the French areas.

3. Some areas have been controlled as Protectorates, *i.e.* government remains in the hands of native chiefs, advised by officials from the mother country. Such are Bechuanaland, Zanzibar, Uganda, parts of British West Africa, and Morocco and Tunis.

Population.—The bulk of the African population is, and must for ever remain, Native (Fig. 19), simply as a result of the latitudinal extent of the land mass. The greater part of Africa is either tropical, and so unsuited to white men, or semi-desert and so uninhabitable, and the areas suited to permanent white occupation are thus comparatively small, although much increased by the altitude of the plateau in southern Africa. Over much of inter-tropical Africa, the highlands of Kenya and the Rhodesian Plateau excepted, complete white colonisation is impossible, owing to the debilitating effect of constant high temperature and humidity; over this great area white men must be temporary visitors only, and the labour of agriculture and industry must be performed by the Natives. Native education within inter-tropical Africa has thus been mainly concentrated on the improvement of agricultural methods.

Here the population problem is largely concerned with the results of the upsetting of tribal life by the introduction of new religious ideas and of a new class of wage-earners, in railway works, mines and plantations. It is essential that an adequate education be given to the native if his mind is not to be distorted by false ideas of the value of money and by his new and unaccustomed ability to purchase luxuries. In many areas, too, an acute problem has arisen concerning peoples whose main occupation before the coming of the white man was inter-tribal warfare. Some new outlets for their energies must be found if some of the finest African peoples are not to degenerate through lack of interest in agriculture.

Development of Communications.—The greatest single factor in the exploitation of Africa has been the development of means of communication. Human portage is still the only means

of moving goods over large areas of inter-tropical Africa, and camels in the Sahara, mules in the Atlas lands, and the ox-waggon in South Africa are still unsurpassed for many purposes. The development of mineral resources and of commercial agriculture would obviously have been impossible, however, without the railway. Railways in Africa have been developed largely as a series of disconnected lines, each running inland from a port (Fig. 20). Except in the Union

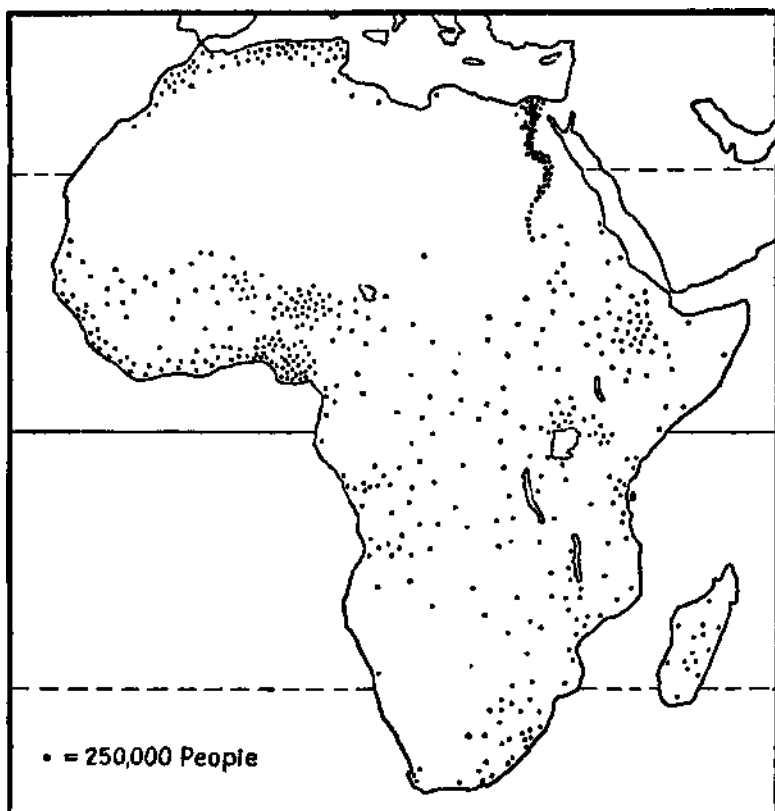


FIG 19.—Distribution of population (all races), based upon the most recent censuses and estimates available.

of South Africa and in the Atlas lands there is nothing that could properly be termed a "system." In French West Africa some conception of a system has been arrived at, but a very large mileage remains to be constructed. In the Congo and Nile Basins several lines have been built round rapids on the rivers to connect river steamer routes. The discovery of the Katanga mineral wealth has been followed by a considerable railway building, British, Portuguese and Belgian lines having been pushed into the region.

Along with railway development and the working of steamers on the principal navigable sections of the great rivers, the building of motorable roads proceeds apace, for the motor car or lorry is a valuable asset as a feeder of the railways. It is perhaps not too much to say that the internal-combustion engine is playing every bit

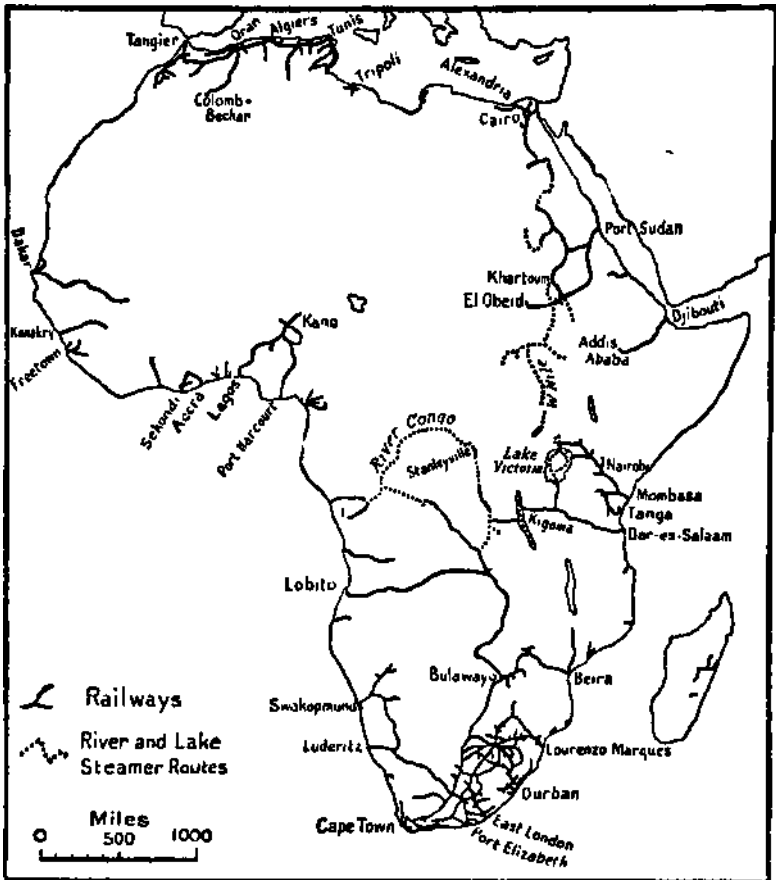


Fig. 20.—Railways and waterways.

AS far as possible every railway open in 1934 is shown in order to demonstrate the differences in density of the rail-net. A number of seasonal water-routes (e.g. the Lower Niger) have been omitted.

as important a part in the development of the interior of Africa as the railway locomotive.. Much has been achieved by the very extensive use of bicycles on the smooth jungle paths. At the moment the development of air services, dealt with in some of the sections which follow, is having a profound effect on communications. (Sec Frontispiece.)

SECTION II

WEST AFRICA ¹

West Africa, extending from the mouth of the Senegal to the Cameroon Mountains, may be described as a region of contrasts. Physically there is the contrast between the interior plateau and the low-lying, lagoon-fringed coastal plain; in climate, vegetation and productions the equatorial rain-forest contrasts with the semi-desert of the north; and in economic development there is a striking contrast in the progress made in different areas by the British, French and Portuguese. The following table of political divisions is given for reference :

Country	Area in sq. miles	Population
<i>British Areas—</i>		
	4,000	198,000(1935)
	28,000	1,890,000(1935)
Gold Coast and Togoland (mandate)	92,000	3,530,000(1935)
Nigeria and Cameroons (mandate) .	373,000	20,000,000(1935)
<i>French Areas—</i>		
Senegal and Dakar District . . .	78,000	1,790,000(1936)
	97,000	2,000,000(1936)
	184,000	3,900,000(1934)
Dahomey.	43,000	1,350,000(1936)
	20,000	750,000(1934)
	591,000	3,600,000(1936)
	22,000	390,000(1933)
<i>Republic of Liberia.</i>	43,000	1,500,000(approx.)

Physical Features.—The greater part of West Africa belongs to the continental plateau of ancient, crystalline rocks. The highest parts are the Futa Jalon or Guinea highlands, forming a watershed only about 200 miles from the south-west coast, the Bauchi Plateau of Nigeria, and the Cameroon highlands (terminating seawards in the volcanic peak of Cameroon Mountain, 13,000 feet high)

¹ The authors are greatly indebted to Major H. A. Harman, D.S.O., B.Sc, formerly Assistant Director of Education, Gold Coast, for valued criticism on this section.

[illegible]

No -The political boundaries within the French area on this map are those existing before 1933 ; the revised boundaries are shown on Figs. 23 and 32.

which form the divide between West and Central Africa (Fig. 21; The ancient rocks are overlain on the north by the Mesozoic sedimentary series which characterise much of the Sahara. The plain of the lower Niger and Benue rivers is occupied by Cretaceous and Tertiary sediments, and deposits of similar age occur in the lower Gambia and Senegal regions. The great age of the plateau, and its exposure to the rainy winds from the Gulf of Guinea, have resulted in the smoothing out of the relief and the formation of a fairly wide and gently sloping coastal plain. The rivers, however, both large and small, are nearly all characterised by irregularities of gradient and of flow which render them of little value for navigation. Only the Niger and its tributary the Benue are navigable over certain sections of their courses, chiefly during the wet season. The nearness to the coast of the Futa Jalon watershed results in the existence of numerous short streams flowing westwards to the indented Guinea coast, whilst the Niger is thrown off north-eastwards, only turning towards the sea after flowing for over 800 miles into the Sudan. The Senegal and the Gambia also rise near the Niger, but flow northwards and westwards to the Atlantic coast. The Volta is the largest river between the Gambia and the Lower Niger.

The coast of the Gulf of Guinea is fringed with swamps, lagoons and sand-bars. There is thus an almost complete absence of good harbours, and the shelving shore prevents steamers coming close in. As a result, except in one or two more favoured places, cargoes have to be unloaded into "surf-boats," the manipulation of which is by no means an easy task owing to the large breaking waves which roll up the gently sloping, sandy beaches. The coastal lagoons, together with the distributaries of the great Niger Delta, form a valuable series of sheltered waterways much utilised locally by native canoes.

Minerals.—As in part of South and Central Africa, the ancient rocks of the West African Plateau possess considerable mineral wealth. Although occurrences are widespread, especially in the areas under British control, development has taken place only in a few areas. Alluvial gold has, of course, been obtained from many streams for centuries—the name Gold Coast is sufficient evidence of this. Gold mining has been developed in the Gold Coast, Nigeria and Sierra Leone, and small quantities of alluvial gold are still panned from the streams running northwards from the Futa Jalon, in French Territory. Diamonds have been worked in the Gold Coast, and platinum in Sierra Leone. The greatest wealth lies not in precious ores and stones, however, Tin, in the Bauchi Plateau of Nigeria, manganese and bauxite (ore of aluminium) in the Gold Coast, and iron ore in Sierra Leone, are worked and exported. **The**

only coal in West Africa occurs in the sedimentary rocks of Southern Nigeria, about 150 miles from the coast. It is mined for local use, for the railways and for steamships.

Climate.—West Africa lies roughly between 5° and 15° north of the equator. Temperatures are therefore constantly high. There is a marked contrast, however, between the small daily and annual range of the coastal regions, where the average temperature is about 70° F. and the annual range only 6° , and the greater variations experienced inland, where distance from the sea, a markedly seasonal rainfall distribution, and a less continuous vegetation cover allow of an annual range of 23° at Timbuktu (71° to 95°), and a far greater daily range, which may show, during the dry season, day temperatures well above 100° , and occasional night frosts. Rainfall varies both in amount and in regime (Fig. 22, cf. Fig. 7). The amount decreases almost everywhere with striking regularity, from the coast northwards, and the isohyets thus run roughly east to west. The wettest parts of the coast are the south-west, where more than 150 inches are received annually (Freetown, 175 inches), and the south-east, where the Niger Delta and the seaward end of the Cameroon Mountains receive more than 100 inches (over 400 inches at the foot of the Cameroon peak). The central part of the coast is much drier. Only 30 to 40 inches fall along the Gold Coast, and even less than 30 inches on the coast of British and French Togoland mandates. Here a body of cold, upwelling oceanic water creates a barrier of cool, dense air, accompanied by frequent fogs, which fends off the rain-bearing south-westerly winds. There are two distinct types of rainfall regime in West Africa. South of about latitude 10° , except in the south-west, the regime shows two maxima (about May-June, and September-October) associated with the passage of the overhead sun, and no real dry season. This may be termed the *normal equatorial regime*. North of latitude 10° , and in the south-west, the two maxima merge into one, occurring about July-August, and there is complete cool-season drought. This may be termed the *tropical or monsoon regime*. The coastal belt experiences south-westerly winds (south-east trades, diverted on crossing the equator) all the year, but these are stronger during the summer monsoon period, and are weakest, and penetrate but a short distance inland, during the northern winter. The high humidity which naturally accompanies the high temperatures gives the climate that debilitating effect which renders the area so unsuitable for occupation by white people. Inland, the conditions are those of a tropical monsoon climate, with three distinct seasons—(a) the dry season from November to May, characterised by the dry and dusty "Harmattan" wind from the north-east, and divisible into (i) cool, dry season, November to January, (ii) hot, dry season, February to May; (b) the rainy season, June to October, slightly

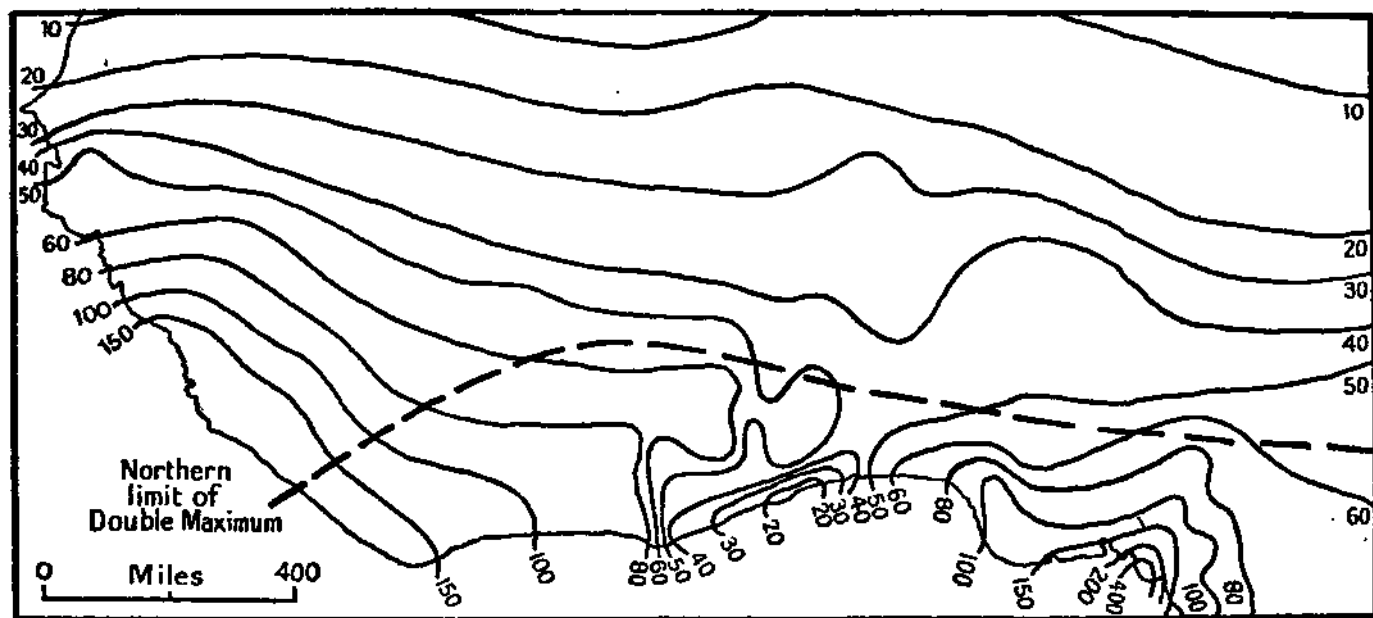


Fig. 22.—West Africa : mean annual isobryta.

cooler but more enervating than the preceding hot season, with a monsoonal inflow of damp south-westerly wind.

Natural Vegetation and Agriculture.—The east to west trend of the climatic belts is reflected in a similar vegetational zoning, from equatorial forest through various grades of savana to the semi-deserts of the north (Fig. 9).

Along the greater part of the coastal lagoons and deltas *mangrove* swamps occur between tidal limits, notably in the Niger Delta. Locally the wood has been used for railway sleepers, and although some red and white mangrove have been exported for the same purpose the West African mangrove belt is not utilised economically to anything like the same extent as that of East Africa.

The *equatorial rainforest* zone lies immediately behind the coastal swamps, extending, except where broken by the dry area of the Gold Coast and Dahomey, from Sierra Leone to beyond the Cameroons, and stretching between 100 and 200 miles inland. The almost impenetrable jungle of large trees and tangled creepers and undergrowth is termed "evergreen," because there is no dry or cold period to cause leaf-shedding. Actually, however, the trees are all at different stages and a single tree may be shedding and growing new leaves at the same time. The forest is still little utilized in many parts, but elsewhere considerable exploitation of the natural resources has taken place. The principal trees of economic worth are the oil palm and the various trees which supply furniture woods of the mahogany type; but wild rubber has also been important in the past and some modern plantations exist. Of cultivated crops, rice in the west and maize in the east are perhaps the most important, but many native food-crops such as yams and bananas are grown. On their northern edge the equatorial forests merge into a belt of what might be called *monsoon forest*, where the existence of an appreciable dry season results in many of the trees being of deciduous type. This belt is the source of most of the kola nuts obtained, and it contains also the principal cacao growing areas.

Northwards of the forests is a broad zone of savanas, the luxuriance of which decreases northwards with declining rainfall. In the driest parts cultivation is only possible where, as in parts of the Upper Senegal and Niger Basins, irrigation water is available. The shea tree provides the most important "collected" product, whilst cotton is grown in the wetter southern part of the zone, or with irrigation in the north-west, and millets, ground-nuts and cassava are characteristic dry crops of the northern part of the savanas. Cattle are more or less confined to the northern half of the zone by reason of their liability to fly-borne diseases in the wetter regions.

Population and Political Control.—Politically, no part of Africa is more confused, consisting as it does of a series of enclaves stretching back from the coast, each originating in the coastal trading centre established between the fifteenth and eighteenth centuries, and now belonging alternately to France and Britain, with the single remaining Portuguese possession and the Liberian Black Republic of liberated slaves to add to the confusion (Fig. 23). These modern political divisions, moreover, have been established with little or no reference to the existence of tribal territories, and native peoples of essentially similar languages and customs have been split up by new and artificial boundaries. There are innumerable tribes of true negroes in the forest regions in various stages of development. Some quite primitive ones remain in the highlands of Sierra Leone, Liberia and the Bauchi Plateau, and generally speaking it may be said that the level of culture becomes more advanced from west to east. The Mandingoes in Senegal, Gambia and Sierra Leone are negro descendants of a once-powerful people who have been influenced by Mohammedan culture. In the more open Sudanese country Hamitic intermixture has produced such farming or trading peoples as the Hausa, whilst the Fulani are true Hamites, widespread over the dry savana zone from Senegal to Northern Nigeria. Many parts, especially the western highlands and the comparatively inaccessible and undeveloped area of the Niger-Volta watershed, are but sparsely peopled. The average density in the French areas is under 20 persons per square mile; the maximum density of over 300 per square mile, which is high for a purely agricultural region, is reached in parts of Nigeria (*cf.* Fig. 19). Even Nigeria is very unevenly peopled, however, a broad belt across the centre of the country, mostly with under 10 persons per square mile, separating the more densely peopled areas of the south and north.

The development of the British and French areas since the abolition of the slave trade has proceeded in some ways along parallel lines and in other ways by different means. The impossibility of permanent white occupation has meant that of necessity a policy of the guiding and directing of native activity into productive channels has been pursued. Both the British and French administrations have concentrated largely upon the improvement of native agricultural methods and upon the introduction or improvement of profitable agricultural industries such as the production of palm oil and kernels, cocoa, cotton and ground-nuts. Speaking generally, it may be said that France has concentrated her attention mainly upon the savana-land portions of her territories, leaving the greatest exploitation of the equatorial forest region to the British. French agricultural progress thus centres around the cultivation of ground-nuts and cotton, and irrigation works of considerable magnitude are

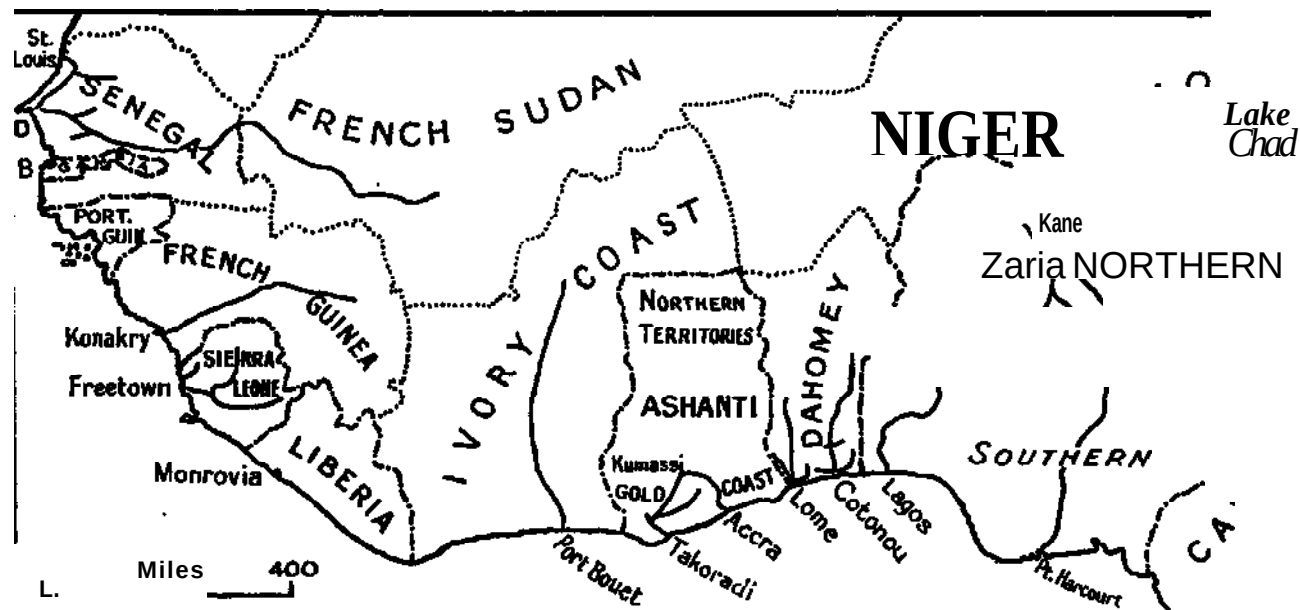


FIG 23.—West Africa : political.
D = Dakar. B — Bathurst.

planned and in operation in the upper Senegal and Niger Valleys. In the British areas, however, which (except for Northern Nigeria) lie far more within the forest zone, the maximum development of the oil-palm and the cacao tree are found ; whilst cotton cultivation is extending in Northern Nigeria. The British areas, too, seem to contain more mineral wealth.

In both British and French areas the provision of facilities for communication has been one of the primary objects, motorable roads and railways having been pushed inland for considerable distances from the coastal ports. At present the railways are mostly isolated short lines ; and anything approaching a West African railway system is obviously impossible of realisation for a very long time, if ever. The beginnings of two systems are apparent, however, the one in Nigeria, where mineral wealth and cotton cultivation have attracted alternative routes to the coast, and the other in the western part of French West Africa, where ambitious schemes have been put forward for the linking of the existing lines of Senegal, Guinea and Ivory Coast. Road-making and maintenance labour under one great difficulty due to the rainfall regime. It requires a very good surface to withstand the combined disintegrating effects of the intense heat of the hot season and the ensuing torrential floods of rain. Most of the native roads are impassable for several months.

In contrast with the stage of development reached in the British and French areas, Portuguese Guinea and the Republic of Liberia remain for the most part in a rather backward state, and their contribution to the developed wealth and trade of West Africa is almost negligible.

BRITISH WEST AFRICA

GAMBIA

This territory consists of a long, narrow strip of land about 250 miles long and 12 to 20 miles broad bordering the Gambia river. Except for St. Mary's Island at the mouth of the river, which is a colony, the area ranks as a British protectorate. It lies just within the zone of high savana, and so a narrow belt of tropical forest (with mahogany and rubber vines) runs along the river, whilst the remainder of the country is tree-studded grassland suitable for miize, millet and ground-nuts. The rainfall is roughly 50 inches, falling mostly between June and October. The rainy season is uncomfortably hot and humid, but the dry season is cooler and more pleasant.

Developed originally early in the seventeenth century by a chartered company, and once a flourishing highway for the slave trade, this small territory is on the whole prosperous, but it has been affected by the construction of the French railway through

Senegal, which now taps trade formerly reaching the coast *via* the Gambia river. Its staple cash crop is the ground-nut, which makes up over 50 per cent, of the value of the exports. The administrative centre is *Bathurst*, from which shallow-draught steamers can ascend the Gambia river for about 300 miles. There are no European settlers or plantations.

SIERRA LEONE

Like Gambia, Sierra Leone consists of a Protectorate and a small Crown Colony. Physically it consists of the undulating, much-dissected westward slopes of the Futa Jalon highland. The solid rocks are granite and gneiss, but as is usual on such formations in the tropics, a thick covering of fertile, red laterite soil is frequently present. The very heavy rainfall gives rise to innumerable streams, few of which possess any value for navigation by reason of the rapids which occur some 20 to 40 miles from the coast. Only the fine estuary of the Rokel, on which stands *Freetown*, the capital, can be used to any extent.

The rainy season lasts from May until November, and some 150 inches fall during this period on the coast, where conditions were formerly excessively unhealthy for white people (the "White Man's Grave"). Behind the tidal mangrove swamps the greater part of the country, except the higher parts, falls within the equatorial forest belt. Although large areas of jungle still remain, the native shifting agriculture has been responsible for the deforestation of a considerable proportion of the area, and government action has been taken in order to conserve what remains. The principal native crops are rice and cotton; both upland and swamp rice are grown, and the cotton provides the natives with a basis for a local industry. Of the forest products the oil-palm easily leads, palm kernels representing 60 per cent. of the value of the exports. Kola nuts are also important, whilst ginger and piassava are exported in small quantities. Cacao has been tried in the south, but not very successfully, owing to the dry season.

Much mineral wealth is known to exist; gold and platinum are worked, diamonds are becoming important in the south, and iron ore is widespread and easily obtained. A considerable native smelting and blacksmith industry exists. In 1933 a railway was completed from Pepel, 15 miles upstream from Freetown, to Marampa, 50 miles inland, where haematite reserves of considerable magnitude have been opened up and the export developed; most of the ore goes to Glasgow.

* The port for Sierra Leone is Freetown (55,000 inhabitants), usually the first port of call for British steamers in West Africa, and a trading centre of some importance. The construction of a tramway, replaced later by fine roads, to the hills above the town

stimulated the growth of a European settlement, high above the native town ; and the opening of two railways running inland from the port has added enormously to the commercially developed area of the country. Only those areas within the roughly 50-mile economic limit of human portage from the railway lines can be said to be really developed. Along these zones the oil-palm industry has rapidly expanded. One line runs from Freetown to Pendembu (227 miles), and the other, diverging northwards at Bauya, to Makeni (83 miles).

Trade.—The principal exports of Sierra Leone are palm kernels (over one-third of the total value); other agricultural exports are palm oil, kola nuts and ginger. Of the minerals, iron ore easily leads by weight, diamonds and gold by value. Cotton manufactures are the chief imports. More than two-thirds of the total trade is conducted with the United Kingdom.

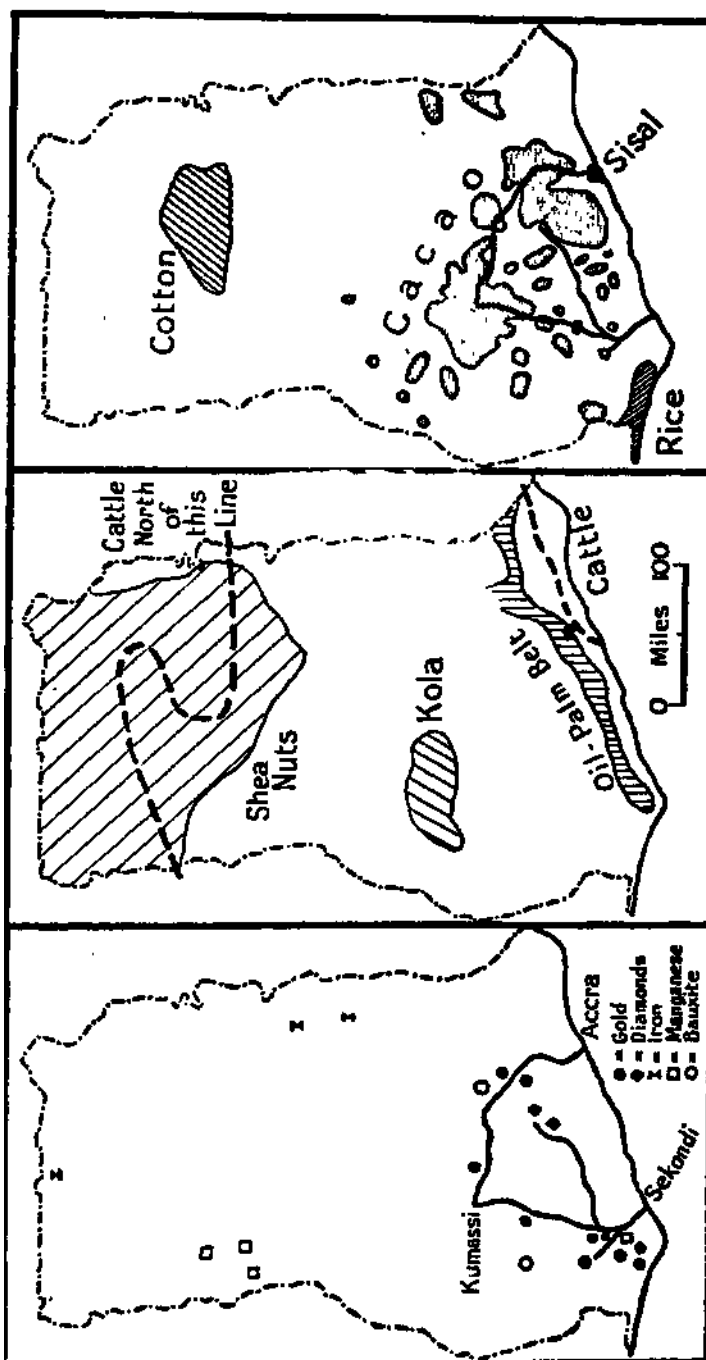
GOLD COAST

The areas known collectively as the Gold Coast comprise the Gold Coast Colony, Ashanti, the Northern Territories Protectorate, and the mandated (formerly German) territory of part of Togoland. Together they form a roughly rectangular area with 270 miles of sea-coast, stretching inland for some 400 miles. Old Portuguese castles still stand, and British settlement along the coast dates from the early part of the seventeenth century, but the Gold Coast Colony was not constituted as such until 1874 ; the Northern Territories were delimited in 1897 and Ashanti was annexed, after a long series of feuds between the British and the warlike native tribes, in 1901.

Physical Features.—A low-lying coastal plain, lagoon-fringed east and west, but higher in the centre, rises gradually to the crystalline upland of Ashanti. This southward slope is undulating and crossed by numerous streams, of which the Tano and the Pra are the largest. The rest of the country falls almost entirely within the basin of the Black and White Volta rivers ; the Black Volta drains most of Ashanti and part of the adjoining Ivory Coast, and the White Volta most of the Northern Territories, whilst the Oti tributary traverses Togoland.

Climate.—We can distinguish three climatic types in the Gold Coast :

1. The south-west experiences typical equatorial conditions with constant high temperature and humidity, and a double rainfall maximum which divides the year into four distinct seasons—December to March, the dry season; April to July, the greater rainy season; a drier period in August; September to November, the lesser rainy season. During the dry season the dry and dusty Harmattan wind blows from the north-east, but its influence is only occasionally felt in the coastal belt.



C.—Cultivated crops.

B.—Forest Products and Cattle.

FIG. 24.—Products of Gold Coast.

A.—Mineral Resources.

2. The south-east is part of the West African dry belt, and although the regime remains similar the total rainfall decreases to about 30 inches in the east.

3. The northern half has less rainfall than the south-west, but more than the south-east, and the rainfall maxima merge gradually into one towards the north, and the length of the dry season increases.

Vegetation.—The natural vegetation shows close correspondence with these climatic features. Behind the coastal sands, except in the south-west, there is a belt of savana with palms and shrubs, varying from about 3 miles wide in the neighbourhood of Sekondi to 20 miles in the east, where extensive grassy plains exist behind Winneba and Ada. Inland from this belt lies the oil-palm belt, followed in the west by dense equatorial forest. The inner edges of the "evergreen" forest merge into "monsoon" forest with deciduous trees, together with bamboo, and then follows a broad belt of high savana or "bush" with shea trees (Fig. 24B).

The oil-palm belt formerly produced considerable quantities of kernels and oil, but its output has declined owing to the greater attraction of the cacao plantations as a labour market. As in Sierra Leone, kernels are far more important than oil. The equatorial forests have been much exploited for furniture woods of the mahogany, ebony and teak types, and timber is still floated down the streams and exported from Axim, Takoradi and other western ports.

Agriculture.—Agricultural development has been considerable. Native collection and cultivation included coconuts, yams, bananas, rice, kola and shea nuts, cotton, maize, guinea corn and millets. British influence has been directed towards the extension of cacao plantation, and the improvement of native agricultural methods. *Cacao* easily leads in importance. The first export was in 1891, but within 30 years the Gold Coast was producing one-half of the world's total. Temperature, rainfall and a rich soil are favourable to the cacao tree, and the dry season is of value for the drying of the beans, which are harvested between August and January. The entire crop is produced by native farmers on small holdings (average about 6 acres). Although the native will plant intensively he does not cultivate intensively, and the quality and life of the trees suffer in consequence. Moreover, careless drying is responsible for an enormous amount of waste through the beans going mouldy. The gradual exhaustion of the soil also is having an adverse effect on the crop. Nevertheless, the acreage under cacao shows no signs of decreasing—cacao still represents over half the total exports by value—and recent railway development (the Central Railway) has opened up further possible areas. The cacao region (Fig. 24c) extends from southern Ashanti to within 15 miles of the coast, and the areas of densest production lie around Kumassi and in the

hinterland of Winneba and Accra. The necessity of adequate means of transport has resulted in this region having the best network of roads and railways in the whole of the Gold Coast. * Head-porterage is still important but many motor roads exist, and lorry transport is now widely used, especially between the plantations and the ports of Winneba and Cape Coast which are not served by railways.

Kola nuts are obtained chiefly from the deciduous forests of the northern edge of the equatorial forest belt in western Ashanti. Most of the output goes to the northern markets, but some kola is sent to the coast for export to Europe. *Shea nuts* are collected in the drier parts of the savanas, i.e. in the Northern Territories. The shea tree provides oil and butter for food, and oil for fuel, and it plays a similar part in the lives of the natives to that of the oil-palm in the south. Yams, millet and guinea corn (sorghum) are the principal native food crops, and much native cotton is also grown. Sheep, goats, cattle and poultry are the chief livestock in the Northern Territories, where the farming population is quite dense. Cattle are restricted to the north by the tse-tse fly. Very little produce of the Northern Territories enters international commerce owing to the lack of transport facilities.

In the savana zone of the south-east, cattle and cotton again appear, and a beginning has been made with sisal plantation west of Accra.

Minerals.—Although agriculture is overwhelmingly the dominant occupation in the Gold Coast, and one single agricultural product—cacao—forms over half the exports, it was mineral wealth which gave the territory its name, and considerable mineral wealth exists and is exploited at the present time (Fig. 24A). *Gold-bearing conglomerates* abound in the south, and gold is both panned from the streams and mined from the rocks. Mining (with its accompanying crushing and extraction) has naturally developed in close proximity to the railways, or railways have been built to assist existing mining enterprises, and the chief mining centres lie along the Sekondi-Kumassi line and its branch to Prestea. Gold is second export by value. *Diamonds* were located in 1919 in the Birim valley, and the completion of the central railway line has given rise to a large industry in this locality. The stones are not of the gem type, but are used for industrial purposes (cutting and boring), and consequently there is less likelihood of violent fluctuations in output such as have occurred in South Africa (cf. p. 110). *Manganese* ore in large quantities has been found and developed by open-cast methods at Insuta, near Tarkwa junction on the western railway line; the ore is exported, for use in the steel industry, to Europe and North America, and Gold Coast ranks second in world production. Other manganese deposits exist in the western part of Northern Territories,

and valuable *iron* ores have been discovered in the extreme north and in central Togoland ; these must necessarily await the advent of the railway before development is possible. Finally, *bauxite* (ore of aluminium) is fairly widespread—a not unusual occurrence in tropical countries where laterite soils developed from crystalline rocks are abundant—but little developed.

Communications and Ports.—The rivers of the Gold Coast are

of little use for any but canoe navigation. The Volta and the Tano are both navigable by steamers for about 60 miles from their mouth but most of the smaller rivers are interrupted—as these two are—by rapids, and all are handicapped by lack of water during the dry season. Native routeways centre upon Tamale, the chief town of the Northern Territories, and upon Kumassi (36,000 people), the capital of Ashanti. Modern motorable roads (about 6,200 miles) and railways (500 miles) are mainly confined to the Colony and southern Ashanti.

There are now three

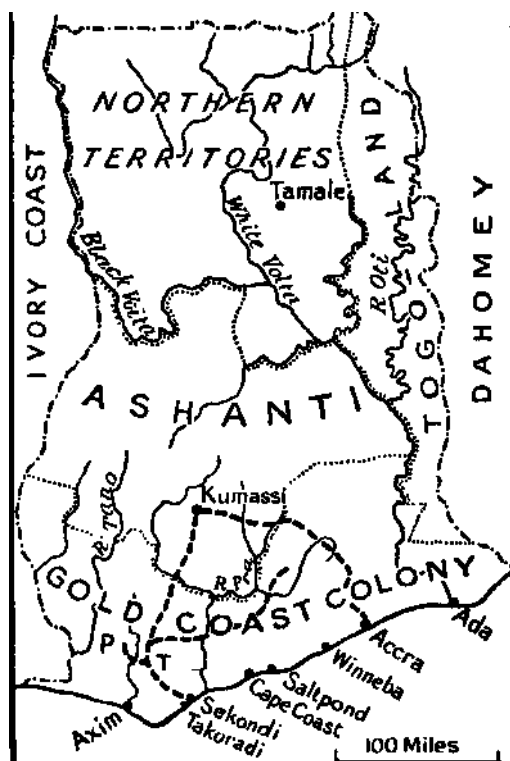


Fig. 25.—Gold Coast.

Divisions and railways. P—Prestea. T = Tarkwa.

main lines of railway—(1) from Takoradi and Sekondi to Kumassi, with a branch from Tarkwa to Prestea ; (2) from Accra to Kumassi ; (3) from Huni Valley on the Sekondi line, north-eastwards (Fig. 25).

The necessity for the employment of surf-boats for unloading cargo at the ports led to the construction and completion in 1928 of a new harbour at *Takoradi*, near the old port of Sekondi, now disused. A long breakwater built of local gneiss, and a dredged area of deep water, enable ships to enter the harbour ; and a con-

United Kingdom	U S A.	perm	Others
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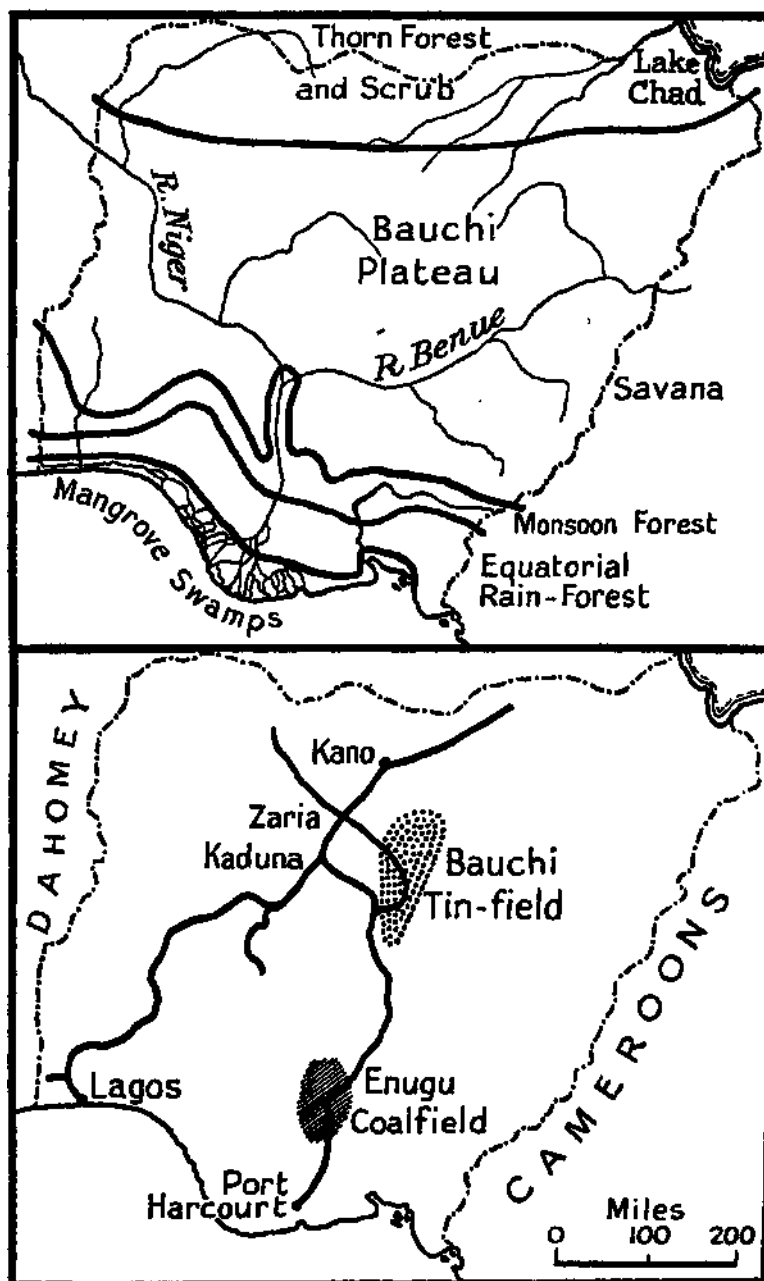
C O C O A	GOLD	MANGANESE	DIAMONDS	OTHERS
United Kingdom	U S . A .	Germany	Holl	Others

plateau, averaging 4,000 feet, which presents a steep southern face towards the Benue trough on the south, and drops in a series of steps northwards to the plains of Zaria and the Bornu country, which drains eastwards to Lake Chad. The Cameroons region is mostly highland, forming the western slopes of a volcano-studded, mountainous zone which runs north-eastwards from Cameroon Mountain.

Climate.—The climates of Nigeria resemble those already described for the Gold Coast, and vary from true equatorial in the south, with over 100 inches of rain and two well-marked rainy seasons (April-July and September-October), to sub-tropical in the north, with summer rainfall, seven to nine months' drought, and a considerable diurnal range of temperature. The rainfall increases very notably in the south-east, where high land rising in the angle of the coast at the head of the Gulf of Guinea results in the precipitation of some 400 inches a year on the slopes of Cameroon Mountain, and 150 inches even on the flats east of the Niger delta. There is a tendency for violent wind-whirls—tornadoes—to occur at the change of the seasons—i.e. at the beginning and end of the rains—due to the meeting of air-masses of different temperatures, densities and moisture contents.

Natural Vegetation (Fig. 27).—Owing to the enormous extent of the Niger delta and of the coastal lagoons, *mangroves* occur farther inland here than anywhere else in the world. The mangrove belt is between 5 and 15 miles broad in the west, around Lagos, and extends no less than 60 miles inland in the Niger delta. True *equatorial forest*, with mahogany, sapele or cedar, African walnut, oil-palms and rubber vines, forms a belt nearly a hundred miles wide in the east, narrowing in the west where the rainfall decreases as the coastal dry belt is approached. Its northern edge merges into a belt of "monsoon" forest with mixed evergreen and deciduous trees, including several mahogany species, obeche (which yields a valuable soft, white wood resembling deal), shea and bamboo. The higher parts of the belt, such as the Udi Plateau and the Yoruba plains, have a cover of high savana of park-like appearance, whilst fairly dense forest or high bush extends up the Niger and along both Niger and Benue above their confluence. The greater part of Nigeria is covered with some form of savana, with acacias, baobabs, shea-trees and *Terminalia*, the density of tree-growth increasing in the better watered (but not swampy) parts, whilst the uplands of Bauchi remain almost treeless. The northern zone, with a rainfall of less than 30 inches, is covered with thorny bush or scrub, and considerable sandy, floodable tracts exist in the Lake Chad drainage basin.

Forest Products.—The mangrove belt is not much exploited, but in recent years the timber has been used in Nigeria for pit-Props and railway sleepers and some has been exported. In the



FIGS. 27 and 28.—Nigeria.

FIG. 27 (above).—Natural vegetation.

FIG. 28 (below).—Mineral fields and railways.

forests, mahogany and other cabinet woods are obtained, notably from the lower Niger and Cross river districts. Native rubber has virtually ceased to be collected, but a few plantations of *Hevea* have been started, notably near Benin and Calabar. The outstanding forest product is the oil-palm. In the eastern region of West Africa the fruit of this tree develops a thicker pericarp (the fleshy shell which encloses the nut) than that of the varieties common in the western region, so that palm-oil is as valuable an export as palm kernels. Oil and kernels together form the staple export of Nigeria (over one-third of the total value). The oil-palm, both wild and cultivated, is the mainstay of the native farmers of the central region of the palm belt, for in this region, roughly between Benin and the Cross river, the poorness of the sandy soils will not permit of much agriculture except for local food supply.

Agriculture.—The dense agricultural population and the comparatively advanced native methods characteristic of much of the northern area, have resulted, after British guidance, in a considerable development of cash, as opposed to subsistence, cropping. The agricultural department of the Nigerian administration has made enormous strides, by the establishment of experimental farms and research stations, in developing the commercial production of such crops as cacao and cotton, and in "getting into touch" with the native with a view to teaching him how better to utilise his land and secure an abundant and higher quality harvest.

The usual native shifting agricultural methods are practised in the jungle, and yams, cassava, maize, sugar cane and bananas are grown, usually mixed together. Cacao plantations have attained considerable success in the south-west, especially within reach of the Lagos railway line (Fig. 29). Developed somewhat later than the Gold Coast, the region bids fair, if unusually rainless seasons do not manifest themselves too frequently, to prove a serious competitor, for much Government attention has been given to the careful drying and grading of the beans, and the proportion of mouldy beans has been reduced to a figure far below that attained by the Gold Coast. Ibadan is an important centre of production. The Cross river district also has plantations. Cacao cultivation is impossible over the central portion of Southern Nigeria owing to the acidity of the soil. As in the Gold Coast, a considerable reduction in the oil-palm industry has resulted from the extension of cacao planting owing to the greater attraction of the plantations as a labour market, and to the competition of the East Indies in the production of palm-oil.

Native varieties of *cotton* have been cultivated over wide areas of the savana zone, and the native cotton industry is equally widespread. Commercial production is naturally greatest near the railway lines, and the extension of the main cotton belt along the

Lagos-Kano line is noticeable (Fig. 29). An improved native variety, with a fairly long staple (one inch) is being grown in the south and is beginning to enter the world market. American long-stapled cotton is successfully cultivated in the north. Ibadan and Zaria are two of the most important centres, where ginneries have been established. Neither improved native cotton nor American long-stapled has yet been successfully cultivated in the central part of the cotton belt.

Another agricultural product which enters commerce is the ground-nut. This plant is grown all over the northern region, but

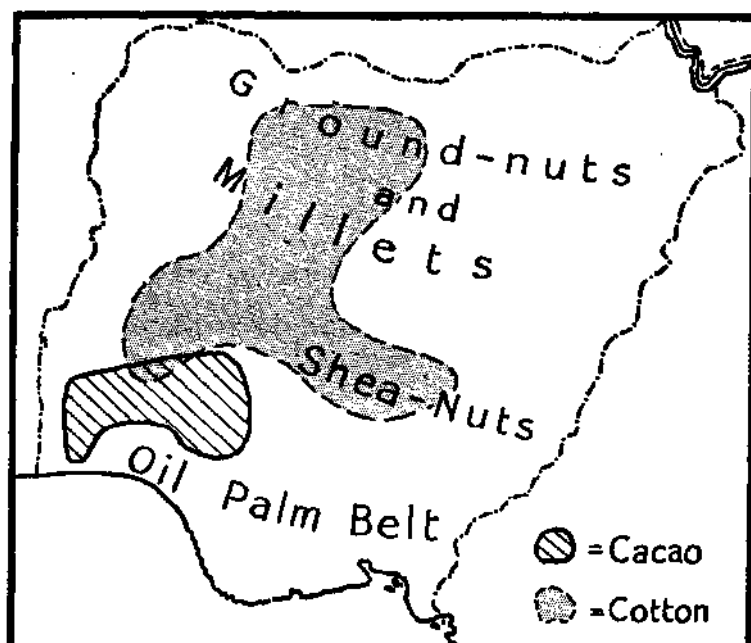


FIG. 29.—Nigeria.
Principal agricultural products.

commercial production on a large scale has developed only since the construction of the railway to Kano. Large quantities of shelled nuts are collected at Kano and railed to the coast for export. Bananas are produced on large German-owned plantations in the Camercons; the fruit is exported mainly to Germany.

There are many other items of importance in the native agricultural economy. In the deciduous forest zone the kola-nut tree assumes importance; its cultivation is extending on the edges of the cacao regions, especially where the soil is too poor for cacao. The shea-nut, as in the Gold Coast, is a vital article of food in the savanas. Tobacco is grown all over Northern Nigeria and in

Yoruba-land; and the principal crops of the agricultural Hausa peoples, whose methods, involving irrigation and manuring, are fairly advanced, are millet and guinea corn, cassava, onions and some wheat, with, of course, tobacco and cotton. Rice-growing may be extended in the Sokoto district.

Livestock represent a large part of the agricultural wealth of the northern region, and certain tribes of the Fulani people are still cattle-rearing nomads. Nearly ten million cattle, sheep and goats exist in Northern Nigeria, and the trade in hides and skins assumes great local importance; there is some export of these products also.

Minerals.—Nigerian mineral wealth falls into two classes—(1) the lignites and coals of the sedimentary rocks of the south; (2) the metallic ores of the crystalline plateau (Fig. 28). The only coalfield in West Africa occurs on the Udi Plateau, where, near Enugu, to which locality a railway was built from Port Harcourt, on the coast, are two adit mines producing several hundred thousand tons a year of quite good quality coal. The coal is used for railway purposes, for river steamers, and for bunkering at Port Harcourt, and some is exported for the Gold Coast railways. Development dates only from 1915 and some 1,600 square miles await exploitation. It is thus very unlikely that the lignites which occur south and west of the coalfield will be much worked. Native tin and iron smelting industries are found on the Bauchi Plateau, and a large area on the western side of that plateau is tin-bearing. Both gravel deposits and lodes have been worked, and modern development has been made possible, notably around Jos, by the light railway line to Zaria, and more recently by the direct main line to Port Harcourt, which has brought the mines within two days of the coast instead of three weeks as formerly. The ore is exported as a 70 per cent. concentrate. Gold and lead have been located and worked by the natives, and recently alluvial gold mining has been active around Minna.

Communications and Ports.—Unlike most African provinces, Nigeria possesses a considerable length of navigable waterways connected with the sea. The value of the rivers is somewhat decreased by their markedly seasonal flow, but during the period of greatest flow—July to October—the Niger is navigable for over 500 miles to Jebba, where the railway crosses it, and flat-bottomed river boats can reach the Kaduna confluence (460 miles) all the year round. The Benue is navigable during the rainy season for some 470 miles above its confluence with the Niger at Lokojo, to Yola; and the Kaduna is similarly navigable for 85 miles above where it joins the Niger. Of the coastal streams, the Cross river, with well over 200 miles navigable, is of great local value, especially for timber and palm-oil transport, and a long avenue of sheltered waterways stretches behind the coastal sand-pits for 150 miles eastwards from Lagos to the Niger Delta.

The railway plan of Nigeria resembles that of the Gold Coast, though the mileage is nearly four times as great (Fig. 30). Two main lines run inland from ports, meeting at a junction. The western line began in two sections, one from Lagos to Jebba and the other from Baro, a Niger port, to Kano. These were subsequently joined by a section from Jebba, crossing the Niger to Minna. Amongst important places on this line are Ibadan, Zaria and Kano. *Ibadan*, the old Yoruba capital, is one of the largest native cities in all Africa (150,000 people) ; it is now an administrative centre for the Southern Provinces. *Kaduna*, the administrative centre of

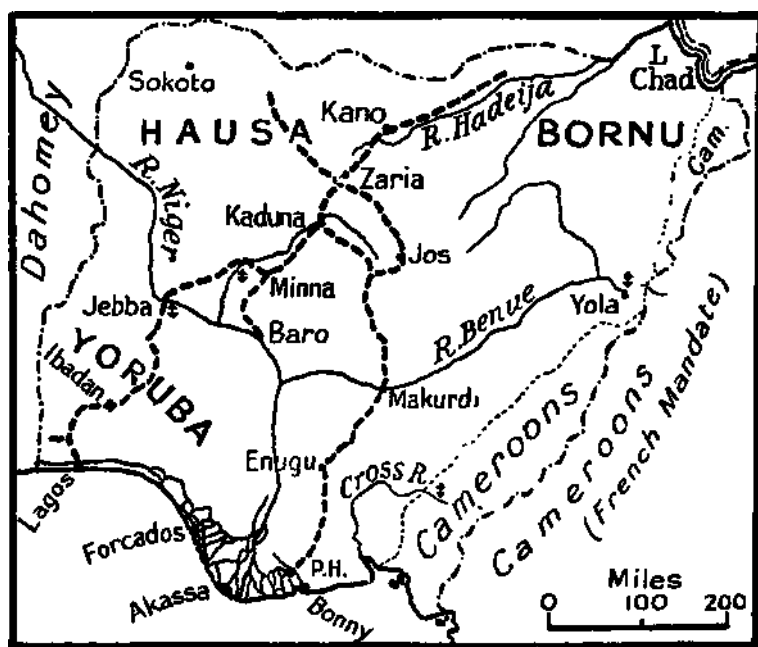


FIG. 30.—Niumu.

Key map showing localities and railways. P.H. =Port, Harcourt
Anchors mark head of navigation on rivers

the Northern Provinces, has replaced the old market town of *Zaria* as the chief railway junction-in Nigeria. *Kano* is the second largest native city (100,000 people), and is one of the greatest trade centres in the whole of the Sudan. Its outlook has been turned from the "grass road" east and west through the Sudan, to the south-bound railway line, but it remains an important market, especially for livestock and ground-nuts. The railway has been continued for some 150 miles down the Hadeija valley. The eastern railway runs from *Port Harcourt*, a deep-water ocean port with wharves on the Bonny river, completed in 1913, via Enugu, the coal-mining and

administrative centre, crossing the Benue at Makurdi, another large native town, and running through to Kaduna, giving off a branch to the Bauchi mining town of Jos. A narrow-gauge line connects Jos with Zaria, and from Zaria a railway is being pushed forward in the direction of Sokoto. The control of railway development by mineral wealth has already been indicated. The results of railway construction have been increased agricultural production, and further extensions in the north will extend the cotton and ground-nuts trade.

As in the Gold Coast, building of motorable roads has accompanied railway construction; there are now numerous east-west roads linking up the north-south railways and rivers.

Of the Nigerian ports, first is *Lagos*, situated on an island in a lagoon. Although Lagos has deep-water wharves, most of the trade is handled at the railhead wharves of Apapa, on the mainland opposite. Before the dredging of the lagoon entrance and the construction of breakwaters, Lagos was only a roadstead, and the chief port was Forcados, on the western side of the Niger Delta. Port Harcourt is now the second port, having as a valuable asset the cheap Knugu coal for bunkering; and Warri, Akassa and Bonny are smaller centres on the Niger Delta. Calabar serves the Cross river region and Victoria the mandated territory.

Trade.—The trade of Nigeria is shown in Fig. 31.

United Kingdom		Germany	USA	Others			
COTTON GOODS	METALS, MACHINERY	VEHICLES	MISCELLANEOUS				
GROUNDNUTS	PALM KERNELS	PALM OIL	COCOA	TIN ORE	HIDES	COTTON	OTHERS
United	Kingdom	Germany	France	USA	Neth'	It.	Others

FIG. 31.—Trade of Nigeria. (Average 1933-35.)

Average value of Imports, £6'5 millions. (Cf. 1925-29, £14'8.)

Average value of Exports, £9'6 millions. (Cf. 1925-29, £17'2.)

FRENCH WEST AFRICA

The main differences between the British and French portions of West Africa have already been partly alluded to. They are (1) the large proportion of the French area which lies within the savana zone (only three tongues of land—Guinea, Ivory Coast and Dahomey—extending southwards into the equatorial forest belt). (2) All the French territories join each other, and thus France has attempted to bring them all under one unifying administration, and to interlink them with railways, a policy which contrasts with

the necessarily individualistic development of the British areas, though in both cases the construction of railways has been prompted by the military authorities for strategic reasons. Over 2,200 miles of railway were in operation in 1933, and the lines are being continually extended (Fig. 32). (3) Mineral wealth is but feebly developed in the French areas, the only deposit of note being an occurrence of gold in French Guinea. (4) The development of the French areas as a whole has not reached such a high level as in the British areas, though considerable progress is being made in many parts, and numerous ambitious schemes for irrigation, agriculture and communications are in course of development.

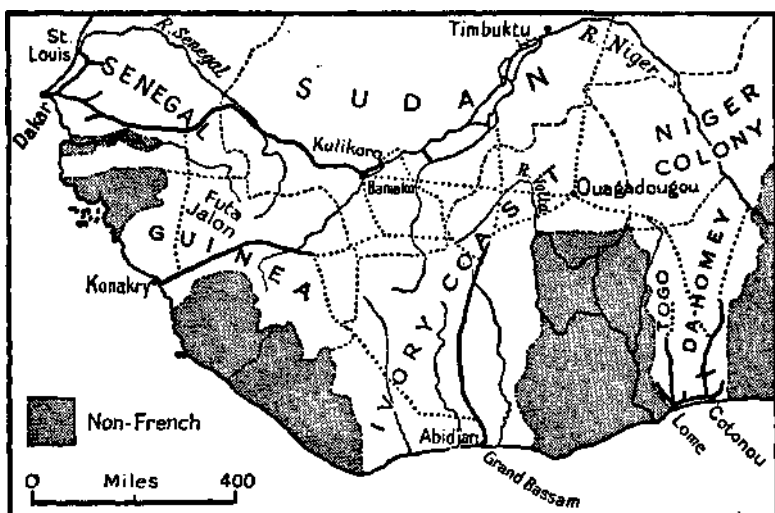


FIG. 32.—French West Africa.

The dotted lines are suggested railways. Note the proposed Unking of the various existing lines, and the possible focal position of Ouagadougou.

Exploitation has taken place mainly in two zones. In the savana zone extending from Senegal through French Sudan to Northern Nigeria, a fairly dense agricultural population exists and problems of agricultural methods and of irrigation have been dealt with. Separating this area from the coastal forests is the thinly peopled upland of Futa Jalon and the Volta-Niger watershed, in eastern French Guinea and north-western Ivory Coast. In the thickly peopled forest zone of western Guinea, southern Ivory Coast and southern Dahomey, the exploitation of forest wealth—cabinet woods and the oil-palm—and the introduction of plantation agriculture—cacao, coffee and bananas—have been the main lines of progress.

Senegal.—This province is situated almost entirely within the savana zone, wrapping round the narrow British Gambia territory on the north, east and south. It is not surprising, therefore, that

ground-nuts, cotton and millet are the chief crops, the former providing the bulk of the export trade. Much attention has been paid to the cultivation of cotton of both native and introduced varieties. The principal areas of economic agricultural production lie in the Senegal river plains in the north and along the railway line in the centre. The development of agriculture in the railway zone has checked the former seasonal movement of people into the Gambia. This railway line, running from *Dakar* on the coast to Bamako and Kulikoro on the Upper Niger, is the most important artery in French West Africa, and since its construction Dakar has easily surpassed St. Louis (33,000 inhabitants) and other ports on the Senegal coast. The Dakar district, with a population of 54,000, is administered separately from the Senegal Colony. *Kaolack*, although 60 miles inland, can be reached by ocean vessels, and being served also by the railway, it is the principal outlet for the ground-nut traffic.

French Sudan,—This region belongs as much to the southern Sahara (*cf.* p. 212) as to West Africa, in that a large part of it has under 25 inches of rainfall, and that one-fifth of its population is nomadic. The vegetation varies from savana in the south, with ground-nuts, rice, wheat, and the possibility of cotton and sisal plantations, to semi-desert in the north, with gum-bearing acacias and date-palms. The area most capable of development lies in the plain of the Upper Niger, from above Bamako, where the railway approaches thereto, to Timbuktu. Extensive stretches of low-lying riverside land, resembling parts of the Anglo-Egyptian Sudan (p. 191), are here inundated annually, and if only the floods could be controlled vast areas of land could be rendered irrigable and cultivable. A beginning was made in 1928 with the construction of earthworks to prevent flood damage, and in 1929 the construction of a dam near Bamako was commenced—a project which will result in the irrigation of a very large area on the right bank of the Niger. In 1931 the works at Sansanding were begun. This barrage and canal system will irrigate 3,700 square miles between Sansanding and Lake Debo. A great extension of cotton and rice cultivation may be expected to follow the completion of these works, and the increased water supply will produce also a greater growth of pasture for cattle and sheep. The irrigable areas have already the advantage of being tapped by the railway.

Timbuktu has lost the glamour which it held in popular imagination in times past. The diversion of much of the traffic of the Sudan to the railway lines, the decline of trans-Saharan caravan traffic and the cessation of the slave trade, have deprived it of most of its importance. *Bamako* (22,000 inhabitants) is the administrative centre.

French Guinea provides a link between the French savana territories and the coastal forests. The western portion resembles

Sierra Leone in its forests and native agriculture, palm kernels being the principal export, and rice the chief crop. The interior highlands are more open, and bananas, ground-nuts and cattle provide the basis of agricultural wealth. The principal port is *Konakry* (13,000 inhabitants) connected with the interior by a 300-mile railway line. Gold is mined and exported to France.

Ivory Coast resembles the Gold Coast, but it is less developed in every way. The equatorial forests yield mahogany and there are cacao and coffee plantations; and in the northern savanas, cattle, millet and native cotton are the most noteworthy items in the agricultural economy. The new wharf of *Port Bouet*, completed in 1931, now rivals *Grand Bassam* for much of the export traffic (except timber). *Port Bouet* lies on the opposite side of the lagoon to *Abidjan*, and is the terminus of the railway to the interior. A

F r a n c e			U K			Fr. Col.	U.S.A.	Belg.	Jap.	Others
COTTON	GOODS	METALS, MACHINERY	FOODS	RICE	WINES	OIL	COAL	MISCELLANEOUS		
GROUNDNUTS				COCOA	PALM KERNELS & OIL	GOLD	BANANAS	ANIMALS	MAHOGANY	OTHERS
P r a n c e								Br. Emp.	Ger.	Others
P r a n c e								others		

FIG. 33.—Trade of French West Africa (1933-35).

Average value; of Imports, 598 million francs (c. £7·7 millions). (Cf. 1930-32, £7-1.)
Average value of Exports, 502 million francs (c. £7 millions). (Cf. 1930-32, £5-9.)

pontoon bridge carries the rails across the lagoon. In 1934 *Abidjan* replaced *Bingerville* as the administrative centre.

Dahomey, and the mandated portion of former German **Togoland**, also resemble the Gold Coast and Nigeria in their vegetation zones and products. Palm kernels and oil are easily the most important items, but cacao and cotton plantations are developing, especially in *Togoland*, where pre-War German activity was considerable. Several short railways run inland from the ports, three from *Lome*, the port of *Togoland*, one from *Grand Popo*, two from *Cotonou*, the chief port, one of these via *Porto Novo*, the capital (24,000 inhabitants).

Trade of French West Africa.—Included in the French West African Federation are the territories of Niger Colony and Mauritania, which are considered later (pp. 190, 213). The combined trade of these two areas makes up less than 3 per cent. of the total, so that the diagram, Fig. 33, is not seriously in error by their inclusion.

The most noteworthy features of the trade are the great importance of Senegal (over half the total), a reflection of its geographical

environment, its sea-ports and its railways; the dominance of ground-nuts in the list of exports (half the total value); and the large share which France and Britain have in the total trade. France takes three-quarters of the exports and supplies about half the imports. Great Britain's share in the import trade (about 15 per cent.) is largely due to the demand for cotton goods and coal.

PORTUGUESE GUINEA

This tract consists of high savana and forest, the chief product of which is palm-kernels, obtained from the coastal districts. It has a well-developed system of roads and water transport, and a good port in *Bissau*.

LIBERIA

This republic commenced its existence in 1822, when a group of liberated American slaves were "settled." It has had a somewhat chequered history, subsisting largely upon American capital and nearly always in a semi-bankrupt condition. The American Liberians constitute an "aristocracy" numbering about 12,000, the governing capabilities of which do not seem to be great, and a large part of the native population is hardly civilised enough to assist actively in the economic development of the country. The whole area forms part of the forest belt, and native coffee, the oil-palm, rubber and piassava (a fibre-yielding plant) are the chief products. The capital and principal port is *Monrovia*, from which a solitary all-weather road has been constructed by the Firestone Company to their rubber plantations 40 miles away. There is a small but very mixed foreign population.

ISLANDS

The volcanic islands of Fernando Po, Sao Thome, Principe and a number of smaller ones, lie in the head of the Gulf of Guinea, continuing the alignment of the highlands of the Cameroons. Of the three named, Fernando Po belongs to Spain and the other two to Portugal. These islands have extensive cacao plantations and formerly occupied a very high place amongst the world's producers of cocoa, until the rise of the Gold Coast. Sao Thom⁶ is the best developed, with a small railway system serving the plantations, Fernando Po the least. Fernando Po has a volcanic peak rising to over 9,000 feet, and the small harbour of Santa Isabel, the chief port, is actually formed by the crater of an extinct volcano about half a mile across.

SECTION III

EQUATORIAL AFRICA

Under the title Equatorial Africa we include the region straddled across the Equator, west of the East African Highlands. Despite the uniformity induced by such a latitudinal position, and although the region consists essentially of the basin of one mighty river, the Congo, there is considerable variety of environment to be found, and the periphery of the region contains samples of several of the major African types. Thus the north-west reminds us, in climate, vegetation and products, of West Africa ; the north fades naturally into the Sudan and the Sahara Desert; the eastern rim borders on the Highlands of the Rift Valley system, and the south and south-east bring us to the typical plateau environment of South Africa; whilst the heart of the basin presents an environment resembling that of the Amazon Basin of South America, but unparalleled elsewhere in Africa.

Equatorial Africa is divided politically into two territories, French Equatorial Africa on the north-west and Belgian Congo on the south-east.

Territory	Area in sq. miles	Population	
		Native	White
<i>French Equatorial Africa—</i>			
Gabon	104,000	387,000	1,300 (1934)
Middle Congo	172,000	600,000	2,100 (1934)
Ubangi-Shari	236,000	1,176,000	800 (1934)
Chad	400,000	1,095,000	400 (1934)
Cameroons (mandate)	166,500	2,338,000	2,300 (1936)
<i>Belgian Congo—</i>	918,000	9,825,000	18,700 (1936)
[Ruanda-Urundi (mandate)]	21,000	3,385,000	900 (1936)

We shall here omit the Chad territory, which, although forming part of French Equatorial Africa, belongs naturally to the Sudan and Saharan regions (see p. 190). Our region thus extends from latitude 10° N. in the north to latitude 6° S. in the south-west and 13° S. in the south-east.

Physical Features.—Equatorial Africa comprises a vast, shallow basin within the surface of the African plateau, crossed by the Congo and its tributaries, and drained through a single

the east the mountainous wail of the East African Highlands, mostly over 0,000 feet, and rising to the peaks of Mfumbiro (14,600 feet) and Ruwenzori (16,800 feet), forms an effective boundary to the basin, but it is noteworthy that Lake Tanganyika sometimes overflows by the Lukuga gorge into the Lualaba stream of the Congo. On the south there are extensive flat tracts in the Dilolo region, at about 4,000 feet, which form an ill-defined watershed between the Lualaba and Kasai head-waters and those of the Zambesi; west and east of this region lie the highlands of Bihe and Katanga respectively, rising to well over 5,000 feet.

Geologically the Congo Basin is a very ancient tectonic depression, formed as early as Palaeozoic times by folding and faulting in the crystalline plateau block of Africa. In this lake-filled depression a thick series of continental deposits accumulated—mostly sandstones—derived from the wearing away of the surrounding rims during late Palaeozoic and early Mesozoic times. These sandstones remain little disturbed and almost horizontal, but occasionally faulting has produced important scarps which diversify the otherwise rather monotonous topography, and which provide obstacle to the smooth flow of the rivers. Large areas, notably in the region of Lake Tumba and Lake Leopold II, are covered with alluvium, and much swamp remains near the rivers.

The highland rims of the basin are composed of the usual crystalline rocks of the African Plateau, augmented by volcanic cones in the Cameroon Highlands and in the mountains bordering the western rift valley. In the Katanga region, in the south-east, occurs an interesting and economically valuable series of Palaeozoic sediments, folded and heavily mineralised, occupying an area surrounded by the ancient, crystalline complex.

The drainage basin of the Congo covers some 1,600,000 square miles, and many of the tributaries are larger than the greatest European rivers. The farthest head stream, known as the Chambezi, rises in the highlands at the southern end of Lake Tanganyika, only 430 miles from the Indian Ocean, and flows south-westwards into a vast swamp called Lake Bangweolo, of irregular size and shape according to season. Thence, turning northwards, the Luapula stream flows through the tectonic trough of Lake Mweru and emerges in the south-east corner of the great basin, and, joining the Lualaba, flows northwards, interrupted by several series of rapids, as far as the equator. Beyond the Stanley Falls the Congo turns westwards and then south-westwards, crossing the equator again, and unimpeded by rapids for 1,000 miles to Stanley Pool. Over much of this stretch the Congo consists of a central navigable channel, never less than 10 feet in depth, in the middle of a series of parallel, island-studded streams which form a belt of moving water sometimes 8 or 10 miles wide. The two largest out of many

hundreds of tributaries in this section are the Ubangi, formed by the confluence of the Mbomu and the Welle, and the Kasai, which, with its numerous affluents from the south and Lake Leopold on the north, drains an area as large as France. The Sanga collects much of the drainage of the Cameroons. Below Stanley Pool lies the great trench which the Congo has cut since the old lake basin first overflowed across a slight depression in the western highland rim, here known as the Crystal Mountains. In about 220 miles the river descends nearly 900 feet, in a series of 32 rapids known collectively as the Livingstone Falls, from Leopoldville to Matadi. Below Matadi, a broad estuary, about five miles wide, extends for the remaining 90 miles or so to the sea.

The unthinkable vast quantities of water—the drainage of a million and a half square miles—which tumble seawards over the Livingstone Falls would be capable, if harnessed, of producing equally unthinkable quantities of electric current, for the lower Congo has a fairly even flow, combining as it does the floods of both northern and southern summers. (The Kasai is lowest in March and July, and highest in May and December; the Ubangi, which is more irregular, floods between April and October.)

The western slopes of the plateau edge between the Congo Gorge and the Cameroon Highlands are drained by numerous swift-flowing streams which, being more powerful by reason of their short courses, have cut back for a considerable distance into the plateau. The Ogowe river, for example, in Gabon, is rapidly encroaching on the headstreams of two Congo tributaries, and the Sanaga, in Cameroons, is gaining ground at the expense of the Logone (to Lake Chad) and the Sanga (to the Congo).

The coast resembles that of West Africa in the presence of a shelving shore with surf, and lagoons with sandspits and mangrove swamps.

Minerals.—A large part of Equatorial Africa, made up of the horizontal sandstones of the Congo Basin, could scarcely be expected to contain much mineral wealth. The surrounding crystalline plateau has not up to the present yielded many metals or precious stones, the only exploited areas of any importance being the southern part of French Equatorial Africa, where copper has been worked, and the upper Kasai region, where diamonds are obtained. The extreme south-east, however, *i.e.* the Katanga, more than makes up for the deficiencies of the remainder, and here, extending into Northern Rhodesia, is one of the greatest potential mineral-producing areas in the world, with an almost unparalleled richness in ores of copper, cobalt and radium, and other metals, and some scattered areas of poor coal. Gold has been worked in the East African mountains west of Lake Albert.

Climate.—Despite the comparatively small latitudinal range of

Equatorial Africa, considerable differences in climate are to be found. The first noteworthy point is that over certain areas altitude reduces the temperature sufficiently to permit of white settlement, as in the highlands of Katanga and Bihe and on the western slopes of the East African mountains. Although the annual range of temperature, is nowhere large (varying from 2° in the Congo Basin to 14° in the Katanga), the daily range in the interior is appreciable (15° - 20°). Humidity is constantly high and damp mists are of frequent occurrence, though the number of actual rainy days in the year may not exceed 120. There are several distinct types of rainfall regime. (1) Equatorial, with no dry season; this occurs in western Cameroons (where the winds are westerly all the year, and have blown over the warm Guinea current) and in the Congo Basin round about latitude 2° to 3° N. The "rainfall equator" may thus be said to lie about 3° N. and the regime north and south of this line quickly shows traces of northern or southern hemisphere dry seasons. (2) Thus in the Ubangi and Welle Basins we find a sub-equatorial regime of northern type, with maxima in June and September, and appreciable drought in December and January. (3) South of about latitude 2° N. the southern type appears, with maxima in March and November and a distinct drought from June to September. (4) In the Katanga the two maxima have merged into the one of the tropical regime, the rainy season being November to April.

Over the whole of Equatorial Africa, except perhaps in western Cameroons, the bulk of the rain is of convectional origin, and over much of the Congo Basin afternoon and evening thunderstorms are of almost daily occurrence during the rainy seasons. Within the Congo Basin the total amount varies between about 50 and 70 inches, but on the west coast a rapid change occurs from north to south, from the 400 inches at the foot of Cameroon Mountain to 30 inches at the Congo mouth and 10 inches at Benguela in Angola (Fig. 35). Such aridity so near to the equator may be compared to that which exists in similar latitudes on the west coast of South America. Here the makicauseis the cold water of the Benguela current, the influence of which is felt as far north as Cape Lopez, where the trend of the coast directs it seawards. As we have seen (p. 6), the prevailing winds during the season when most rain could be expected (November to March) are from the west (the south-east Trades drawn in by the low pressure in the interior), and as these winds are blowing from the cool water to the heated land, they precipitate little moisture until they reach the interior and rise convectionally. At the opposite season of the year the south-east Trades, blowing from the land, are naturally rather dry. The Benguela current is also responsible for the cooling of the coastlands, but this phenomenon is most evident south of the Congo mouth in Angola.

Natural Vegetation and Agriculture.—Four major types of natural vegetation occur : equatorial forest, high savana, dry savana forest, and the forests and grasslands of the East African mountains. Mangrove swamps occur along the whole coast, and especially north of Cape Lopez. The equatorial forest belt is of much more limited extent than was supposed in the early days of African exploration. Its greatest density is reached in southern Cameroons and Gabon,

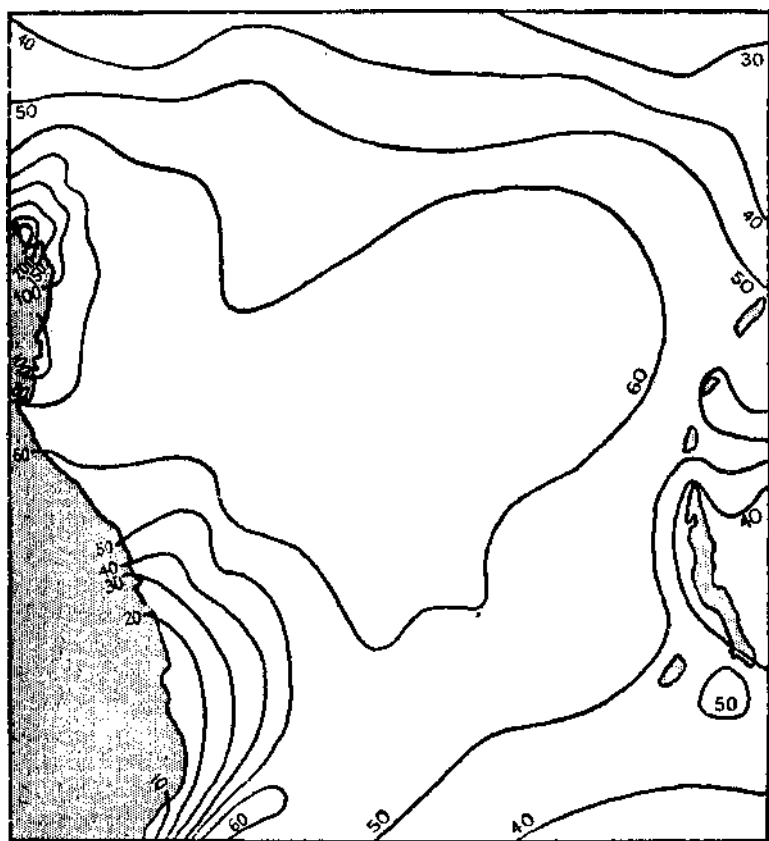


FIG. 35.—Equatorial Africa : mean annual rainfall.

over the area between the Middle Congo and the Ubangi-Welle, and between the Upper Congo and the northern section of the East African mountains. A rainfall of less than 60 inches is inimical to the growth of dense rain-forest, and so the southern half of the French colony of Middle Congo is covered with high savana. Parts of the area lying within the great double bend of the Congo, away from the rivers, are likewise not densely forested, and a broad belt of high savana extends from southern Middle Congo to the Katanga.

Large areas of these savanas owe their existence to the poorness and porosity of the sandstone soils. Native utilisation of the forest resources resembles that of the West African forests. Rubber, palm-oil and gum copals are amongst the collected products, whilst yams, plantains, bananas and rice are the principal cultivated crops. Many of the more primitive tribes, notably the pygmies, still practise a shifting agricultural system, occupying a forest clearing for only a year or two before moving on to another, for the soils are frequently poor and are badly leached by the heavy rainfall; and no fertilisers are used. This agriculture can scarcely be called cultivation, as the only implement is the wooden hoe and little attention is paid to the growing crops—the climate and the luxuriance of the vegetation render it undesirable and unnecessary to perform much labour. Under white influence rubber-tapping and the collection of oil-palm products have attained a considerable degree of development. Rubber production reached its maximum in the first decade of this century, but overtapping seriously reduced the resources, and cheaply produced plantation rubber reduced the competing power of the collected produce of the Congo. Plantation products include "hevea" rubber in the eastern part of the Congo Basin, cacao in Cameroons, and coffee in the lower Congo region. Cabinet woods of the mahogany type have been exploited in Cameroons. In the Congo Basin it is impossible to make much use of the timber resources, in the first place because of the "unsocial" nature of the species, and secondly because of the extreme difficulty of transport to the coast over the 220 miles of the Livingstone Falls. Ivory was formerly an important forest product, its value enabling it to stand the cost of transport to the coast.

High savana extends in the north across the northern Cameroons and Ubangi-Shari, and in the south from southern Middle Congo to the Katanga. Northwards these tree-savanas merge into the grassy-savanas of the southern Sudan. Southwards they assume the dry-forest type (p. 15), with considerable stretches of open grassland, as on the Katanga Plateau, and on the Bihe Plateau in Angola. The principal natural resources of these savanas are native crops of tobacco and cotton, and livestock. Both tobacco and cotton are extensively grown north of the Ubangi and in the Welle-Mbomu Basin, and also in the southern savanas, where cotton cultivation is especially important in the Kasai region and tobacco on the Bateke Plateau of southern Middle Congo. The native livestock suffer severely from the ravages of the tse-tse fly in most areas, but in the Katanga cattle-rearing is being developed.

Above about 3,000 feet, on the highlands of Cameroons and the East African mountains, the density of the equatorial jungle decreases, and forests of different type, often with extensive bamboo thickets and broad areas of open grassland, supervene. In the

Lake Kivu Highlands, in an environment not unlike that of the Kenya Highlands (pp. 163-7), coffee plantations and livestock farms have been developed.

Population and Development.—Naturally, in an equatorial area, a great deal of which is little more than 1,000 feet above sea-level, the population is almost entirely native. It is perhaps fortunate, from the point of view of economic development, that the area having the greatest potential wealth—the Katanga—should lie in the far south-east, where latitude and altitude combine to render the climate more suited to white occupation.

Three main ethnic groups are to be found in Equatorial Africa. Numerous pygmy tribes still lead a semi-nomadic existence in the western part of the equatorial forest belt, untouched by civilisation, though usually having friendly relations with neighbouring Bantu tribes. In the north, in the Ubangi-Welle region, are a group of agricultural—and formerly cannibal—people of Negro-Hamitic character, but unrelated either to the Bantus or to the Nilotes of the Anglo-Egyptian Sudan. Over the rest of the Congo Basin, Bantu peoples are settled, often in long, straggling villages of great size, housing perhaps 15,000 inhabitants. Many extensive native empires have been built up in this region, and the Congo derives its name from the Kongo Empire which held sway in the fifteenth century, when the first Portuguese discoveries were made. Amongst the most powerful groups at the present time are the Fang, in Gabon, formerly a very warlike people much addicted to cannibalism; the Bushongo in southern Belgian Congo (in the basin of the Sankuru, a tributary of the Kasai); the Balunda of the Congo-Zambezi divide; and the peoples of the once-famous Wanyamwezi kingdom in the Katanga.

This area had an unhappy introduction to white "civilisation." It has been estimated that from the French area alone some 10 or 12 million slaves must have been obtained in 300 years, and the number exported from farther south by the Portuguese probably greatly exceeded this.

The modern period of development began in 1879 when a Belgian commission, led by the explorer Stanley, commenced the exploration of the Congo Basin and the inauguration of friendly relations with the native chiefs. This resulted, in 1885, in the formation of the Congo Free State, with Leopold II of Belgium (acting only in his private capacity, and not as King of Belgium) as its first monarch. Leopold renounced his rights in 1890, and the area was declared inalienable, i.e. no other country except Belgium could attempt to annex territory. It passed finally into Belgian control in 1908. Numerous missionary stations had been founded and roads cut into the interior, and the great work of introducing the on the whole intelligent and adaptable native peoples to higher standards of

life and civilisation was in progress. After the set-back caused by the Great War, development has proceeded apace during the last decade, and great strides have been made in the improvement of communications and agriculture and in the suppression of disease.

From the beginning, one great incentive to the development of transport in the southern part of the Congo Basin was the mineral wealth of the Katanga. This region was annexed to the Free State in 1892 from a native chief who seemed favourably disposed towards the acceptance of a British protectorate. It has become a focal centre for railway development, and has important relationships with the adjoining British and Portuguese territories, for the outlet to the ocean through Belgian territory is only one of several alternatives.

French and German occupation and development in the north-west began shortly before the end of the last century, and, as in West Africa, the German territory had reached a more advanced stage than the French by the outbreak of the War. After the War the greater part of Cameroons was handed over to French control, under mandate from the League of Nations, a small portion on the western side being included with Nigeria. The population is not dense, and is greatest in the coastal region; some difficulty has been experienced in getting a sufficient and reliable supply of labour for works in the interior. The development of plantation agriculture, and the improvement of rail and road transport are amongst the main objects of the French administration.

FRENCH EQUATORIAL AFRICA

The territories which comprise L'Afrique Equatoriale Française are Gabon, Moyen Congo, Ubangi-Shari, and Chad, together with the Cameroons mandate. Dealing here only with the equatorial and sub-equatorial portions, we omit the Chad Colony which lies north of 10° N.

Physical Features.—The coast is low and swampy with mangroves. Between the Congo mouth and Cape Lopez it is fringed with sandspits and lagoons, the result of the northward-flowing Benguela current, and throughout its extent it resembles the shelving surf coast of West Africa. There are few inlets. The Gabon estuary supports Libreville, but the new port of Pointe Noire, in the south, is artificial (*cf.* Takoradi). The land rises quickly to the crystalline plateau, often in a series of terraces. This plateau, extending in a broad arc from the Crystal Mountains to the Anglo-Egyptian Sudan, averages between 2,000 and 3,000 feet in height, and contains many broad expanses of little relief, thickly covered with a mantle of laterite soil; but several large massifs of higher and more rugged topography stand out above the general level. Such are the Chaillu massif in Gabon, the Yade Plateau in Central Cameroons, the Cameroon Highlands forming the Nigerian

frontier, and the Dar Fertit massif in the north-eastern part of the Ubangi-Shari colony. The western slopes are drained by the Kwilu, in the south, the Ogowe in the centre and the Sanaga in the north ; the rest of the territory, with the exception of a part of the Lake Chad drainage system in the north, drains *via* the Mbomu, Ubangi, Sanga and other tributaries to the Congo.

Climate.—There are four major climatic regions :

(a) Western Cameroons, with a very heavy rainfall (80-200 inches) which reaches a maximum at the time of the West African monsoons—*i.e.* June to September, and shows no dry season.

(6) The lower Ubangi region of Middle Congo Colony and south-eastern Cameroons where, a few degrees north of the equator, an equatorial rainfall regime prevails, with maxima in April and October, and no dry season. The total rainfall is about 70 inches.

(c) Gabon and southern Middle Congo, where the rainfall is between 50 and 100 inches, and a " southern hemisphere " regime is shown by the maxima in March and November and the dry period from June to August.

(d) Northern Cameroons and the Ubangi-Shari Colony, with a rainfall of between 40 and 60 inches and a distinctly " northern hemisphere " regime, with maxima in June and September, and a dry period from December to February. In the Shari Basin, in the northern part of this region, the two rainfall maxima merge into the one characteristic of the Sudanese type of climate.

Natural Vegetation and Agriculture.—To a very large extent these climatic regions are also natural vegetation regions, (a) and (b) corresponding to dense equatorial forest, whilst (c) and (d) show high savana, with fairly dense stands of forest along the rivers, especially in Gabon and Middle Congo. .

Native agriculture of primitive type in the equatorial forests yields the usual essential food crops: yams, bananas, rice and manioc amongst others. Various rubber-vines have been exploited, notably in the Sanga and Ubangi forests, and there are some young plantations of Brazilian rubber-trees in Gabon. Palm-oil and kernels are also obtained, chiefly in the coastal zone. Mahogany woods of various kinds are cut in Gabon and western Cameroons, and ivory has long been a product of value. Some flourishing cacao plantations, developed by the Germans, exist in Cameroons; much native coffee is grown in the Congo Basin, and some plantations have been started in southern Gabon. Development is greatly hampered, however, by lack of transport, both railway and road construction and maintenance being difficult owing to the plateau edge and the heavy rainfall.

The high savanas of the north are lands of millet, maize, beans and cotton. Little improvement of native agriculture or plantation development has yet been effected, but there are possibilities of a considerable increase in cotton acreage in the lower Mbomu

Valley, and in the annually flooded Upper Shari region. Livestock suffer in most areas from the tse-tse fly, but they may become of greater importance in the fly-free area of the Bateke Plateau in southern Middle Congo, where also tobacco and sisal are grown.

Minerals.—The only mineralised region which has begun to be exploited lies in the extreme south of Gabon, where, around Mindouli, copper ores are worked. Other metals are known to exist and have been worked by the natives, but commercial exploitation is obviously impossible without railway transport.

Communications and Ports.—The development of French Equatorial Africa up to the present has been largely coastal, and not very great, although ambitious schemes for road, railway and air transport have been formulated, as in West Africa. The chief obstacles are the density of the equatorial forests, and the inadequacy of the native labour supply. The navigable rivers of the interior are valuable arteries of trade (Fig. 36). *Banghi* is a river port on the Ubangi, and *Wesso* acts in a similar capacity as the head of flood-season steamboat navigation on the Sanga. *Brazzaville*, on the northern shore of Stanley Pool, is at the foot of the Congo navigation, and is the administrative centre of the territories. It is now connected by a 360-mile railway through the Mindouli copper-mining area to *Pointe Noire*, a new and artificial port, with a long pier which can be approached by ocean vessels, thus eliminating the use of surf-boats. *Pointe Noire* has thus supplanted *Loango*, its near neighbour, where steamers must anchor three miles from the shore. *Libreville* is the chief outlet for the produce of Gabon. The former German Cameroons region is rather more developed, except in its northern part, and four short railway lines run inland from the coast, three of them from the port of *Duala* (for which ocean liners off-load at the mouth of the Cameroons river, 25 miles away), the longest of which runs to the plateau town of *Yaunde*. It is proposed to extend this and the northern line north-eastwards. Much of the trade in the Cameroons area is still in German hands.

Trade.—The total trade of French Equatorial Africa is not great. It is only about one-quarter the value of the trade of French West Africa. France supplies about half the imports, and takes nearly as great a proportion of the exports. The chief exports are timber from Gabon and palm-oil, kernels and cocoa from Cameroons.

SPANISH GUINEA

This small and undeveloped territory (population 140,000) lies between Gabon and Cameroons, centred upon the *Rio Muni*, which gives the area its alternative name. Its Spanish ownership is a reminder of the slave-trading days, when the port of *Benito* was an exporting centre for human freight. It is characterised by dense equatorial forest.

BELGIAN CONGO

The Belgian Congo possesses the advantage of an earlier start on its road to development than the French areas, and of having received a very great deal of attention, both as regards mineral and agricultural development, from the Belgian administration. Although large areas within the vast territory, 900,000 square miles



FIG. 36.—Equatorial Africa : Railways and navigable waterways.

Note the ability of the new Benjuela and Pointe Noire railways to reduce the importance of the Leopoldville-Matadi line.

in extent, are still almost untouched, many other areas have been subjected to a considerable advancement of productive capacity and degree of native civilisation.

Physical Features.—Physically, Belgian Congo falls into four divisions :

(a) The central basin of the Congo, averaging 1,200-1,500 feet above sea-level and exhibiting little variety of relief except for the

inward-facing fault-scarps. The northern half of this region drains by many tributaries to the navigable Middle Congo ; the western portion is the basin of the lower Kasai and its main tributary, the Sankuru.

(6) Below Stanley Pool the Congo enters its swift lower course through the edge of the plateau, and the areas on either side have been subjected to considerable development.

(c) Eastwards of the fall-interrupted Upper Congo, the land rises gradually to the mountain wall of East Africa and to the plateau which forms the Congo-Nile Watershed. The Ruanda-Urundi territory, mandated to Belgian Congo from German East Africa, extends across the western rift valley between Lakes Edward and Tanganyika, including the fairly developed highland area around Lake Kivu.

(d) In the south and south-east the land rises gradually to the Bihe and Katanga Plateaus where, although the elevation reaches more than 5,000 feet, the relief is inconsiderable. In the main this region is drained northwards by the Upper Kasai and its tributaries, and by the Lualaba and Luapula headwaters of the Congo, but a small area comes within the drainage of the headwaters of the Zambesi.

Climate.—The latitudinal range of the Belgian Congo, from 5° N. to 13° S., necessarily entails considerable differences of rainfall regime. The actual total is at a maximum in the region of the Middle Congo (about 70 inches), decreasing northwards, eastwards and southwards, to about 65 inches on the Ubangi frontier, 40 inches on the highlands around Lake Tanganyika, and 40 inches in the Katanga. Four distinct regimes are apparent, as described above: (1) northern sub-equatorial, in the Ubangi region, with maxima in June and September and a December-January drought; (2) equatorial, without dry season, round about latitude 2°-3° N. ; (3) southern sub-equatorial, extending from about latitude 2° N. to the southern plateaus, with maxima in April and November and a dry season lengthening southwards from about two months on the equator (July-August) to four months in the south-west (June-September, as at Banana); (4) tropical, in the Katanga, with practically six months' drought from April to September.

During the dry season, south of the " rainfall equator," the winds blow from the south-east; in the north we find convectional rainfall with calms, associated with the overhead sun, or westerly winds from the Gulf of Guinea. During the southern wet season, calms and daily thunderstorms, with occasional westerly winds, occur, whilst the north is receiving dry north-easterly winds.

The association of heavy rainfall and high humidity for the greater part of the year means that natural hot-house conditions prevail; but the incidence of tropical fevers and other diseases is

probably greatly lessened by the altitude. The most unhealthy region is the lowest stretch of the river Congo, below Boma. Higher up the Lower Congo the daily cool sea-breeze from over the Benguela current somewhat alleviates the heat and humidity and permits of some white settlement.

Natural Vegetation and Agriculture.—The greatest extent of dense equatorial forest occurs between the Middle Congo and the Ubangi, and between the Stanley Falls bend and the mountain rim. Broad strips of dense forests follow the main streams south of the Congo, but the porosity of the underlying sandstones in the intervening regions results in a much sparser distribution of large trees, with some savana grasses. Native agriculture resembles that of the French equatorial forests. The women do most of the cultivation, although men do the forest clearing and hunt and fish. The people are self-sufficing, and have no incentive to forsake this mode of life for plantation labour or other work. Of the collected products, rubber has been of greatest importance in the past. In fact, the formation of the Congo Free State may be said to have created the African rubber industry, for the natives previously made no use of the substance. The completion of the Leopoldville-Matadi railway in 1898, by at last providing a fairly easy route avoiding the Livingstone Falls, gave a great impetus to the export of rubber, and the peak period was 1900-1910. The primitive and wasteful methods had by this time seriously spoilt many of the best producing areas, however, and only an all-round improvement in methods and the planting of Brazilian varieties saved the industry from complete disaster. The chief rubber-producing plants are woody lianes—*Funtumia elastica* and others—which are found all over the Congo Basin except on the south-eastern plateau. Some 5,000 acres of *Hevea* rubber-trees have been planted in the eastern region near Stanleyville, but the industry is now practically dead.

Previously to the development of rubber-tapping, the oil-palm and ivory had provided the chief exports from the forests. The oil-palm, at its best on the outer edges of the equatorial forests, has regained the prime position on the list of vegetable products, and much attention has been concentrated on the production of kernels and oil during the last decade. Gum copals are also important.

In the high savana zones the forested parts yield rubber, as before, and the native cultivation, as in the Welle basin, includes tobacco and cotton. An increase in the cultivation of improved varieties of cotton may be expected in the Welle and Kasai regions, for the supply of the Belgian textile industry. Two highland areas have coffee plantations: the Mayumbe district, north of the Congo Estuary, and the highlands of Lake Kivu; a good deal of native coffee is also grown.

The dry forest zone of the Kasai and the Katanga have yam, maize and manioc cultivation, and being, on the whole, free from

tae-tse fly they will probably increase in importance for cattle-ranching, since white occupation is possible, and the mining settlements provide a local market. Livestock farming is developing also in the highlands of the north-east (west of Lake Albert).

Minerals.—1. *The Katanga.* As a result of its mineral wealth, the Katanga region has attained to a considerable industrial development, and is now well supplied with railway and water routes to the coast. It is an area of folded and fractured early Palaeozoic rocks, lying on the watershed between the Lualaba and the Lufija headwaters of the Congo and the head of the Kafue tributary of the Zambesi, and surrounded by the crystalline rocks of the South African Plateau. The most important mineral-bearing formation is a series of dolomites of Cambrian age, and the mineral content is greatest along the N.W.-S.E. fault-zones which cross the east-west folds. The chief region is a 250-mile belt stretching north-westwards from Elizabethville, which as a result of the industry has become the greatest commercial centre in Central Africa. Copper is mined on a large scale at Kambove, and smelted at Panda. There are other rich copper mines farther south. Tin is mined, zinc and iron are known to occur, and the output of cobalt is the greatest in the world. The region had until recently practically a world monopoly of radium. Some coals occur near Bukama and in the Lukuga Valley. The former are important because of the smelting industries, but they are insufficient for the local needs, and large quantities are imported from the Wankie mines of Southern Rhodesia for the smelters and electric power-stations; some of the latter, however, have been superseded by hydro-electric plants.

2. *The Kasai.* Alluvial deposits are here worked for diamonds, and the region ranks second to South Africa in the production of these gemstones. The chief mine is operated by hydro-electric power.

3. *The Kilo-Moto* area, in the highlands north-west of Lake Albert, has exploited gold deposits, whilst gold and tin are also worked further south, in the mandated territory.

Communications and Towns.—The Congo and its tributaries provide over 6,000 miles of navigable waterways, and where rapids occur to interrupt navigation, railways have been built (Fig. 36). The Congo is navigable for 95 miles from its mouth to Matadi, and then the Livingstone Falls are rounded by the earliest railway in the region, from Matadi to Kinshasa and Leopoldville, which was completed in 1898 and has recently been re-aligned to lessen the gradients. Above Stanley Pool there are 1,000 miles of steam-boat navigation to Stanleyville. The Stanley Falls are rounded by a railway to Ponthierville, and then another navigable section extends to Kindu. A further series of rapids is rounded by the railway to Kongolo, whence navigable water extends to Bukama,

the river port of the Katanga, on the Lualaba. A railway also connects Kabalo, on the Upper Congo, to Albertville, a port on the shore of Lake Tanganyika which has steamer connections with Kigoma, the terminus of the Central Tanganyika Railway.

It is proposed to connect Kilo and Moto, the highland mining centres, by a railway to Stanleyville, and construction has already begun in the mining region. At present much of their output reaches the outer world *via* the Uganda Railway.

The Katanga mining region has become the focus of three main lines of railway (Fig. 37). The all-Belgian exit to the coast is the most difficult. It involves a rail journey to Port Franqui on the Kasai (it is intended to continue this line to Kinshasa), then a steamboat trip down the Kasai and the Congo to Kinshasa and then

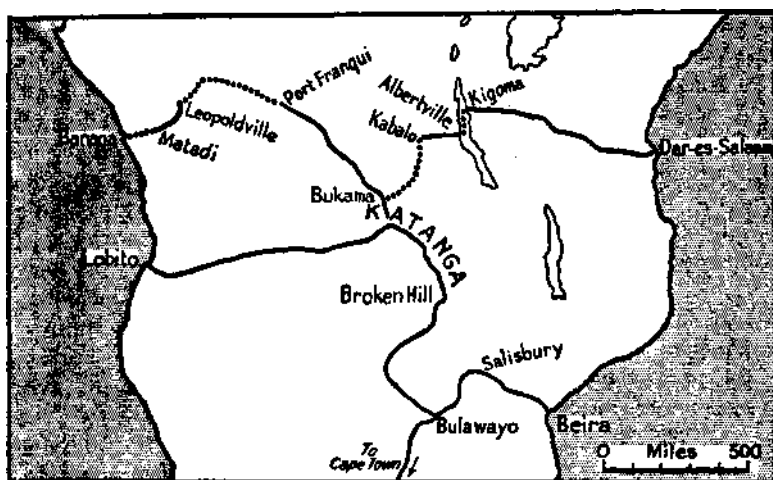


FIG. 37.—The outlets of the Katanga.

Lines = railways ; dots = steamer connections.

by rail to Matadi. Southwards the Bukama-Kambove-Elizabethville line continues into Northern Rhodesia, thus giving another outlet to the port of Beira. Most of the Katanga minerals are exported from Beira. With the recent completion of the Benguela Railway from Tenke, on the Elizabethville-Bukama line, to the Portuguese port of Lobito, a new direct route, some 300-400 miles shorter than any of the others is opened, but the vested interests of Beira have as yet prevented any considerable traffic from following this route.

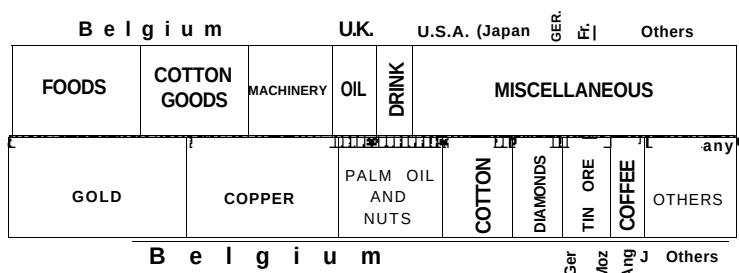
The only other noteworthy railway line lies in the Mayumbe country, running from Boma, on the Congo estuary, to Chela and serving the rapidly developing plantations.

Aeroplane services, obviously of immense value in an area of

difficult surface communication such as this, have been established between Boma, Leopoldville and Stanleyville, between Leopoldville and Luluabourg, and between Elizabethville and Broken Hill, and a regular service links the territory with Brussels.

The administrative centre of the Belgian Congo is *Leopoldville*, adjoining it is *Kinshasa*, the principal Congo port above the Livingstone Falls. *Matadi*, with its extension Fuca Fuca, is the only ocean port of importance, despite its position 100 miles up the Congo mouth; over 100 million francs have been spent on its equipment. Boma and Banana are of little consequence. Just below Matadi is the special oil port of Ango Ango, from which a pipe line carries fuel to Leopoldville for the Congo steamers.

Trade.—The trade of the Belgian Congo is illustrated in Fig. 38. The most noteworthy features are the importance of minerals, especially copper, in the list of exports; the large quantities of iron and steel goods imported for railway and mining development; and the large proportion of the trade which is conducted with the mother country, Belgium.



Average value of Imports, 431 million francs (c. £3.6 millions). (Cf. 1925-29, 1.4 million fr.)
 Average value of Exports, 901 million francs (c. £7.5 millions). (Cf. 1925-29, 1.0 million fr.)

ANGOLA

Portuguese West Africa, otherwise known as Angola, is the largest of Portugal's possessions. It includes the Kabinda Enclave lying to the north of the Lower Congo between French and Belgian territory. The total area is about 485,000 square miles; the population in 1934 was 3,225,000, including 58,000 whites. Until the war Angola remained in a very backward condition. An extensive programme of development was formulated and commenced in 1921, but after a time financial difficulties set in and progress was arrested. Within the last few years a revival has been staged, largely as a result of the completion, with the help of British collaboration, of the Benguela Railway from Lobito to the Katanga mining region, and a considerable advance in the economic utilisation of the central part of the territory is likely to occur, for the new railway will be the main gateway, from Europe into the southern part of Central Africa.

Physical Features.—Angola occupies a transitional position between the Congo Basin on the north, the coastal semi-deserts on the south-west, and the plateau of South Africa on the east and south-east. Its east-to-west "axis," along which runs the Benguela Railway, is the Bihe or Benguela Plateau, one of the main watersheds of the continent, dividing the Congo and Kwanza drainage to the north from the headwaters of the Zambesi to the south-east, the Lake Ngami drainage to the south, and the Kunene to the south-west.

Behind the coast lies a belt of lowland, rising gradually to 1,000 feet, and narrowing from over 100 miles wide along the Congo estuary in the north until it almost disappears in the south as the plateau approaches the sea. Behind this flat or gently undulating zone the land rises more steeply, and often by distinct terraces, to the level of the plateau. The plateau has an elevation in the Congo and Loanda provinces of the north of from 3,000 to 5,000 feet; towards the south it rises to the Bihe Plateau in the Benguela Province, where the average is nearer 6,000 feet, and parts rise to over 7,000 feet. The level drops again southwards and eastwards to about 4,000 feet, the characteristic level of much of the South African Plateau.

Climate.—The most striking feature of the climate of Angola is the drought and comparative coolness of the coastal region. The rainfall varies from 20 inches in the north to less than 10 inches in the south as the coastal desert of south-west Africa is approached. The average temperature for the year at Mossamedes is only 69° compared with 79° at Mozambique in the same latitude on the east coast, and average temperatures on the coast may be less than those of stations a couple of thousand feet up on the plateau, although of course the range will be greater in the interior. These features are partly the result of the cool Benguela current, across which the prevailing south-westerly breezes have blown, and partly due to the position of the coastal plain at the foot of the plateau, so that any easterly winds are descending and thus dry.

On the plateau the rainfall varies between about 40 and 60 inches. The regime varies from southern sub-equatorial to tropical, but in general one may say that the rainy season lasts from about September to May in the north, divided into the lesser rains from October to December, and the greater rains from February to April, separated by a drier period in January. In the south the rainy season is shorter, and shows a single maximum. In the dry season frosts are common on the plateau at night owing to the great radiation under clear skies.

Natural Vegetation and Agriculture.—The whole of Angola is covered with various forms of savana. Forests only occur along the larger rivers in the north. The savanas vary considerably

in character with the total rainfall and the length of the dry season. In the north, on the plateau, high savana occurs, producing a park-like landscape of tall grasses and trees. Farther south the high savana changes to a "dry forest" of flat-topped trees and tall dry grasses. The coastal zone shows dry acacia-savanas in the north, merging southwards into semi-desert scrub with low bushes and eventually into almost absolute desert. The Kabinda region lies on the outer edge of the equatorial forest belt.

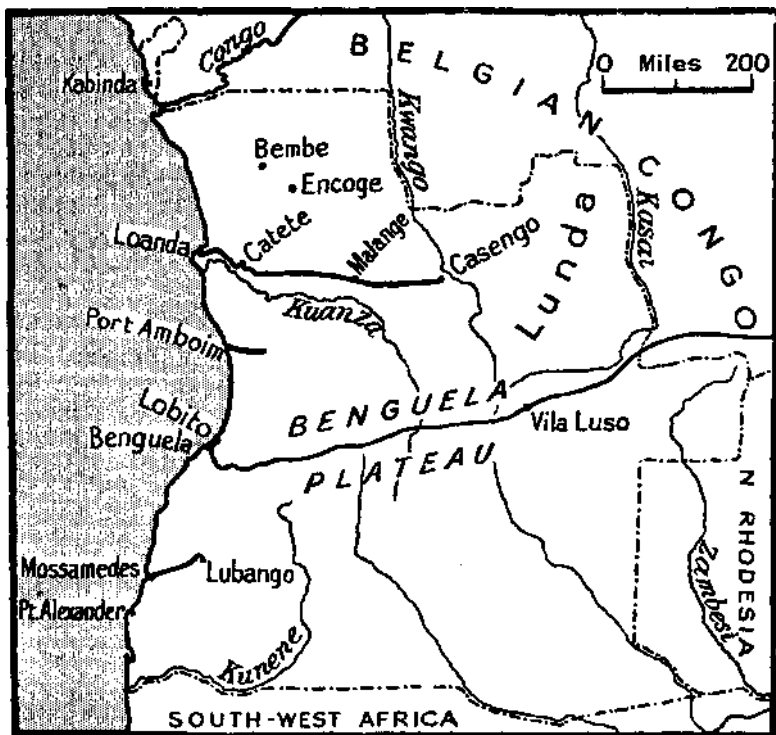


FIG. 39.—Angola.

Native agriculture is concerned with such crops as maize, manioc, beans and tobacco, whilst upland rice, ground-nuts and even wheat are grown on the central plateau. Wild coffee grows abundantly in the north, where also the oil-palm occurs.

Commercial agriculture naturally depends to a large extent on transport facilities, and so the greatest development has taken place in the neighbourhood of the Loanda, Amboim and Benguela Railways (Fig. 39). Improvement and standardisation of quality are very necessary in the case of most of the exports.

Coffee is planted with greatest success on the western edge of the plateau, but most of the output is still from wild trees. Production

for export is mainly in the Casengo area, on the Loanda Railway, in the district around Encoge, to the north of Casengo, and in the Amboim region, where the recently constructed railway has opened up some of the best coffee areas in the country.

Interest in the *oil-palm* has increased and its products are obtained from the northern riverside forests, particularly near the Congo and the Lower Ewanza, and also from the Kabinda region. *Sugar-cane* is also a product of the wetter riverside lands of the north, and is particularly important in the hinterland of Port Amboim. *Cotton* is a natural crop in a region of savanas; the chief growing centre at present is Catete, inland from Loanda on the railway, but the crop is grown also in the Amboim region and in some parts of the Benguela Province. *Cacao* plantations have been established in the Kabinda area. *Maize* is the most widespread crop, forming an important export (as flour) as well as the principal food of the natives. Much is cultivated on the Benguela Plateau, where the advent of the railway has provided a stimulus to production for export. Beeswax is collected by the natives and exported.

Livestock are naturally present in large numbers in an upland savana region. Cattle are reared chiefly in the Mossamedes Province and on the plateau in the interior of Benguela, where the possibility of supplying the Katanga market may result in increased activity. Sheep are found mainly in the drier southern regions.

There is a good deal of coastal fishing, centred on Mossamedes. Loanda and Benguela, and dried fish are exported, mainly to the Congo territories.

Minerals.—The diamond field of the upper Kasai region of Belgian Congo extends into Angola, and deposits are being worked in the Lunda district, in the far north-east. This is at present the only seriously exploited mineral product, although a variety of ores and fuels probably exists. Thus copper ores are known to be present in great quantity at Bembe, in the north, awaiting the arrival of a railway line, and much metal wealth has been found on the southern plateau. Coal, which may be important for the Benguela Railway, occurs on the Benguela Plateau, and traces of oil have been found in several localities, though boring has not as yet tapped any considerable reserves.

Communications and Towns.—The four regions of greatest economic development in Angola are the areas served by the four railway lines. The Loanda Railway runs from *Sao Paulo de Loanda*, the administrative centre and an important port, via Catete and Malange to Casengo, serving the cotton and coffee plantations. The Amboim Railway, the most recent addition to the transport system, goes inland from the small and wharfless *Port Amboim* into the valuable agricultural territory of the same name. The Mossa-

modes Railway connects *Mossamedes* with Lubango on the Huila Plateau. The longest and most important line, however, is the Benguela Railway, built largely with British capital and using British-built rolling stock. Unking the small but growing port of *Lobito*, across the Benguela Plateau, to the Katanga mining region, to which it provides the shortest route from any coast. The Portuguese section of this line was completed in 1928 and the final link across Belgian territory was made in 1931. *Lobito* bids fair, with the improvement of its docking facilities, to become one of the major African ports. *Port Alexander*, in the south, has greater natural advantages than *Mossamedes*, but it has no railway to the interior.

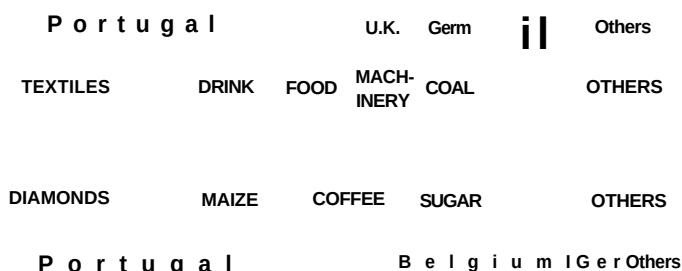


Fig. 40.—Trade of Angola. (Average 1933-35.)

Average value of Imports, 171,000 Contos (e. £1,500,000). (Cf. 1928-30, 276,000 C.)
 Average value of Exports, 235,000 Contos (c. £2,100,000). (Cf. 1928-30, 266,000 C.)

There is an excellent road system on the plateau—over 20,000 miles of motorable roads—but the descent to the lowlands is but poorly catered for, and there are few good roads on the coastal plain.

Trade.—The trade of Angola is illustrated in Fig. 40. The export trade is essentially in the products of agriculture. The export of diamonds, although representing a high value, actually means practically nothing on the traffic side. As the result of a foreign exchange decree of 1931, the share of Portugal in both import and export trade has been greatly stimulated. Thus, compared with the percentages shown on the above graph, in 1928-30 Portugal took only 38 per cent. of the exports and provided only 37 per cent. of the imports. In the same period the United Kingdom supplied a much greater proportion of the imports by reason of the large amounts of material for the Benguela railway.

SECTION IV

BRITISH SOUTH-CENTRAL AFRICA

Under this title we include three territories, Northern Rhodesia, Southern Rhodesia, and Nyasaland, which in addition to their geographical proximity have certain features and problems in common. They are all areas of recent development, possessing considerable highland tracts capable* of white settlement, in which the exact relations between black and white, and between agricultural and mining occupations, have yet to be worked out.

	Area sq. miles	Population (1935)		
		Native	White	Asiatic
Southern Rhodesia	150,000	1,366,000	10,000	200
		1,228,000	55,000	5,300
		1,603,000	1,800	1,400

Physical Features.—Thk area occupies the north-eastern corner of the South African Plateau, where it abuts on to the highlands of the Rift Valley system. Each of these territories has a more or less central highland axis, with lower regions on either side (Fig. 41). In Southern Rhodesia the axis is oriented in a S.W.-N.E. direction, and comprises the highlands of Matabeleland and Mashonaland, with a general level of somewhat over 3,500 feet, which tends to rise towards the east and north-east to the Inyanga highlands of the Salisbury district, over 5,000 feet above sea-level, and the highlands around Melsetter. This axis forms the divide between the Limpopo and the Zambesi drainages. Both the Limpopo and the Sabi (in the south-east) occupy deep trenches ; so does the Zambesi.

The axis of Northern Rhodesia is the Zambesi-Congo divide. In the north-east this is represented by the Muchinga highlands, over 5,000 feet, which separate the broad depression of Lake Bangweolo and the Chambezi river from the deep trough of the Loangwa, an important left-bank tributary of the Zambesi. In the west the divide comprises the vast level plains, roughly about 3,500 feet above

sea-level, and waterlogged during the rainy season, which separate the headwaters of the Zambesi and Kafue from those of the Lualaba. Much of western Barotseland, an ancient lake-basin some 2,500 feet above sea-level, now traversed by the Upper Zambesi, is also extremely flat and liable to annual flooding. The

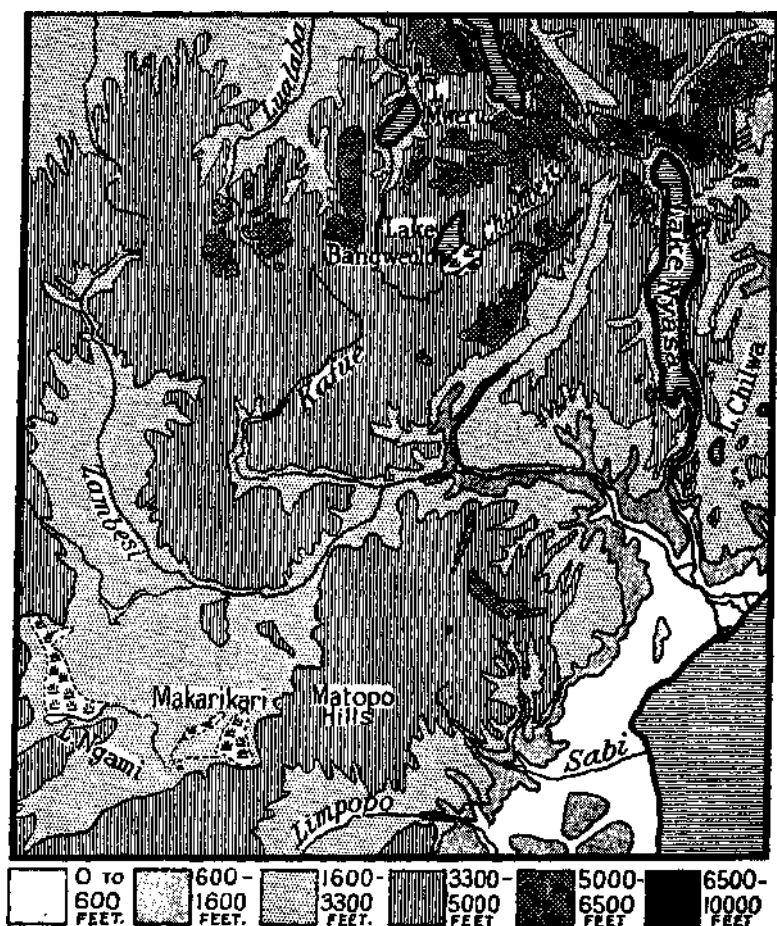


FIG. 41.—South-Central Africa: Relief.

northern end of Northern Rhodesia forms part of the Rift Valley Mountains.

The axis of Nyasaland is the narrow belt of mountainous country (5,000 to 6,000 feet) which borders the deep trough of Lake Nyasa on its western side, continued southwards by the Shire highlands (3,000 to 7,000 feet) and Mlanje Mountain (9,000 feet), which separate the Lake Chilwa depression from the lower Shire-Zambesi lowland.

Lake Nyasa occupies a deep faulted rift, with very steep sides and very few creeks or inlets.

Geology and Minerals.—The greater part of these three territories is made up of the typical African crystalline plateau. A characteristic rock-type is granite, which weathers into rounded forms with frequent, massive isolated boulders, as in the Matopo Hills in the Bulawayo district. Gold-bearing quartz conglomerates, basalts and extensive stretches of ancient sandstones also occur, and flat-topped hills known as "kopjes," the result of differential erosion of the sandstones, are frequent. The crystalline rocks, as is usual in the tropics, weather into fertile laterite soils. Paeozoic sediments—the Karroo formation—sometimes, as in western Southern Rhodesia, with coals of Carboniferous age, occur in the Zambesi and Loangwa troughs and in Barotseland.

Mineralisation has been considerable in many areas. In the north, the metal-bearing belt of the Katanga extends into Northern Rhodesia, where lead, zinc and copper are mined; in Southern Rhodesia gold, chrome iron, asbestos and mica are important.

Climate.—Essentially, there are two types of climate in this region, and they are distinguished by altitude. On the lowlands below 3,000 feet, high temperatures and high humidity associated with summer rainfall make for extremely unhealthy conditions, and the Limpopo, Sabi, Zambesi and Loangwa troughs are avoided by white people and by cattle. On the plateau and highlands above 3,000 feet, the temperature is lowered by altitude, and the daily and seasonal range is greater, so that Europeans may exist for most of the year in comparative comfort. At Salisbury, for example, 4,800 feet above sea-level, the monthly average ranges from 56° to 69°, but in the dry season the daily range may average nearly 30°, and frost is liable to occur at night. The farther north one goes, however, the more tropical do temperatures become, and at Abercorn, in the Tanganyika highlands at 5,000 feet, the range is only 8°—from 63° to 71°. Even the highlands in Northern Rhodesia cannot be said to be entirely free from malaria.

The whole area experiences a tropical climate, with summer rainfall, but the regime varies slightly, and the amount considerably, from region to region (Fig. 42). In general the rain-bearing winds are the south-east Trades, blowing from S.E., E. or N.E., and the rainy season lasts from October to April, with a slight break in late December, when the sun is farthest south, and a maximum in January and February due to a monsoonal inflow of air from the Indian Ocean. Usually over 90 per cent. of the rain falls in the summer six months. On the Nyasa highlands, however, there is probably no absolutely rainless month, and the slopes of Mlanje Mountain receive more than 100 inches a year. In Southern

Rhodesia there is a greater tendency for thunderstorm rains to occur in the spring months, September-November.

In general, too, the rainfall decreases south-westwards from the Nyasa highlands, but relief exercises a considerable influence. Thus the Zambesi, Loangwa and Sabi valleys are distinctly drier than the surrounding regions, and the Mashona highlands attract more rain

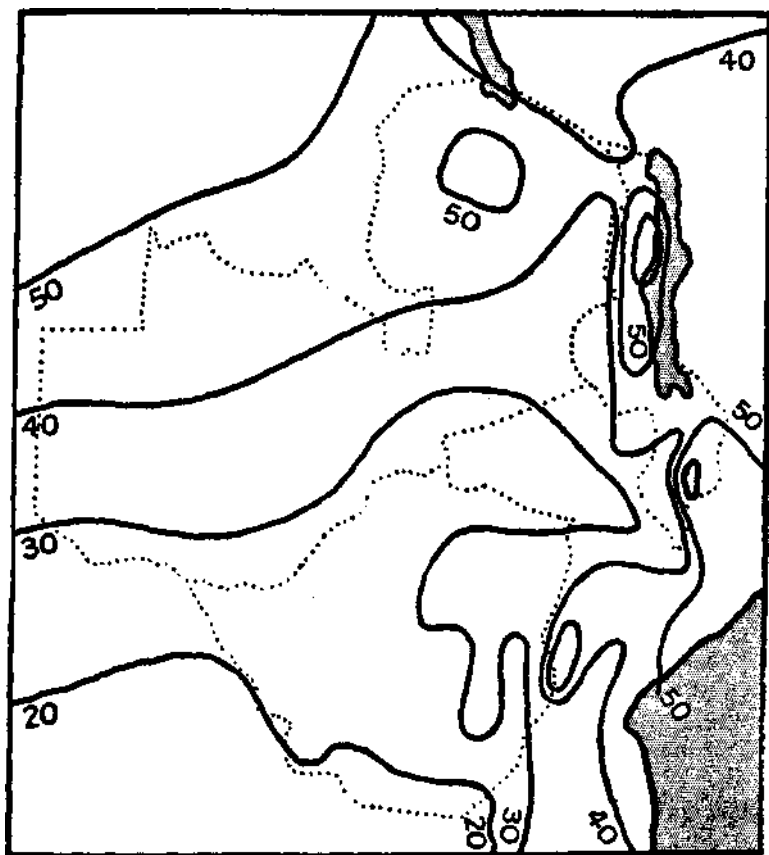


FIG. 42.—South-Central Africa: mean annual rainfall.

than the lowlands lying to the north and south. Two very unfortunate characteristics are to be associated with the rainfall of this region, however. In the first place the total varies very considerably from year to year—a very upsetting feature from the agricultural point of view, for 30 inches distributed over only half the year is barely sufficient for many subtropical crops, remembering the high temperatures and consequent great evaporation. Thus

at Mazabuka in Northern Rhodesia, where the average is 32 inches, the annual total has varied from 18 inches to 52 inches in successive years. Secondly, heavy falls in thunderstorms are common, and these result in a great amount of soil erosion, especially on the upland areas where most of the cultivation is carried on.

Vegetation and Agriculture.—The greater part of the region falls within those natural vegetation zones which we have called "acacia savana" and "dry forest"; and the luxuriance of the cover decreases, like the rainfall, from the north-east highlands towards the scrublands of Barotseland and Bechuanaland. But damp forests are by no means absent. Belts of tropical forest, with mahogany, follow the courses of the principal rivers, and some areas of valuable timber are found on the highlands, where, after a long period of rather wasteful native depletion, reserves have been demarcated. The principal forests are found on the Nyasaland highlands and on the highlands of eastern Southern Rhodesia. The most useful hardwood tree is the Mlanje cypress, found in southern Nyasaland and in the Melssetter highlands of Southern Rhodesia.

Native farming in such a region as this naturally centred on cattle-raising and the cultivation of maize, millets and ground-nuts. The cattle were not of particularly good quality, the herds being frequently decimated by rinderpest or other diseases.

Since the arrival of Europeans, commercial agriculture has been introduced; maize is now grown in quantities sufficient to allow of an export surplus, and tobacco, cotton, tea, and citrus fruits are grown under plantation conditions, whilst the importation of pedigree bulls and the development of facilities for dipping have enabled the cattle-raising industry to be placed on a firmer basis. Agriculture of this kind must naturally be confined to those areas which are within economic reach of railway transport, and hence a large part of the three territories remains to be opened up:

Population and Development.—As the table at the head of this section shows, the Native population greatly outnumbers the Europeans. They are of Southern Bantu stock, and some of the tribes, better perhaps described as nations, are of great size, and have given their names to large regions. Thus we have Matabeleland and Mashonaland in Southern Rhodesia, Barotseland in western Northern Rhodesia; the Mashukulumbwe occupied the Kafue basin and the Awemba the Chambezi basin. In Nyasaland the Yao and the Anyanja are the principal groups. The intrusion of white people into this land dates really from about 1888, though effective penetration of Southern Rhodesia scarcely took place until the completion of the Salisbury-Bulawayo Railway in 1902, and the development of Northern Rhodesia and Nyasaland is very largely post-war. In contrast with the history of South Africa, the "conquest" of this region has been almost bloodless, only the Matabele wars of

1893 and 1896-97 marred the otherwise peaceful penetration of British influence.

The Rhodesias, of course, take their name from Cecil Rhodes, who was largely responsible for the addition of the territory to the British Empire. In 1888, Lobengula, King of the Matabele people, entered into a treaty of peace with Great Britain and granted mineral concessions (the Rudd concession) to a group of men who next year founded the British South Africa Company, which was given its Royal Charter by the British Government in 1889. The Company organised a pioneer expedition which founded Salisbury in 1890. Both Northern and Southern Rhodesia were administered by the Company until 1923, when Southern Rhodesia became a self-governing unit of the empire. In the following year Northern Rhodesia became a Crown Colony under the British Government.

The areas of European occupation within this region have been described as "three archipelagoes of settlement set in a sea of bush and scrubland" (Fig. 43). In Southern Rhodesia settlement is most continuous, extending in a broad band along the Bulawayo-Salisbury-Umtali Railway line, and agriculture and mining occupations have gone hand in hand in the economic exploitation of the country. In Northern Rhodesia, settlement is far more patchy along the railway line and in the outlying centres of Abercorn and Fort Jameson, and agricultural enterprise has on the whole been distinct from that of mining. In Nyasaland again, we find a difference. Here scattered planters replace the farmers and ranchers of the Rhodesias, and there is little or no mineral production. Southern Rhodesia, in fact, most resembles the Union in its development, Northern Rhodesia partakes of the characteristics of south-eastern Belgian Congo, whilst Nyasaland shows features akin to those of Portuguese East Africa.

Yet in spite of their differences of development, these territories all have a similar population problem—the problem of the black Native and the white intruder. They are as yet too young to have developed the "poor white" problem which so harasses the Union. Two aspects of their problem stand out: (1) The relation between black and white as regards land. In Southern Rhodesia the spread of white settlement along the railway lines and the consequent displacement of the natives has resulted in the allocation of native reserves, in which the people may pursue their own method of life. These reserves lie mainly on the outside edge of the white belt. Of over a million natives in Southern Rhodesia, **nearly 600,000 now live in these reserves.** The land **problem** is not yet **of great magnitude in the other two areas, but in Northern Rhodesia Barotseland has been set aside as a native reserve.** (2) The relation between black and white in agriculture and mining. **The native still performs the bulk of the labour in the European farms and in the mines; the**

white man must be in the position of master or foreman. The effect of this contact with western civilisation upon the native is of vital importance. The question of the adequate education of the native is often aggravated by the instability of the labour supply. An individual native will leave his home, work for a few months or a year or two in the mines or on the plantations, And then, having accumulated a little unaccustomed wealth and having absorbed a

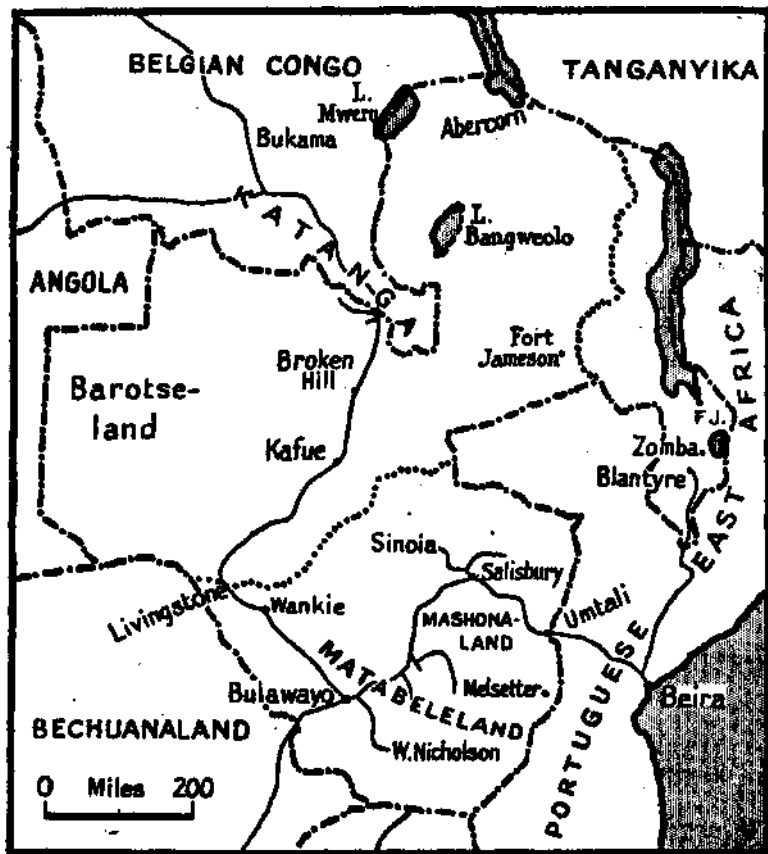


FIG. 43.—South-Central Africa. .

Boundaries and communications. F.J. =Fort Johnstone.

few odd fragments—probably not of the best—of white civilisation, will return to his native village. The problem which remains is—how can the country be most effectively developed, whilst giving both native and white peoples the best opportunity for education and advancement? Are the native civilisations to be gradually submerged beneath white " culture," or are the two systems to **grow** up aide by side, each deriving benefit from the other?

NYASALAND ¹

Nyasaland is considered first, as being the smallest, least developed, and simplest—being purely agricultural—of the three countries. A British protectorate was established here in 1892.

Physical Background.—The topography and climate have already been outlined above. Nyasaland falls naturally into three major zones: the western highlands, averaging over 5,000 feet, the central rift valley, occupied by Lake Nyasa (1,650 feet above sea-level) and the trench of the Shire river, and the eastern highlands, comprising the Shire highlands and Mlanje Mountain. East of the Shire highlands lies the depression of Lake Chilwa, a region of inland drainage.

On the highlands the rainfall is anything between 40 and 100 inches, but it drops to 35 inches on the lake-shore lowlands and in the Shire Valley. The lowland climate is distinctly unhealthy for Europeans, the great heat and humidity of the hot season combining to render the conditions enervating and provocative of malaria.

Much savana forest formerly clothed the mountain slopes, but native destruction has reduced much of the best areas to bush, and since the advent of the British no less than forty-eight reserves have been established, totalling 2,600 square miles. The Mlanje cypress yields a hard timber resistant to the attacks of the white ants, and is therefore much in demand for railway and constructional work.

Agriculture.—Native subsistence agriculture is of course as widespread as are the natives themselves. Rice (on the lake shores), maize, millets, cassava, beans and ground-nuts are amongst their principal food-crops. Plantation agriculture has been introduced with considerable success, following the construction of the railway to the Zambesi, and in addition to the white planters, who naturally employ natives as labourers, many natives have set up on their own with such crops as tobacco and cotton. Thus in 1935, 50,000 natives were registered as tobacco growers and 81,000 as cotton growers.

Tobacco grows best between 1,500 and 3,000 feet, and the Shir6 highlands are increasing their production. *Cotton* has hitherto been grown mostly in the lower Shir6 Valley. Great success has not been attained, largely owing to climatic difficulties, but perhaps the establishment of upland plantations will have better results. A few local centres of cotton ginning and tobacco manufacturing (e.g. Limbe) have sprung up. *Tea* is grown under very favourable conditions of sloping land and heavy rainfall on the south-eastern slopes of Mlanje Mountain; plantations are being extended in the Cholo district south of Blantyre. Livestock are not important except as elements in the native farming economy. The tse-tse fly

¹ The authors are indebted to Major Dale, Commissioner for H.M. East African Dependencies, for comments on this and the following section.

prevents much development. The best cattle are found on the Angoniland Plateau, south-west of Lake Nyasa, and in the north.

Minerals.—Large mineral fields do not seem to exist in Nyasaland, and although coal, iron, mica, plumbago and bauxite, and numerous others have been located, the size of the ore bodies and the absence of transport facilities has prevented any development.

Communications and Towns.—Some small steamers ply on Lake Nyasa, but there is not a great deal of trade. The Shire

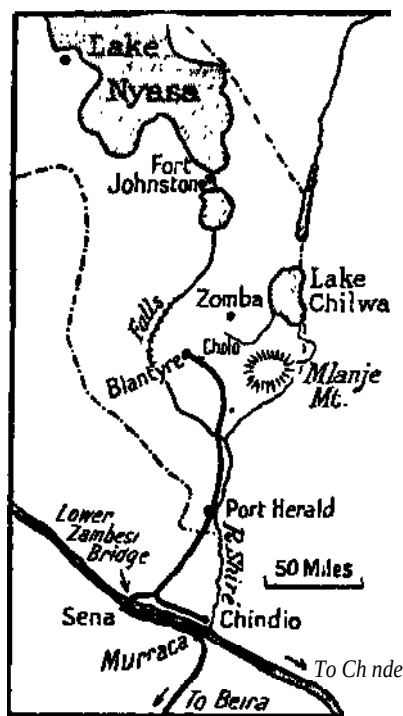


FIG. 44.—The old and new outlets of Nyasaland.

The black dot near the western shore of Lake Nyasa is Salima, the terminus of the Nyasaland railways extension, opened October, 1934. The delta, whence coasting is Salima, the terminus of the Nyasaland steamers took it on to Beira to pick up an ocean vessel. But

Chinde was destroyed by a storm in 1922, and much traffic has passed across the Chindio-Murraca ferry and so to Beira. The railway from Chindio to Blantyre has been extended northwards through the Shire highlands to Salima, near the lake-shore. The railway may be said to have brought nearly one-third of Nyasaland within reach of an economic transport system; the remainder of the country has scarcely begun to be developed. *Blantyre*, the commercial centre, is the focus of plantation agriculture in the Shire highlands. *Zomba* is the administrative centre.

river, which might have been the great highway of the region, is unfortunately not amenable to navigation. Its volume fluctuates considerably, it is choked with sand-banks where it leaves the lake, and for 70 miles in its course at the foot of the Shire highlands it is interrupted by falls (Murchison Falls) and rapids (Fig. 44). It is navigable, however, from Port Herald to the Zambesi. The development of the country has depended very largely upon railway construction. Blantyre is now connected to Chindio, on the left bank of the Zambesi, and the completion in 1934 of the Lower Zambesi bridge at Sena now gives all-rail access to the port of Beira. Formerly much of the traffic was transferred to river steamer at Chindio, and sent down to Chinde on

Trade.—The total trade of Nyasaland in recent years has been worth about £1¼ millions. The principal exports are tobacco, cotton and tea. Great Britain takes almost all the exports (97 per cent, in 1932-34) and sends over a half of the imports.

NORTHERN RHODESIA

Northern Rhodesia is a little more complex than Nyasaland, by reason of its far greater extent and the double nature of its activities—agriculture and mining. In 1890 the Barotse Chief accepted British protection and later granted certain mining and trading concessions to the British South Africa Company, which managed the territory until 1924, when the Crown took over the administration. Progress at first was slow, and it took some years for the Arab slave-trading activities in the north to be completely extinguished.

Physical Features.—The Belgian Katanga " tongue " divides Northern Rhodesia into two parts. The south-west, mainly Barotseland, consists of the Kafue Basin and an old lacustrine depression of the Upper Zambesi. The north-east comprises the Loangwa trench and the Muchinga divide which separates Congo waters from those draining to the Zambesi, together with the Bangweolo depression and a section of the Rift Valley highlands at the southern end of Lake Tanganyika.

Climate and Vegetation.—Northern Rhodesia extends over 9° of latitude, but there is greater uniformity of climatic conditions than might be imagined. The chief differences are due to the gradual decrease in the rainfall from north to south (50 to 30 inches). Savana (" bush ") is everywhere the dominant type of natural vegetation, and the annual burning of grass over the areas devoid of trees leads to considerable soil-erosion, for the rainfall is mostly of the heavy thunderstorm type.

Native agriculture centres around maize cultivation and the rearing of large herds of rather poor cattle. The Loangwa trench and much of Barotseland are infested with tse-tse, and even on the highlands constant dipping is necessary in order to keep the animals healthy.

Zones of Settlement.—The native population, numbering about 1¼ millions, is scattered over the territory. There are native reserves totalling 110,000 square miles, including the whole of Barotseland. White settlements are in three zones : along the railway line, around Fort Jameson and around Abercorn.

(a) The only railway line enters the country from Southern Rhodesia (and so from Cape Town) across the Victoria Falls bridge

at Livingstone, and runs in a north-easterly direction over the Batoka Plateau (the Kafue-Zambesi watershed) to Kafue, thence running northward to the Katanga. This railway, constructed between 1905 and 1909, inaugurated the first period of settlement, which was concerned mainly with the development of the mineral resources of the Broken Hill district, and with agricultural settlement along the line. The second period of settlement is post-war, and is still in progress; it began with the discovery of the copper deposits of the Rhodesian Katanga in 1927. Between 1921 and 1930 the white population of the country rose from 3,600 to 11,000.

Farming and ranching within the railway zone are as yet confined to within a few miles of the actual line (Figs. 43 and 45). The southern-section, on the Batoka Plateau, with its infertile granite

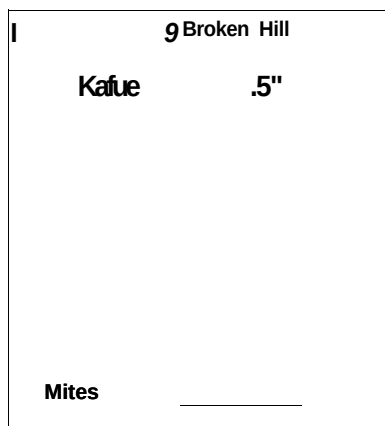


FIG. 45.—Land occupied by Europeans (in black) in the Rhodesian railway belt (after H. C. Darby). Compare with Figs. 41, 43 and 47.

B—Bulawayo; S—Salisbury.

soils, is mainly cattle-ranching country, and with the improvement of the herds and constant attention to the prevention of disease dairying is increasing in importance. North of the Kafue, tobacco, cotton and maize plantations occupy most of the arable acreage. Both types of farming, assisted by the experimental work done at the Government research station at Mazabuka, are being developed with a view to supplying the market offered by the Katanga mining community and exporting the valuable tobacco and cotton crops. It is noteworthy that, owing to

past crop failures, white farmers are turning from "one-crop" to mixed farming. This is allowing the natives, with their lower standards of life, to capture a large share of the maize market, and presents what is perhaps the first of the native versus white problems in Northern Rhodesia. The expansion of European farming cannot be very rapid, for the conditions are not easy owing to the climatic irregularities already alluded to; and the native labour supply is not abundant, for more lucrative occupations are offered in the mining zone.

The mining zone is in two parts. The older, centred on Broken Hill, has in the past yielded precious metals, but is now chiefly important for zinc and vanadium. The newer portion is really an extension of the Belgian Katanga copper belt. The development, which has been very rapid, though not as spectacular as was origi-

AFRICA

nally hoped, owing to the world depression, dates only from 1927-28, when copper was located in great quantities in the Ndola district, along the Belgian Congo frontier and quite close to the existing railway line. At least 400 million tons of copper ore, with a metallic content averaging 4-5 per cent., has been proven, and five mines, serving three great smelting plants, have been developed. The ore, which yields cobalt as a by-product, is all converted to blister copper (over 99 per cent. pure) and exported. At first it went mainly to the United States for final refining, but during the depression that country put on an almost prohibitive tariff to protect its own industry (for Rhodesian copper is the cheapest in the world, despite its inland situation), which practically closed that market. In 1933, however, a special works was set up in England, near Liverpool, to deal with the produce of the Roan Antelope smelter, and recently Britain and Germany have been taking most of the copper. Production in 1933-35 averaged 120,000 tons of metallic copper per annum, and the industry, around which complete model villages have grown up, employed about 15,000 natives and 1,800 Europeans. Despite the existence of the new Benguela railway (*cf.* p. 82), all the Rhodesian copper reaches the outside world *via* Beira, and agreements exist whereby this situation will continue until 1944.

Road transport in Northern Rhodesia suffers from the effects of climate. In the cool season the roads are thick with dust, in the rainy season they are mostly impassable owing to mud. February and March may be regarded as the most difficult period for wheeled vehicles.

At the extreme southern end of the country, in the Zambesi Valley west of Livingstone, is an isolated area of quite good forest, which has been exploited for hardwoods of the teak and mahogany types. *Livingstone*, until recently the administrative centre of Northern Rhodesia, has saw-milling establishments. *Lusaka*, 80 miles south of Broken Hill, has been selected as the new capital.

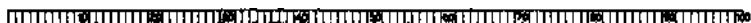
(b) The other two zones of white settlement are each very far removed from a railway. Around *Abercorn*, in the highlands at the southern end of Lake Tanganyika, are grouped a number of coffee planters. Their outlet to the outside world is *via* the lake and the Central Tanganyika Railway to Dar-es-Salaam.

Around *Fort Jameson*, near the Nyasaland frontier, tobacco-planting has attained to a considerable development. The produce is transported 300 miles by motor lorry to Blantyre. The Nyasaland railway extension and the new Zambesi bridge will provide a much easier outlet for this area.

The suitability of Northern Rhodesia for white colonisation i.e. for the breeding of the white race, has yet to be really proved.

The liability, even on the highlands, to a mild yet recurrent form of malaria, and the over-stimulation of the nervous system from long exposure to the brilliant sunshine may hinder the progress of the settlers and their Rhodesian-born children.

Trade.—The trade of Northern Rhodesia has changed, within the last dozen years, more completely perhaps than that of any other African territory, owing to the rapid expansion of the copper industry. It was only in 1932 that exports exceeded imports in value for the first time. The dependence on copper exports is most striking—and of course machinery occupies a high place in the import list.



malarial lowland climate from the more healthy upland conditions. With a markedly seasonal rainfall the natural vegetation is savana grassland and open forest. Only in the Zambesi lowlands and in the eastern highlands are dense stands of timber found. In the Zambesi region Rhodesian teak and mahogany are cut, in the highlands the Mlanje cypress occurs. The rainfall regime is also responsible, with an average rainfall of between 20 and 35 inches, for the need of irrigation in the south and west, as a precaution against drought, and for winter cultivation, since few except the largest streams contain much water for more than six months of the year. Here, too, as in Northern Rhodesia, the problem of soil erosion—due to the heaviness of the rainstorms—is an important one; it is aggravated by the fact that all the most important agricultural regions are on watersheds.

Agriculture : Livestock.—As most of Southern Rhodesia, except the north-western sector, is free from tse-tse, cattle-rearing is of great importance. In the past rinderpest has played havoc with native herds, but now strenuous efforts are made to prevent outbreaks of the disease. Matabeleland, with rather infertile soils and a low rainfall (20 inches) is the chief cattle region. Huge ranches exist for beef-cattle, and near the railway line between Bulawayo, Gwelo and Salisbury dairying is increasing. Each of these towns has a creamery. Pig and poultry rearing, closely allied with the large maize crop, also flourish. Cold-storage facilities and bacon factories are beginning to be developed, there is a canning factory at West Nicholson, and the export of chilled beef to the United Kingdom (*via* Cape Town) has commenced. The Rand and the Katanga are valuable markets for the livestock and dairy products.

Crops.—In the native farming economy, maize is the most important crop. It covers a large acreage also on the European farms, notably in the wetter eastern region, and especially north of Salisbury. It occupies, in fact, nearly four-fifths of the cultivated land. Tobacco, introduced as a commercial crop in 1910, does well on the light, sandy soils overlying the granite outcrops, especially in the north-east, and has assumed a position of considerable importance in the agricultural exports of the country. Citrus fruits will grow well and oranges are now being exported to Europe. Among other crops suited to the climate are cotton (not yet well established), ground-nuts, sunflowers (the seeds of which yield oil), beans and fibre plants, as well as vegetables for local use. There are still abundant possibilities for the extension of arable farming, especially should facilities for irrigation become available in the southern half of the country.

Minerals.—Two-thirds of Southern Rhodesia are built of a complex of granite and other crystalline rocks, many parts of which

are highly mineralised. It was mineral development which first attracted the railway. Old gold workings of unknown antiquity existed at Zimbabwe, and when gold-bearing reefs were struck in 1894 the railway was pushed north from the Cape Province in the hopes of developing a second Rand. But the gold of Southern Rhodesia, although abundant, is very scattered. There are about ten large mines and several thousand small diggings. Numerous workings exist along the railway line between Bulawayo and the Portuguese frontier, notably near Umtali, and gold remains the most valuable mineral product; working has been greatly stimulated since 1932 by the enhanced value of gold. A narrow elongated belt of intrusive rocks extending from near Sinoia to West Nicholson is rich in chrome iron ore, and a tonnage greater than that of any other region in the world is obtained from the Selukwe district and from Sinoia. Large reserves of asbestos have been worked in the region of the Bulawayo-Victoria Railway line. Mica is mined in the Sinoia district. Copper has declined in importance since the rapid expansion of mining in the Katanga. Numerous other metals are known to occur. Coal exists in the sandstones and shales of the Karroo formation in the Zambesi and Limpopo valleys, but the only worked field is that of Wankie, tapped in 1904 by the advancing railway line from Bulawayo to Victoria Falls. The presence of this coal midway between the two important mining regions of the Katanga and central Southern Rhodesia is of vital importance. Large quantities of coal are sent northwards to the Katanga.

Population, Communications and Towns.—Of the native population of over 1,200,000, nearly 600,000 dwell in the native reserves, and most of the remainder are employed directly or indirectly by the Europeans. European settlement, with few exceptions, is noticeably concentrated within easy reach of the main railway line and its branches (Fig. 45). Few farms lie more than 30 miles from the line—this distance being the economic limit of ox-wagon transport for maize, which is the staple crop. Compared with the railway, the ox-wagon is very slow and feeble. A team of 16 oxen can only be expected to travel 15 miles a day with a load of 5 tons, whereas a railway train could move 500 tons 300 miles in the same time. Moreover wet-season road travel is difficult if not impossible, and although motor lorries are being more used, road maintenance difficulties are very great.

Since the railways of both Southern and Northern Rhodesia were built to tap mineral resources, they follow watersheds for the most part to avoid the expense of bridge construction over streams (Fig. 47). As a result, they do not always run through the best agricultural districts, and they always traverse those areas most subject to soil erosion. Both the trunk lines, viz. Bulawayo-Salisbury-Umtali-Beira, and Bulawayo-Livingstone, were completed by

1904. Subsequent branch-line construction has tapped the mineral resources of Sinoia, Selukwe and Victoria, the ranching country of West Nicholson, and the farming region of the Mazoe Valley around Shamva. The principal outlet to the coast is *via* the Portuguese port of Beira (p. 146). The most vital piece of construction remaining to be effected is the "cut-off" from Sinoia to Kafue (Fig. 47), which would avoid the enormous detour at present

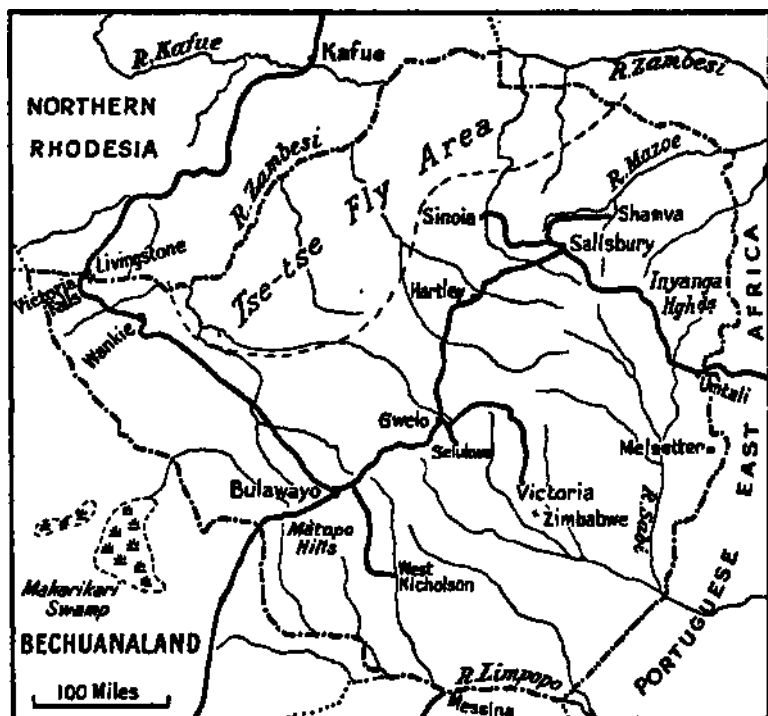


Fig. 47.—Southern Rhodesia.

Note the relation of the railways to the chief watersheds. Tse-tse fly area after H. C. Darby.

necessary to cross the Zambesi at the Victoria Falls. A rail link between West Nicholson and the Transvaal railhead on the south side of the Limpopo at Messina, now under construction, will give a short cut to the port of Lourenço Marques.

The most important urban settlements of Southern Rhodesia are the following: *Salisbury*, the capital, with 29,000 inhabitants (including 9,700 whites), is rapidly developing as an industrial centre for the preparation of bacon, flour, biscuits, oil, candles, tobacco, leather and other products depending on local supplies of raw material

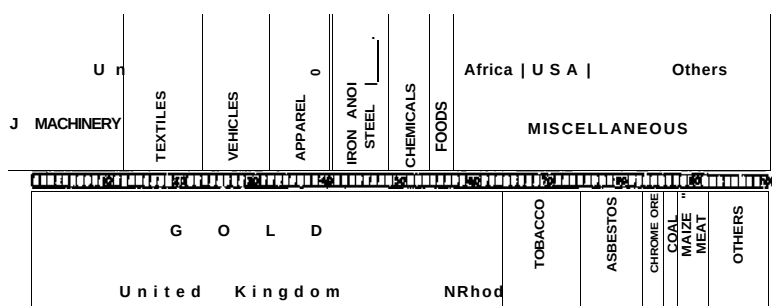


FIG. 48.—Trade of Southern Rhodesia. (Average 1933-35.)

Average value of Imports, £5.4 millions. (Cf. 1925-29, £7.5 millions.)
 Average value of Exports, £6.3 millions. (Cf. 1925-29, £7.4 millions.)

SECTION V

SOUTH AFRICA

" South Africa " occupies the bulk of the southern part of the continent. Nearly the whole, excepting parts of Bechuanaland and South-West Africa, lies outside the Tropics. This vast area comprises three main political divisions :

1. The Union of South Africa (Unie van Zuid Afrika), defined according to the recent Status Act as " a sovereign independent state," is a Dominion within the British Commonwealth of Nations, and was formed in 1910 by the union of the four provinces of the Cape of Good Hope, Natal, the Orange Free State, and the Transvaal.

2. Included under the Administration of the Union is the mandated territory of South-West Africa (formerly German South-West Africa).

3. The three separate areas of Basutoland, Bechuanaland, and Swaziland are at present protectorates under Imperial control. They are enclaves within Union territory, though the northern frontier of Bechuanaland marches with Angola and the Rhodesias.

On the east the Transvaal is cut off from the Indian Ocean by the territory of Portuguese East Africa; on the west there is a large stretch of very dry country, the Kalahari semi-desert. In the main, therefore, the outlet of the whole of British South Africa is towards the south.

The following table is given for reference purposes :

	Area in sq. miles	Population (1936)	
		Europeans	Natives, etc.
Union of South Africa (four provinces)	473,089	2,003,512	7,585,153
	276,966	791,394	2,737,633
	50,389	200,947	570,907
	119,459	820,620	2,520,524
Natal	35,284	190,551	1,756,091
		31,600*	328,467*
	11,716	1,458	559,534 ¹
Bechuanaland Protectorate . . .	275,000	1,899	263,857
	6,704	2,935	152,502

* Estimated, 1934.

¹ Excluding about 70,000 absent on employment in mines, etc., in the Union.

Physical Features.—The great African plateau is highest in the south, that is, in South Africa. Here the greatest heights are reached along the south-eastern edge, and the surface of the plateau slopes, on the whole, towards the north and west. It will be obvious that South Africa is at once divisible into two parts :

1. The interior plateau.
2. The country between the escarpment or edge of the plateau and the sea.

The Interior Plateau is a region of great plains. The surface

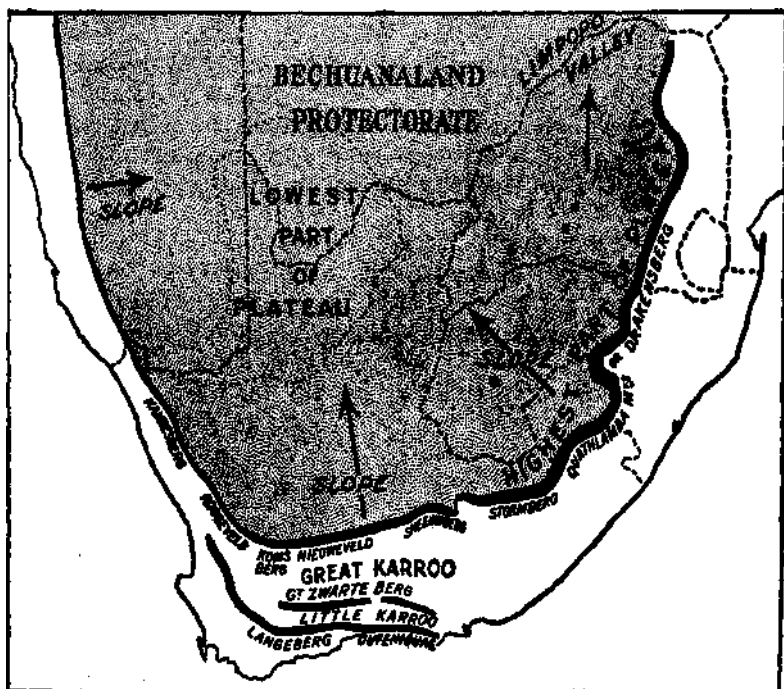


FIG. 49.—The physical features of South Africa.

Note carefully the position of the escarpment and the high plateau of which it is the boundary.

is sometimes almost flat, at other times gently rolling, whilst sometimes low, flat-topped hills rise from its surface. The surface is, on the whole, saucer-shaped with the western rim of the saucer lower than the southern and eastern. Except in the centre, nearly the whole is more than 4,000 feet above sea-level. The escarpment receives various names: in the Transvaal it is known as the Drakensberg; farther south, where it forms the boundary between the Orange Free State and Basutoland on the one side and Natal on the other, it is known either as the Drakensberg or the Quathlamba Mountains. Then the edge turns westwards and runs

through the Cape Province as the Stormberg, Sneeuwberg, Nieuweveld, Komsberg, Roggeveld, and Kamiesberg. The lower western edge through South-West Africa has various names. Fig. 49 shows that the whole of the Transvaal lies on the plateau, and so do the whole of the Free State and Basutoland. About one-third of the Cape Province is on the plateau; Bechuanaland, with the Kalahari Desert, occupies the lower part of the saucer. The highest points of the south-eastern edge reach 11,000 feet (Giant's Castle).

The plateau is drained, as one would expect, by rivers which rise near its high south-eastern or eastern edge and have a long course to the west to the Atlantic Ocean. Except for the northern

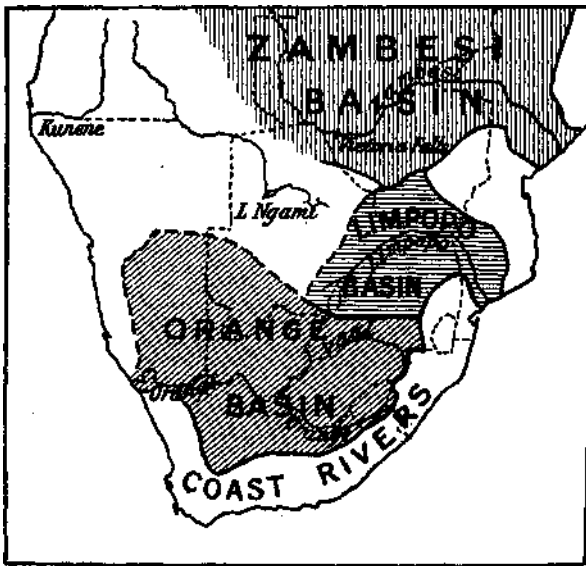


FIG. 50.—The rivers and river basins of South Africa.

part of the Transvaal all the interior plateau of the Union (including most of South-West Africa) lies in the basin of the Orange river, with its two chief tributaries, the Caledon and the Vaal. The rainier part of the plateau being the east, the rivers there usually have some water in them, but in the west the Orange river flows through very dry country and receives no important tributaries. This part, in the dry season, may be only a succession of pools. About 300 miles from the ocean the Orange River commences its descent from the plateau in the Aughrabies Falls. The northern part of the Transvaal is drained by the tributaries of the Limpopo river, the Limpopo itself forming the boundary between the Transvaal and Southern Rhodesia for a considerable distance,

and then breaking through the eastern escarpment and emptying itself into the Indian Ocean. Neither the Limpopo nor the Orange river is of any importance as a highway, and though the Orange river runs through very dry country for much of its course, its value for irrigation purposes is minimized by the fact that the river flows between steep high banks considerably below the general Jand level. Many of the South African rivers are liable to sudden floods, and a great trouble to farmers in the Union is the formation of deep "dongas" or gullies; the rain when it falls drains rapidly away along these dongas instead of moistening and enriching the surface soil. There are no large lakes in South Africa, but scattered over the surface of the plateau are large numbers of shallow hollows known as pans or vleis. It is believed that the loose sand or soil which once covered these areas has been blown away by the action of wind, leaving holloas which may be covered by water after heavy rain. Many of the pans when dry are covered with deposits of salt.

The Country between the Plateau and the Sea.—This tract is

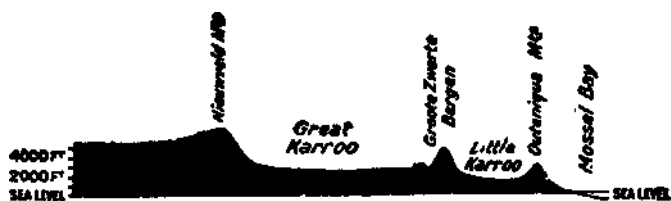


FIG. 51.—Section from the High Veld to the South Coast.

not a coastal plain. In the south-west there are numerous fold mountains separated by fertile valleys; in the south there are, as shown in Fig. 51, a number of "steps" up to the surface of the plateau from the coast. The lowest "step" is the narrow coastal plain or coastal plateau—it is often several hundred feet above sea-level. Then comes a range of mountains—the Langeberg and Outeniquas—and then the second step, a dry plateau known as the Little Karroo. On the north the Groote Zwarte Bergen separate the Little Karroo from the third step, the plateau of the Great Karroo. Most of the country which lies between the great escarpment and the ocean is drained by rivers which rise at the foot of the escarpment or amongst the fold mountains themselves. The Natal rivers flow swiftly in deep valleys, and waterfalls are frequent. Rivers rising amongst the fold mountains of the Cape of Good Hope tend to flow along the valleys between the ranges as far as possible, and then to cut through them by series of great "poorts." Some of the rivers, such as the Great Fish river and Sundays river are important for irrigation purposes.

Geology.—The plateau of South Africa consists of a foundation of very old, hard rocks, which were folded very early in the earth's history, and were afterwards covered by great sheets of sandstone and shale, known as the Karroo System. These beds are, in large part, of freshwater origin, and in some areas contain valuable seams of coal. The Karroo Beds where they rest on the ancient massif are still nearly horizontal and are penetrated by great sheets—also horizontal—of an igneous rock known as dolerite. These masses of dolerite are harder than the sandstones, and so form the flat tops to the hills when the softer sandstones are worn away. Where the flat-topped tablelands have been dissected by weathering, the characteristic conical hills, known as kops or kopjes, result. In the east of the plateau there are sheets of lava poured

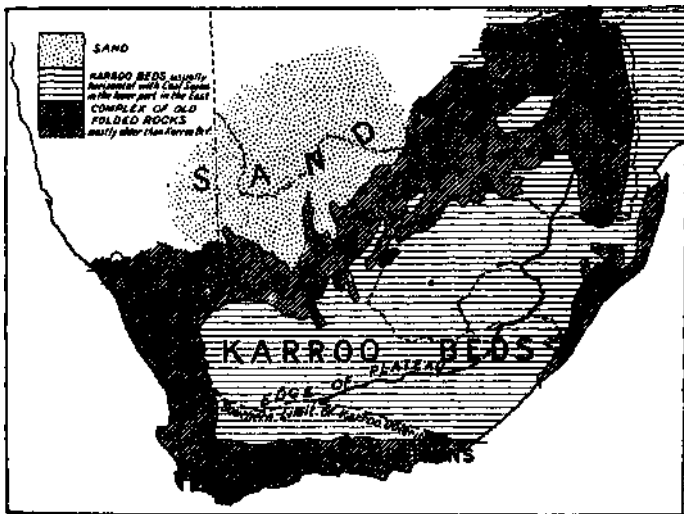


Fig. 52.—Simple geological map of South Africa.

out at the same time as the Karroo Beds were laid down. The plateau has not been folded by earth movements since the Karroo Beds were laid down, but has been raised up by gradual elevation to its present height. At the same time the Karroo Beds have been removed by denudation over large areas and the ancient rocks exposed as in the gold-bearing Witwatersrand and over much of Bechuanaland.

The country between the escarpment and the ocean is different, mainly because it has been folded since the deposition of the Karroo Beds. In the south-west many of the folded mountains in the Cape Ranges consist of the hard Table Mountain Sandstone.

Minerals.—South Africa was until recently almost the only source of diamonds, and produces more than half the world's total

annual output of gold, so that the mineral industry is a very important one.

Gold.—Gold was known to occur in South Africa in ancient times, but the Witwatersrand, the richest goldfield in the world, was not discovered until 1885. "From that time to the end of 1934, the Transvaal has produced gold valued at about £1,300,000,000. It is nearly all found in curious beds of rock, a few feet thick, called "bankets." The rock is a hard conglomerate or puddingstone with pebbles of quartz, and the particles of gold are so small that they can rarely be seen by the naked eye. The banket is a very old rock, and is part of the area of old rocks which has been uncovered by the wearing away of the Karroo Beds.

The annual production in recent years has been roughly 11 million fine ounces, about 300 tons, obtained by crushing some 35-40 million tons of rock. The industry employs over 300,000 people.

The whole economic structure of the Union has been built up on the basis of gold production, and the prosperity or otherwise of the whole community fluctuates with the price of gold in the world's markets, and especially in Britain. In recent years the most noteworthy event was the suspension of the gold standard in 1931 by Britain (and by the Union in 1932). This measure, enhancing the value of the gold output, stimulated mining and enabled the Government to apply much-needed financial aid to the agricultural industries, which were suffering severely from the effects of the world depression, coupled with the drought of 1932-3 and the ensuing heavy rains and disastrous locust plague.

It must not be forgotten, however, that gold is a waning asset; it has been estimated that by 1950 the production will have fallen to one-quarter of the present figure, and although a high-price level for gold may lengthen the life of the mines by enabling poorer ores to be profitably worked, there is little doubt but that increased attention will have to be focused on the base metals and agriculture if the Union is to maintain its present level of prosperity.

Diamonds.—The most famous diamond-field is at Kimberley, in Cape Province, where diamonds were first found in 1871, but the largest single mine is now the Premier Diamond Mine, near Pretoria. The total value of the diamonds produced was, until recently, nearly one-third that of the gold, but working in most areas is temporarily suspended, owing to the large production from newly discovered fields. The earliest diamonds found were alluvial—that is, they had been washed out of the parent rocks. The Kimberley diamonds were found in decomposed rock known as yellow ground, occupying oval or circular patches corresponding to "pans" on the surface. Underneath the decomposed yellow rock is hard rock known as "blue ground" and the momentous discovery of the diamond

industry was the realisation that the blue ground was the parent rock of the diamonds. The blue ground, scientifically known as Kimberlite, is an igneous rock, occupying pipes going down into the earth's crust which may represent old volcanic necks. Large numbers of pipes are known, but only a few are diamond-bearing. In the early days the pipes were excavated to depths of as much as 400 feet, before underground mining became necessary. The deep diamond mining is in the hands of a few large companies such as De Beers, Jagersfontein and Premier, which restrict and control the

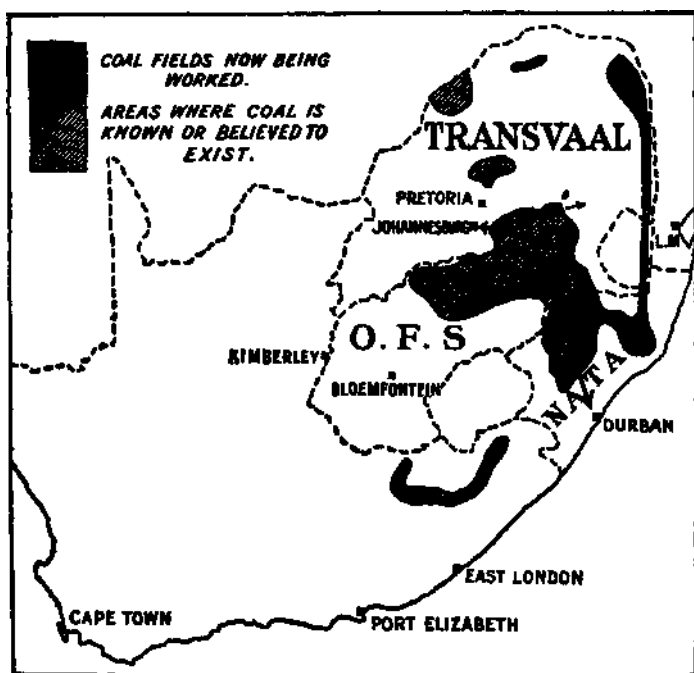


FIG. 53.—The coal-fields of the Union.
The arrows show where the coal is sent from the mines.

output, and the principal mines are near Kimberley, at Jagersfontein, Kofnefontein, and near Pretoria. In the years 1925-27 new discoveries of richly diamond-bearing alluvial deposits were made, especially in South West Africa, resulting in a huge increase in the output of alluvial stones and temporary cessation of mining. (Production, 1931, 2'1 million metric carats; 1933, 0'5 million metric carats, all alluvial.)

Coal.—Although the value of the coal produced in South Africa is small compared with that of the gold, it is safe to say that it is the presence of cheap coal, in an area devoid of timber or of hydro-electric power, which has enabled many of the gold mines to be

worked at a profit. The coal occurs in the lower part of the great Karroo System, and coal-fields are known in Natal, Transvaal, Orange Free State, Zululand, and Cape Province. The principal fields at present worked are around Witbank and Middelberg in the Transvaal (which supply Johannesburg, the goldfields, and the

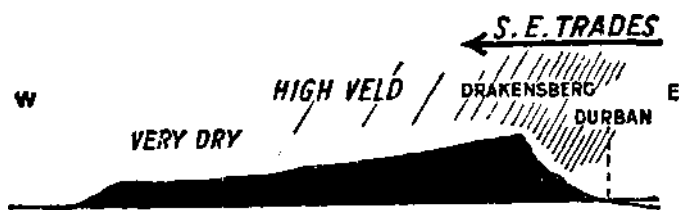


FIG. 54.—Section across South Africa.

Pretoria iron and steel industry), and around Newcastle, in Natal. The Natal coal goes largely to the port of Durban, which not only supplies bunker coal but has a considerable export; it is also used for generating electricity for the railways.

Copper is produced in Namaqualand (Cape,) at Messina in the Northern Transvaal, and in South-West Africa. *Tin* is mined in the Transvaal Bushveld.

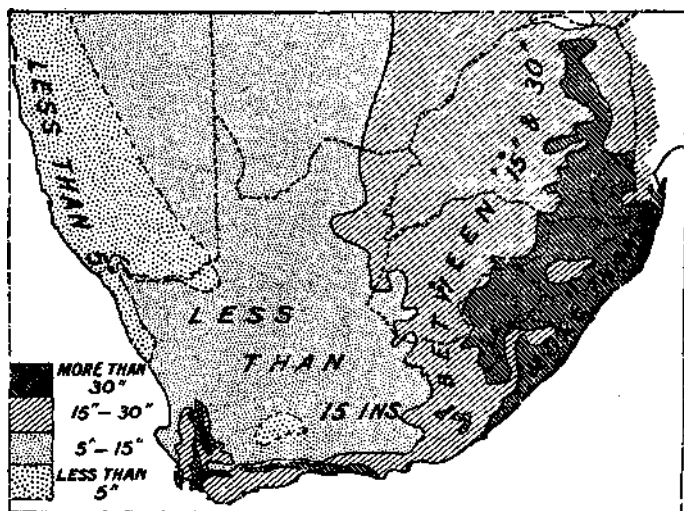


Fig. 55.—Simple rainfall map of South Africa.

Iron ore occurs in huge quantities near Pretoria, and is mined for use in the new iron and steel works there.

Other minerals produced in South Africa are asbestos, chromite, platinum, mica, corundum, manganese, graphite, magnesite and soda.

Torbanite, from which oil can be obtained, is found at Ermelo, in the Transvaal, and a refinery is being established at Boksburg.

Climate.—Certain outstanding features control the climate of South Africa :

(a) The elevation of the plateau lowers the general temperature to the extent of between 10° and 25° throughout the year.

(b) Except in the south-west which receives a winter or Mediterranean rainfall of cyclonic origin from westerly winds, the rain-bearing winds are the south-east Trades. These meet the high (eastern) edge of the plateau and are there robbed of much of their moisture. The lower western half of the plateau gets very little rain indeed.

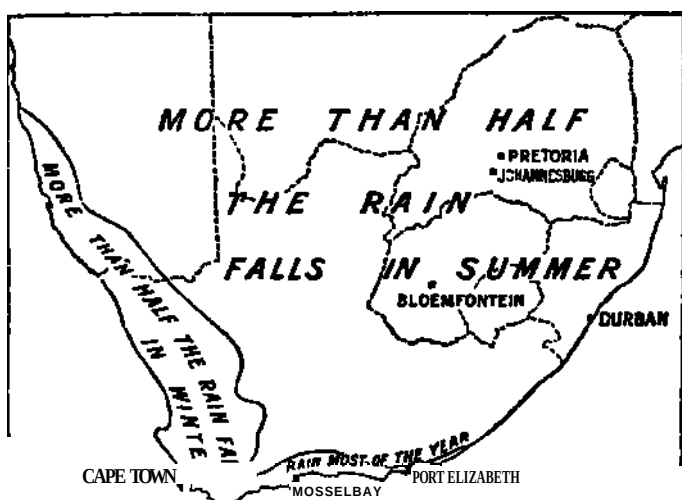


Fig. 56.—The limit of winter and summer rainfall regions [cf Fig. 7].

Climatic Regions.—South Africa can be divided into a number of climatic regions :

On the plateau :

(a) The *Tropical Climate* giving rise to typical savanna or "bush veld" occurs over the northern part of the Transvaal, roughly from Pretoria northwards.

(b) The *Hot Desert Climate*, giving rise to the Kalahari semi-desert, occurs over the western half of the plateau. The rainfall decreases steadily westwards and the 15-inch rainfall line may be taken as the limiting line.

(c) The *Temperate Continental Climate*, giving rise to treeless grasslands, is found over the eastern half of the plateau, south of the tropical region of the Transvaal.

Between the plateau and the sea :

(a) The *Hot Desert Climate* occurs **down the west coast in a more extreme form than on the plateau.**

(b) The *Mediterranean Climate* occurs in the south-west. Eastwards this region fades very gradually into one with rainfall all the year round. The Great and Little Karroo lie in the south-west, but are cut off from the rain-bearing winds by mountain barriers. Such rain as they have comes mainly in winter and they may be regarded either as having a very dry Mediterranean climate or a desert climate akin thereto.

(c) The *Warm Temperate Climate* (Eastralian type) starts about Port Elizabeth and occurs through Natal, passing gradually northwards into tropical and equatorial regions along the coast.

These climatic regions have been shown in Fig. 58.

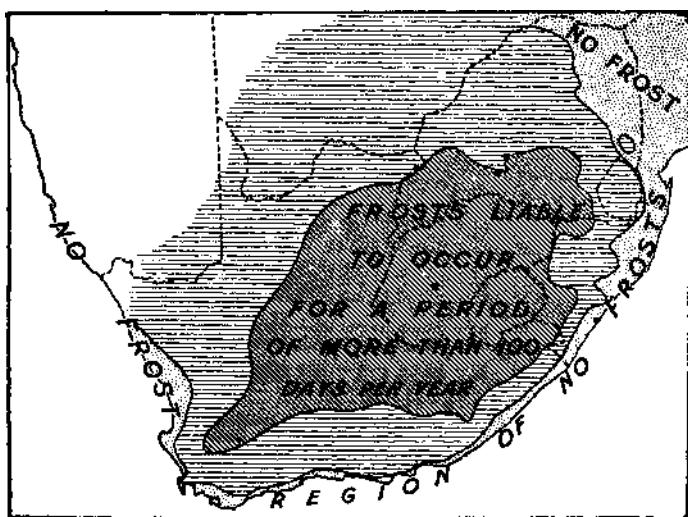


FIG. 57.—Frost map of South Africa.

Natural Vegetation.—In South Africa most natural vegetation is referred to as "veld"—in the same way as "jungle" is used in India or "bush" in Australia. Different kinds of natural vegetation are referred to as different kinds of veld—bush veld (=savana), grassveld (=grassland), thornveld, etc. As would be expected, the vegetation regions correspond closely with the climatic regions shown in Fig. 58.

On the plateau :

(a) *The Transvaal and Limpopo Bush Veld* (savana) consists of grassland with scattered trees and occupies the area with a tropical climate. It commences north of Pretoria and stretches away northwards to the lower and warmer lands of the Limpopo Valley, where frosts and cold winters are rare.

(b) *The South-Western Scrubland or the Cape Medilleanart Vegetation* occupies the region of winter rainfall in the south-west of the Union. Most of the valleys are fertile and cultivated, but the hill-slopes are covered with a vegetation of shrubs, usually from one to six feet high, with small leathery leaves and often a grey-green foliage. There is very little grass. In damper, more sheltered situations patches of forest occur. As one goes eastwards along the coast the summer drought becomes less and less marked. In this area, especially around Knysna,

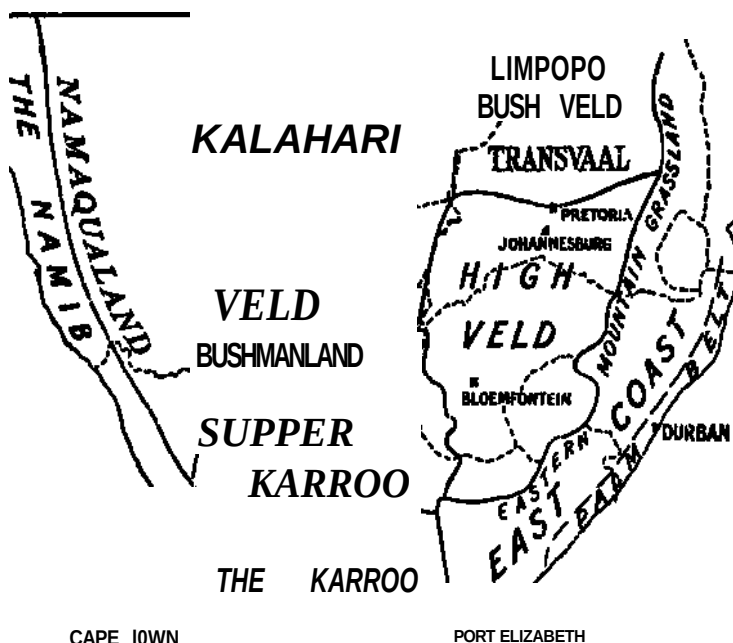


Fig. 59.—The natural vegetation and natural regions of South Afrilea.
Compare this map very carefully with the last one, showing the climatic regions.

there are still some fine forests in which trees with valuable timber, such as the yellowwood and stinkwood, grow. If we include this forested part, the Cape Mediterranean vegetation extends roughly as far as Port Elizabeth. Many foreign trees flourish in the Mediteiranean region—especially pines, oaks, and eucalypts.

- *The Karroo Vegetation* is a semi-desert vegetation of small shrubs and succulent plants, not usually exceeding two or three feet in height. Trees and bushes are typically absent. Usually dull and uninteresting, after rain the Karroo produces

a wealth of flowers. The Karroo extends roughly as far east as the 15-inch rainfall line.

(c) *The East Coast Vegetation* occupies the coast from Port Elizabeth right through Natal. Three belts may be distinguished :

- (1) *The Palm Belt* of semi-tropical plants occurs along the coast where there is an absence of frost. With a hot, wet summer the usual vegetation is a dense bush of palms, wild bananas, or a forest of varied trees.
- (2) *The Eastern Grassveld* or *Thornveld* lies between 1,000 feet and 4,000 feet, and stretches from the Palm Belt to the foot of the escarpment. The ground rises by terraces and is covered by grassland with scattered bushes.
- (3) *The Eastern Mountain Grassveld* and *Eastern Mountain Forests* occupy the eastern slopes of the escarpment mountains.

Forests and Forestry.—South Africa cannot be described as a country rich in natural forests. Forests cover only about one two-hundredth part of the Union, or 0·5 per cent. The natural forests occur in three main areas :

(1) The Cedar Forests occupy a small area in the Cedarberg Mountains of the south-western area (north of Cape Town).

(2) The Yellowwood and Broad-leaved Forests occupy the seaward slopes and ravines of the mountain ranges of southern and eastern South Africa from the Outeniqua Mountains to the north of Natal. The finest forests are around Knysna in that part of the south-western region which enjoys rain through most of the year. They require a rainfall of from 35 to 70 inches. Besides the yellowwood (*Podocarpus*) there is the fine stinkwood, formerly much used for furniture, the ironwood, the assegai wood, and the pear woods.

(3) The Sub-Tropical Forests of the coasts of the Transkei, Pondoland, and Natal. These forests yield several varieties of fine hard timber.

Foreign trees have been planted in many parts of the country, especially by mining companies, by farmers, towns, and the Government. The most important are :

(1) Various Australian eucalypts (gum-trees) which grow very quickly—70 or 80 feet in seven years—and give good hard wood unless growth is too rapid.

(2) Wattle trees from Australia. The bark of the black wattle is used for tanning leather, and the timber for pit-props.

(3) Various kinds of pines from the Northern Hemisphere, giving wood suitable for box-making.

The planting of trees, especially over the formerly treeless plains of the High Veld, has made a very great difference to the scenery.

Many bare, rocky regions, like the northern suburbs of Johannesburg have now become pretty and attractive with a wealth of pine and gum-trees. South Africa is not yet self-supporting as regards timber, and still imports large quantities of hard woods for railway sleepers from Australia and soft woods for building and box wood. The present afforestation policy, however, should render the country self-supporting in 15 or 20 years' time.

Agriculture.—Apart from the mining of gold and diamonds, farming is by far the most important occupation in South Africa. Yet only about 5 per cent, of the Union is under the plough, and 12 per cent. is the absolute maximum that could ever be cultivated. The handicaps to agriculture are many: the irregularity of the rainfall, with periodical droughts (*e.g.* 1932-3), soil erosion due to the torrential and seasonal character of the rain, locust plagues (*e.g.* 1934), and the necessity for relying on rather costly rail transport, there being no waterways. For a long time agriculture has been subsidised in the Union to a greater or less extent. The original policy was to foster grain-farming by protection, but it came to be realised that in this type of agriculture the Union could not possibly compete with *e.g.* Canada and Argentina. Thus there is now an increased emphasis on animal and fruit-farming. Some £10 millions per annum are spent by the Government on wheat, sugar, citrus fruit and other subsidies and protective measures, and yet the total value of the agricultural produce is only about £60 millions ! It is only economic to do this because of the large revenue derived from the gold industry.

Irrigation is not yet much developed, and intensive farming, such as is practised in the thickly populated parts of Europe and North America, is only in its early stages. The distribution of many crops is limited to certain natural vegetation regions.

Maize (Indian corn or mealies).—Maize is the principal grain of the Union. Not only does it form the staple food of the greater part of the population (excepting only the Europeans) but it also affords excellent food for cattle and considerable quantities of the grain are exported. The principal maize-growing area of the Union, often known as the "Maize Triangle," lies on the High Veld (see Fig. 60) in the Southern Transvaal and the northern part of the Orange Free State. This area produces between one-half and two-thirds of all the maize grown in the Union. Most of the remainder is grown in the East Coast region. Maize cannot resist drought and so is not found where the rainfall is less than 15 inches. Compared with other maize-growing countries the yield of grain per acre in South Africa is small. It is rather less than three bags of 200 lbs. each per acre, whereas in the United States it is eight bags. In Natal the yield is higher than on the High Veld! When land becomes scarcer it will be necessary to improve the yield by fertilising, etc., but at

present plenty of land is available. As a food for cattle the grain is often used, but a fine succulent food is prepared by cutting the maize before the cobs are ripe, stacking it in a shed and allowing it to ferment slightly. The resulting ensilage, as it is called, has lost some of the natural moisture of the maize stalk freshly cut, but forms a fine cattle food. The production of maize in the Union during the last 12 years has varied from 2'2 to 4'8 million lbs., averaging about 3'8 million lbs. or 19,000,000 bags (1,730,000 metric tons), *i.e.* only about one-fiftieth of that of the United States.

Wheat.—*South Africa* is not a great wheat-growing country, but it grows nearly enough for its own needs. The wheat is nearly all

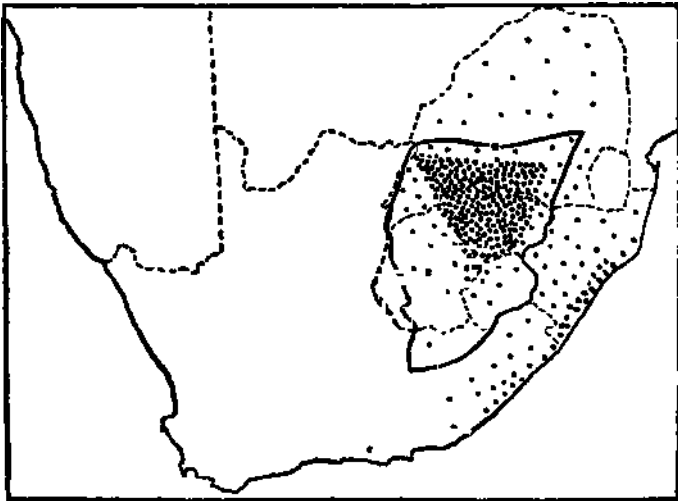


FIG. 60.—Distribution of maize.

Each dot represents a production of 50,000 bags in a good year (*e.g.* 1928-29). The thick black line shows the limits of the High Veld. Notice that the "Maize Triangle" lies in the wetter, eastern part of the High Veld. (Note one bag = 200 lbs. or $3\frac{1}{2}$ bushels.)

grown in the south-western region during the winter months, when the rain falls, and is harvested early in the summer. Associated with wheat are the other "winter cereals," as they are called in South Africa—rye, oats, and barley. Of these the Union produces sufficient for its needs.

Kaffir Corns or Sorghums.—Kaffir corns of various kinds are very largely grown throughout the Union by the natives, but are little cultivated by European farmers. They are better suited to the drier western parts of the plateau than is maize. There are several different kinds, one of the best is a native of South Africa, but has been improved by careful cultivation in America. Kaffir corn is used both as a grain and as a forage crop and is also used for the manufacture of Kaffir beer.

Sugar.—The sugar cane, essentially a tropical or sub-tropical crop, is limited in South Africa to the warm coastal strip of Natal and especially Zululand (Fig. 61). Natal is able to produce much more than the total amount of sugar required by the Union, and the surplus is exported. The industry is protected by a heavy tariff on imported sugar.

Fruits.—The fruit-growing industry of the Union is now a very important one and is rapidly increasing. In fact, fruit may be said to play second part to gold in the agricultural and industrial life of the Union, by reason of the many secondary industries. *e.g.* crying, canning, wine-making, to which it gives rise. The fruits grown may be grouped into four classes :

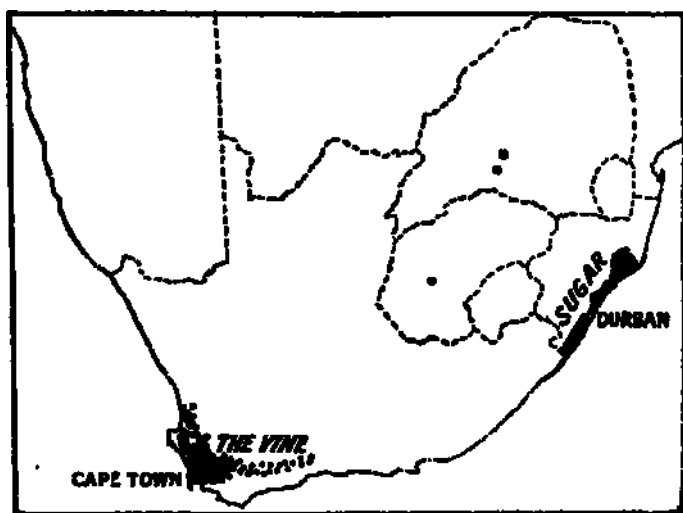


FIG. 61.—Distribution of sugar cane and the vine.

The sugar cane grows only in the coastal strip (sub-tropical) of Natal, the vine is almost restricted to the Mediterranean Region.

(1) Citrus Fruits—oranges, naartjes or tangerines, lemons, and grapefruit.

(2) Deciduous Fruits, *i.e.* fruits from deciduous trees, trees which lose their leaves in the cold season—apples, pears, peaches, apricots, nectarines, plums.

(3) Grapes.

(4) Tropical or Sub-Tropical Fruits—bananas, pineapples, melons, mangoes, papaws, guavas, grenadillas.

Owing to the fact that the seasons are reversed in South Africa when compared with Europe, fruit ripens in the Union when it is practically unobtainable in England, so that South Africa has great opportunities in the export trade to England. Some 220,000 tons of fresh fruit are exported every year—over 90 per cent, to Britain.

Citrus Fruits are now grown successfully in several areas of the Union, but they require warm, sheltered positions and so we find thorn limited to three of the regions of natural vegetation:

(a) The South-Western region, especially in the valleys near Cape Town and around Port Elizabeth.

(b) The Sub-Tropical East Coast region around Durban.

(c) The Northern Transvaal, especially in the warmer eastern part.

Deciduous Fruns have long been grown successfully in the early settled south-western region of the Cape, which is still the most important region. There are also many apple and pear orchards on the High Veld, throughout the Orange Free State and the Southern Transvaal.

Grapes.—All the vineyards of South Africa are in the sheltered valleys of the Mediterranean region. Not only are grapes grown for eating and for export, but considerable quantities are dried as raisins and currants and quantities of wine and brandy are made. The wine industry has had a phenomenal growth since the Great War, despite the absence of any subsidy and in the face of severe Australian competition. There is now an export trade of nearly "2 million gallons a year.

Tropical Fruits are limited to the sub-tropical coastal strip around Durban.

South Africans eat large quantities of fruits but every year now seas larger quantities being sent abroad. The most important exports are of oranges, pears, grapes, peaches, plums, grapefruit and pineapples (in order of value). Large quantities of fruit are row canned, bottled or dried, both for home use and for export.

Tobacco is grown in a number of different parts of the Union, on the High Veld, South-Western region, and in Natal. On the High Veld and in the South-Western region the warm temperate type used for cigarettes and pipe mixtures is grown, whilst in Natal the tropical type uted for cigars and cheroots is cultivated.

Cotton is a crop which has only recently become of importance. It is a sub-tropical crop, and so is almost limited to the Northern Transvaal, Natal, and Zululand.

Tea can be grown in Natal, but it is less important than formerly, as it is cheaper to import tea than to grow it.

Livestock.—*Sheep*. The breeding of sheep for the sake of their wool is the oldest and the most important of all the agricultural and pastoral industries of the country, but its world importance dates only from its rationalisation during this century. There are 30-40,000,000 sheep in the Union.

Sheep are well distiibuted except in the wetter parts of Natal and the Northern Transvaal. The High Veld is, however, the most important region. The original Cape sheep were inferior, but the

importation of sheep from England and Holland and, during the present century, from Australia has improved the stock immensely. The best wool is obtained from the Merino sheep, but the hardest sheep for the driest regions (such as South-West Africa) is the Karakul sheep, whilst the fat-tailed Cape sheep gives the best mutton. On an average a flock of Merino sheep yields about 11 lbs. of wool per sheep, and South Africa is one of the five great wool-producing countries of the world. Exports vary between 250 and 300 million lbs., worth in recent years between £6,000,000 and £16,000,000. France, Britain and Germany each take about a quarter of the exports.

Goats. Goats are able to live on the poorest vegetation where even sheep will not thrive. Consequently they are found in large numbers (6 millions) in the dry parts of the Cape Province. South Africa leads in the world's production of mohair, obtained from the long-haired Angora goat, which was originally introduced from Asia Minor; but the industry is declining. In 1923 there were 2*2 million Angora goats, in 1935 only 0·7 million. The ordinary (Jape) goat is of value for food in the driest regions.

Cattle. There are about ten million cattle in the Union of South Africa, and the last few years has marked not only a very rapid increase in numbers but a great improvement in quality. It must still be remembered, however, that amongst the natives cattle are regarded as tokens of wealth rather than as food-producers. Cattle are bred mainly for three purposes :

(1) As draught animals. Although the old-fashioned trek waggon with its half-dozen pairs of bullocks, on which the early European settlers had to depend for transport, has largely disappeared with the spread of the railway and the motor-car, much of the ploughing is still carried out by oxen. The early settlers gradually created a distinct breed of cattle capable of standing long treks, a breed known as the Afrikaner.

(2) For the production of beef. Fine natural gattle-ranching country is found in the Northern Transvaal, Bechuanaland, etc., in the various regions of Bush Veld, but very large numbers of cattle are kept on the High Veld and the natural grassland feed is supplemented by various specially grown fodder crops. The quality of the beef has been greatly improved of recent years by the importation of first quality stock from Great Britain and Holland.

(3) For the production of milk, butter and cheese (dairy-farming). This industry has also grown rapidly in recent years; the natural cattle country is in the wetter regions of the east coast, but fodder-fed dairy cattle are kept over most of the High Veld.

We should notice that in many of the dry districts of the Karroo and the High Karroo there are practically no cattle, though sheep are able to thrive there. The map, Fig. 62, illustrates this. In

connection with the cattle industry we must notice the various fodder crops. Maize, Kaffir corn, peas, beans, and monkey-nuts are all grown for this purpose and especially for ensilage. For the preparation of ensilage, deep pits are dug and filled with layers of the green fodder crops, with a little salt. The pits are then covered over and the contents allowed to ferment. Part of the moisture dries out and the resulting ensilage can be cut by a chaff-cutter.

Cattle, sheep, and goats are also very important for the hides and skins which they yield ; there is a valuable export trade in these commodities.

Horses, mules, and asses have been introduced into South Africa

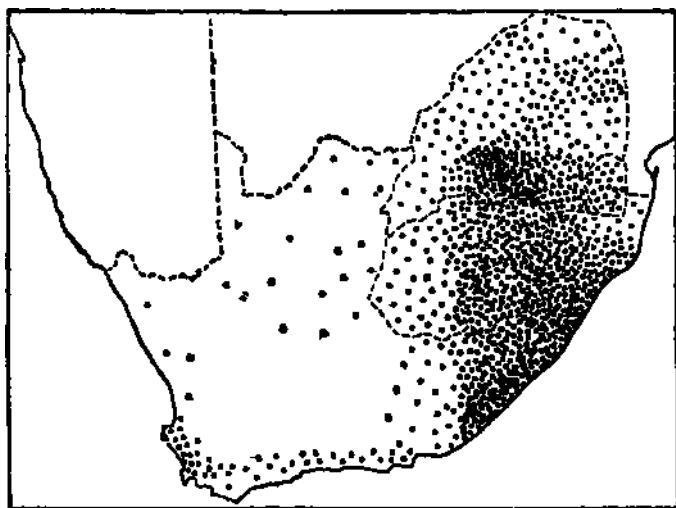


Fig. 62.—Distribution of cattle.

Each dot represents approximately 10,000 head of cattle

by Europeans. Except in times when there are scourges of horse-sickness, they have proved extremely useful in South Africa, and mules especially have proved more hardy than cattle for trekking in dry country. Transport by mule- or donkey-drawn waggons is still important in the dry parts of the Cape Province.

Pigs.—The bacon industry has made good progress during the last few years. There are nearly a million pigs, mostly in the Transvaal and Cape regions.

Poultry.—There are good opportunities in South Africa for the development of poultry-farming. This industry progressed rapidly and a very considerable export trade in eggs was established, but the high cost of maize and wheat has had a bad effect.

Ostriches.—For several years before the Great War, the production of ostrich feathers was an important industry, centred

mainly in the Little Karroo around Oudtshoorn, and the value of the feathers was between two and three million pounds annually. But women's fashions change, and the demand for ostrich feathers has almost disappeared.

Irrigation.—A large proportion of the Union of South Africa receives a small rainfall of less than 15 inches. Moreover, the rainfall from year to year is often very irregular and severe droughts may occur for two or more years in succession. Consequently irrigation is a matter of great importance. Although the Union has not, so far as we know at present, any large artesian basins such as are found in Australia, there is often a good supply of water at small depths below the surface, which can be reached by boreholes and pumped up to the surface by windmills. In this way a large number of farms have their own water supply, especially over the Karroo and High Veld where water is badly needed for watering stock. There are a few small rain-patchment dams as well as a number of river dams. The more important of the latter are :

Hartebeestpoort Dam (Crocodile River) north of Pretoria.

Sundays River, north of Port Elizabeth.

Karaanassie River, near Oudtshoorn.

Tarka River (tributary of the Great Fish River) near Cradock.

Great Brak River, near Fish River Station.

Altogether about a million acres are irrigated by canals in the Union, a very small area in comparison with that of agricultural lands as a whole.

An interesting system employed in South Africa is that known as "warping" or "Zaaidams." Flood water, rich in alluvium, is allowed to spread over the land, and the deposit of silt is then ploughed in.

Dry Farming.—The system known as "dry farming" makes it possible to utilise land for crops which would otherwise be too dry. The main principle is to plough the land very deeply and then to cover the surface with a "blanket" of dry soil, which has the effect of preventing the underlying soil from losing its moisture. It has not yet been practised to the same extent as in Canada or Australia.

Fisheries.—The southern shores of South Africa have valuable and extensive fishing areas. The industry is carried on in the neighbourhood of the Cape Peninsula, False Bay, Mossel Bay, The Agulhas Bank, and Algoa Bay. The Agulhas Bank promises to be one of the finest and most prolific fishing grounds in the world. The industry is as yet little developed, but crayfish are exported to France.

The *whaling industry* is carried on round the South African shores, the most important stations being in the neighbourhood of Durban.

Manufactures.—One of the most important recent develop-

ments in South Africa is the growth of manufacturing industries. The leading industrial regions are the Witwatersrand goldfield around Johannesburg ; the south-western region around Cape Town and Port Elizabeth, and in Natal at Durban and on the coal-fields.

The value of the manufactured goods is roughly £100 millions per annum, but apart from this the industries are of exceptional importance as offering employment to the growing numbers of " poor whites " who have been displaced from agricultural activities through economic causes and mechanisation.

TABLE OF EMPLOYMENT IN SOUTH AFRICA.

	i Industry (1932-3)	I Agriculture (1930)	Mining (1934)
Total.	192,000	749,000	367,000
Total.	192,000	749,000	367,000
Europeans.	45%	25%	11%
Natives.	28%	25%	11%
Asiatics.	3%	2%	89%
Other coloured.	24%	48%	89%
Asiatics.	4%	2%	
Other coloured.	12%	10%	

Population.—The white population of South Africa has descended from Dutch, English, and French settlers, with a very small infusion of Portuguese, German, and other European races. The Dutch in early days severed their connection with their mother country and the Dutch language as used in South Africa suffered many changes. Afrikaans, the South African form of Dutch, varies widely from ordinary High Dutch. When the Union was formed in 1910 both English and Afrikaans were recognised as official languages. English predominates in Natal and the town districts of the Transvaal, but Afrikaans is the principal language amongst the farming community of the O.F.S. and the Transvaal. In Cape Province the usual rule is English in the towns, Afrikaans in the country districts ; but it is the policy of the schools to make all South Africans bilingual. 65 per cent. of the white population can speak Afrikaans.

The peoples now living in the Union of South Africa may be classified under four main heads: (1) Europeans. (2) Coloured (mixed). (3) Natives. (4) Asiatic.

This is the classification officially adopted, and below are the numbers at the last full census (1936):

	European	Coloured	Native	Asiatic	Total
Cape	791,394	661,831	2,045,110	10,692	3,529,027
Natal	190,551	18,513	1,553,930	183,646	1,946,640
Transvaal	820,620	49,008	2,445,045	25,561	3,341,144
O.F.S.	220,947	17,722	553,156	29	771,854
Union	2,003,512	767,984	6,597,241	219,928	9,588,665

Natives.—The Native population is now almost entirely restricted to the eastern and northern parts of the Union* This is important,

because whereas in the temperate regions of the south the climate is suitable for white labour, cultivation in the warmer districts of the north and east must depend largely upon Native labour. The great mining district of the Rand also depends on an adequate supply of Native labour, drawn to some extent from Portuguese East Africa.

The natives are mostly Bantus and include such widely different races as Matabele, Zulu, Basuto, Bechuana, Barotse, Swazi, Griqua, Xosa (Kaffir), etc. Amongst the most noteworthy are the Zulus who inhabit the fertile and productive east coast. They are powerfully built and intelligent people, and it is for this reason that they have been able to hold the best lands.

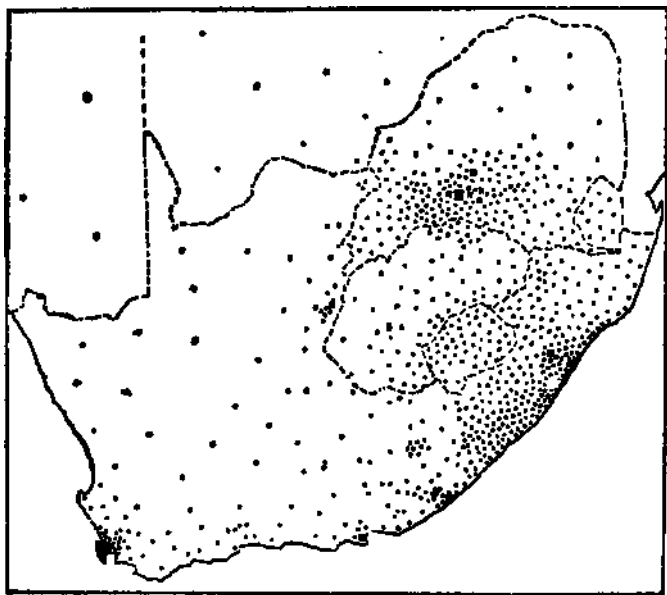


FIG. 63.—The population of South Africa (all races).

Each dot represents roughly 10,000. All towns with more than 10,000 people are marked by a square dot.

Among the non-Bantu native races the most interesting are the Hottentots of the south-eastern coastal belt and the Bushmen. The latter are very primitive, small in stature, and weak in warfare. They have been driven by stronger tribes to the inhospitable borderland of the Kalahari Desert, and are tending to die out (*cf.* p. 31).

Mixed or Coloured.—As a result of the intermarriage of the white settlers and the Native races a large mixed population has arisen, usually known as "Coloured persons." They are especially numerous in the south-western districts around Cape Town. Other coloured persons are of Hottentot-Kaffir or Hottentot-Malay parentage.

Asiatics.—The Asiatic population consists almost entirely of

Indians and Malays. The larger number of Indians were brought to South Africa to work on railway construction and in the tropical plantations of the east coast. Many of them have settled and have been followed by many of the Trader class.

The native and coloured races of South Africa are of the greatest importance economically; for not only do they provide cheap labour of the unskilled and semi-skilled types, but also, as they outnumber the Europeans by about four to one and are steadily increasing, afford a large local market. Under the influence of European peoples the native and coloured peoples show strong desires to attain a higher standard of living—a tendency which greatly increases the importance of the local market.

A great problem is presented by the growth, during the last quarter of a century, of an ever-increasing body of white people not belonging to the land-owning or professional classes. These people, numbering at present some 300,000, are mainly located in the Rand.

Communications.—South Africa is well served by an excellent railway system. The first railway (from Cape Town to Wellington) was commenced in 1859 and there are now over 13,000 miles of railway in the Union. The railways and harbours are owned and controlled by the Union Government, being administered by a special department. The railway gauge is 3 feet 6 inches, and South Africa is an example of the excellent result which can be achieved with a narrow gauge. Fig. 64 shows the position of the principal lines. Notice first of all the position of the four main ports of the Union—Cape Town, Port Elizabeth, East London, and Durban, and also of the Portuguese port of Lourenzo Marques which serves the eastern Transvaal. Notice next how these ports are connected with the leading towns of the Orange Free State and the Transvaal. From Cape Town there is a long main line through the Bechuanaland Protectorate to the town of Bulawayo in Southern Rhodesia, where it links with the Rhodesian railways. This line runs through Kimberley and has an important branch to Johannesburg. The railways of South-West Africa were connected with those of the Union in 1915 in the early days of the Great War.

It is a great advantage to South Africa that the railways and harbours are under one control. The railways are able to make special arrangements for taking coal from the collieries right to the sides of steamers in the harbours. Again, the railways have constructed a series of maize elevators in the maize-growing districts and at the ports to enable the farmer to ship his produce more cheaply and easily. Electrification of the railways has been commenced, notably in Natal, which has now one of the largest stretches of electrified *main* lines in the world, and in the Cape Town and Johannesburg districts. Over 500 miles of line are now electrified.

Airways are developing, and in addition to the bi-weekly Imperial Airways Durban to London service, there are several local airways in the Union (see Frontispiece).

Harbours.—Most of the foreign trade of the Union passes through the four leading ports and through Lourenço Marques; the trade of the minor ports (Mossel Bay, Port Nolloth, Simons-town, Knysna, Port St. Johns, etc.) is less than 1 per cent. of the whole. Fig. 64 shows diagrammatically the proportion of the import and export trade passing through the chief ports. Cape

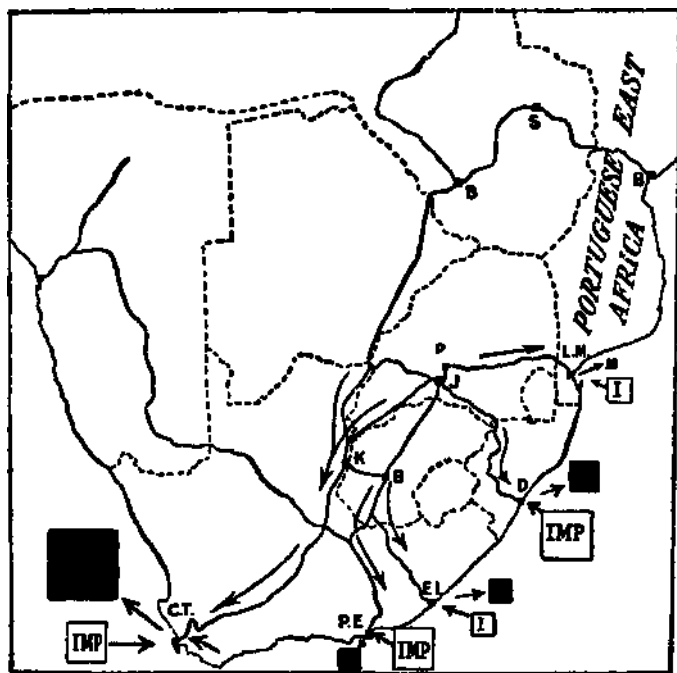


FIG. 64.—Main railways and ports of South Africa.
Over 3 million tons of cargo are handled yearly by the ports.

Town, Port Elizabeth, and Durban share the import trade in roughly equal proportions (Durban leading), but Cape Town leads easily in the export trade and two-thirds of the whole of the Union's exports pass through Cape Town.

Cape Town.—Cape Town serves as the outlet not only for the western part of the Cape Province, but for a large part of the whole Union and Rhodesia. Diamonds from Kimberley and the gold of the Witwatersrand are sent through Cape Town. A large maize storage elevator has been built, and the harbour is equipped with a dry dock. Before the construction of the harbour Table Bay did not afford sufficient protection to ships when the north-westerly winds

were blowing, and many wrecks occurred in the old days, so that an artificial breakwater was commenced as long ago as 1860.

Port Elizabeth Harbour is situated on the shores of Algoa Bay. The ships used to anchor out in the Bay and were loaded or off loaded from lighters, but extensive harbour works now enable ocean steamers to be berthed alongside the quays.

United Kingdom | U.S.A. | g |||^| Other

FIGS. 65 and 66.—Union of South Africa : Imports.

Average value 1921-25, £77 millions; 1928-31, £70 millions; 1933-35, £60 millions.

East London Harbour is situated at the mouth of Buffalo River, the entrance being protected by breakwaters.

Durban Harbour or *Port Natal* consists of a sheltered bay with a narrow entrance. The entrance suffers from the presence of a sand bar, and constant dredging is required to keep the entrance

United Kingdom India Germ. Fran. Rhod. Others

921-25

G O L D					WOOL	DIAMONDS	FRUIT	HIDES	OTHERS
United Kingdom						Rhod.	Fran.	Germ.	Others

which has a climate closely comparable with the home of so many European and Asiatic civilisations—the Mediterranean climate.

The region is on the whole a mountainous one and consists of ranges of mountains enclosing sheltered and fertile valleys in which the population is concentrated. Most of the mountains are built up of a hard, resistant series of sandstones, called the Table Mountain Sandstones, from the fact that they build up the well-known Table Mountain. The region as a whole is bounded on the landward side by a series of ranges the most important of which from north to south are the Cedarberg, Bokkeveld, Hex River Mountains, the Langebergen, and the Outeniqua Mountains. These ranges cut off the south-western region from the dry Karroo.

The mountain scenery in this part of South Africa is magnificent. There are long, sinuous passes between lofty mountain-barriers. Down these passes run river courses almost dry in the rainless season but filled with roaring surging cataracts and flood waters in the wet season. The railways communicating with the interior follow these passes and thus we find steep gradients near the coast. One of the most celebrated passes is the Hex River Valley. When floods occur, washaways on the railways are frequent.

Fig. 69 shows the proportion of land under 1,000 feet. In the northern part the land tends to be lower and the region extends as far as Oliphants River.

The climate is characterised by winter rain, but eastwards towards Port Elizabeth the influence of the Trade Winds is felt and rain falls practically throughout the year. This area might be considered as a sub-region. The rainfall varies greatly over the whole region ; for example, at Cape Town it is only 20 inches at the Royal Observatory, but over 70 inches on Table Mountain. The average temperature of Cape Town is 62 degrees—roughly the same as Naples. Frost is rare on the lowlands, but snow frequently falls on the mountains.

The natural vegetation consists of shrubby plants with a wealth of flowers, covering the mountain slopes ; the valleys are almost entirely cultivated. Forests grow in the damp " kloofs " ; in the wetter regions round Knysna fine natural forests still exist. The sheltered valleys are famous for their fruit orchards and vineyards. Though originally introduced by the early Dutch settlers, viticulture and fruit-farming undoubtedly owe their development and success to the application of the French Huguenots, who, after the revocation of the Edict of Nantes (1685), settled in South Africa. The fertile valleys of the Berg River, Breede River, and Hex River are eminently suited to this type of farming. The neighbourhoods of Paarl, Wellington, Worcester, Stellenbosch, French Hoek, Montagu, and the Constantia District of Wynberg (Cape Peninsula) are noted for their trim vineyards and fruit orchards. Wheat is the

principal cereal. Mixed farming has been carried on by **Europeans from** early days, and most of the available land is tilled.

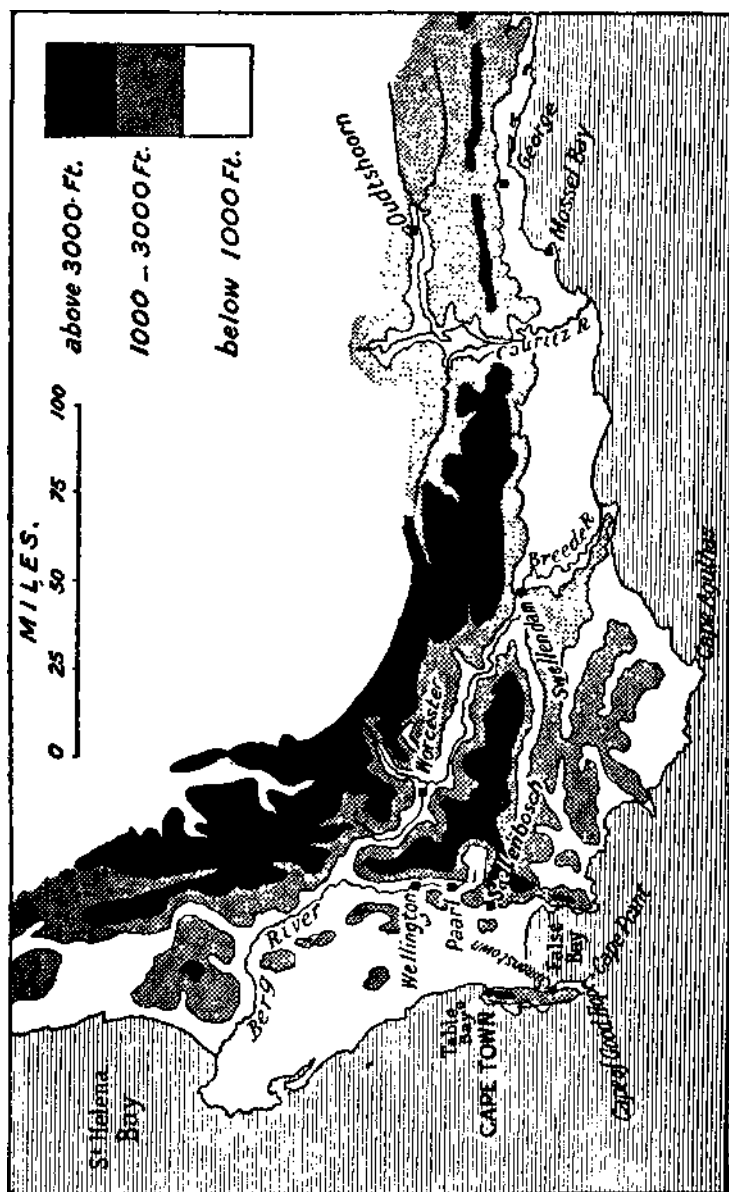


FIG. 69.—The Mediterranean or south-western region.

The fruits already mentioned as produced in this district give rise to many industries. First of all there is the exportation of *fresh fruit*. As *the* crop is ripe at a time when these fruits are not in

season in the Northern Hemisphere, there is a great demand for them in European and American markets. Grapes, peaches, apricots, oranges, naartjes, plums, pears, and figs are exported in large quantities. Owing to the perishable nature of these fruits and the long distance they have to be transported, it is necessary to preserve them in cold storage. So rapid has been the development of this trade that steamers calling at Cape Town, from which most of the fruit is exported, have had their cold-storage capacity increased. In spite of this fact, fruit has frequently to be detained at Cape Town owing to lack of cold-storage capacity. Fruit of similar kinds is exported from the "Mediterranean" regions of Australia; but, as the journey is considerably longer, South Africa possesses a great advantage. The fruit for export purposes is specially selected and in the case of grapes especially careful pruning, trimming, and selecting are necessary. The *drying of fruits*—especially apricots and raisins—is becoming important, and great developments are possible in this direction. The *manufacture of wines and brandies* is carried on on a considerable scale. The use of French names for the wines is prohibited, but a large export trade is developing, mainly with Britain, where Empire wines are being popularised.

Tobacco grown in this region is locally manufactured. The chief factories are in Cape Town, where large quantities of cigarettes and pipe tobacco are turned out. Some of the tobacco used in these factories, however, is grown in the Transvaal (Magaliesberg) and Southern Rhodesia.

The olive could be extensively cultivated in this district, and a little *olive-oil* is manufactured in Paarl. In Cape Town, as well as in some of the Eastern Province centres, various forms of *leather goods* are now manufactured, especially *boots and shoes* and *harness*. There is still, however, a large import from Europe and the U.S.

Cape Town.—Cape Town is the largest town and the legislative capital of the Union of South Africa. Notice its fine position on Table Bay sheltered by Table Mountain. It has an important university; it is the starting-point of the South African Railway system, and there are important railway works at Salt River a few miles from Cape Town. Cape Town is one of the leading ports, and has a well-equipped harbour, with a dry dock, maize elevator and storage sheds. It is the natural outlet for the region; it is the nearest large port to England, and remains the port of call for steamers *en route* for Australia. The population is over 295,000, of whom 151,000 are Europeans; the non-Europeans are mainly "coloured persons," only a few being Natives.

The rocky Cape Peninsula is separated from the mainland mass by a flat area of sand dunes often called the Cape flats. To the north is Table Bay, to the south is False Bay. False Bay is protected from the north-westerly winds. Along its shores are many

delightful seaside resorts, such as Muizenberg and Somerset Strand. On the shores of the bay is situated the small naval base of Simonstown. *Stellenbosch* is situated in a delightful valley surrounded by mountains. It is a university town, and a religious and cultural centre of the Afrikaans-speaking people. *Wellington, Paarl, Stellenbosch, Swellendam, and Worcester* are all the natural centres of the fertile valleys in which they stand and act as collecting centres for the local produce. The position of Worcester in particular should be noted ; it lies at the foot of the Hex River Valley. *Mossel Bay* lies in a sheltered bay and commands two passes across the Outeniqua Mountains into the interior, and so is the outlet for the fertile valleys around Oudtshoorn. *George* is a fruit-growing centre, whilst *Knysna* lies in the forested region. *Uitenhage*, at the western end of the region, is an important centre for the citrus-growing industry. Considerable areas of rich land have now been irrigated from the Sundays River, and the district is progressing rapidly. Situated on Algoa Bay, *Port Elizabeth* is the natural outlet of a large area of South Africa, including the Orange Free State. It is not naturally a good port, and extensive harbour works have had to be built in order to cater for shipping. With the completion of these it is fast becoming a leading port of South Africa, mainly as the result of its position, *i.e.* its nearness to a productive hinterland. It is the third port of the Union, and has a large wool trade. Recently, manufacturing industries have been developed, and the General Motors and Ford motor works of South Africa are here. The population in 1936 was 99,000.

Sub-tropical Eastern Coast.—This region stretches from Port Elizabeth along the coast to the Natal border and inland as far as the great escarpment. It has a good rainfall throughout with a high temperature and an absence of frosts along the coast. The palm belt with tropical fruits occupies the coastal strip ; grassland with scattered trees and forests in the deeper valleys occurs inland. This is one of the great cattle regions of South Africa ; the principal grain is maize. There is a large Native population, and little room for European expansion, especially in the eastern part of the region, known as the Transkei and occupied largely by a Native reserve. The citrus orchards are situated mainly around the European centres of Port Elizabeth and East London. *East London* (47,000 inhabitants) is the largest town and port ; it does *not* depend for its importance on the region itself, but is the outlet for the interior as far as the Orange Free State. Like Port Elizabeth, it has developed manufacturing industries depending on the supply of raw material from the hinterland, and exports wool, hair and leather produced on the High Veld. It is a very popular seaside resort. *Grahamstown* and *King Williamstown* are the most important of the inland centres, the former as an educational centre

Queenstown is farther inland, being situated just below the great scarp.

The Namib.—The greater part of the Namib lies in South-West Africa. In this coastal strip are found the most extreme desert conditions known in South Africa, the rainfall being less than 5 inches per year and very irregular.

The Karroo.—Both the Great Karroo and the Little Karroo are treeless plains hemmed in by mountains. Not only is the rainfall small (less than 15 inches), but it is very irregular. Usually drab and monotonous, the small shrubs and succulent plants burst into flower after a shower of rain and the country looks comparatively fertile. Indeed, where water is available, the soil is very fertile. The Government is quite aware of its immense possibilities and is already financing irrigation schemes. In particular, extensive irrigation works are being carried out in the Little Karroo, around Oudtshoorn. Oudtshoorn is the centre of the now dying ostrich-farming industry. Settlements on the Great Karroo are far apart, and the herds of goats form the principal source of wealth. *Beaufort West* is the chief town.

The Upper Karroo or Karroid Plateau.—This region lies north of the great escarpment. Nearly the whole is more than 3,000 feet above sea-level and slopes gently northwards towards the Orange river. It suffers from extremes of temperature, with severe frosts in winter and dry heat in summer. The rainfall is less than fifteen inches and is very irregular. The Upper Karroo consists of vast treeless plains broken by flat-topped hills. The soil is shallow and rocky. The vegetation consists of small scattered bushes and supports only a few sheep and goats. The whole region is very thinly populated and people depend on underground water which is raised by wind-driven pumps. There are no towns in the region of any size, but *Carnarvon* and *Victoria West* are the principal centres of the pastoral industry. The people of this district suffer greatly from drought, and there has been no appreciable rainfall here for periods of three years and more.

Bushmanland.—Around the Orange river the Upper Karroo passes into an area which has a still poorer and sparser type of vegetation. There are large patches of bare stony or sandy soil. Often the only plants are widely separated shrubs and, locally, tufts of grass.

The Kalahari Thorn Belt.—This region includes a great part of British Bechuanaland and will be considered later under Bechuanaland. In the area which lies in Cape Province the eastern border is of interest and importance owing to the occurrence there of the famous diamond mines of Kimberley and the ranching districts around Mafeking. *Kimberley* (39,000 inhabitants) has grown up entirely as the result of the diamond-bearing "pipes." The value of the diamonds produced at Kimberley exceeds that for the whole

of the remainder of the world, and diamonds rank third amongst South Africa's products after gold and wool (but see p. 110).

The High Veld.—Only a small part of the north-eastern border of Cape Province lies within the borders of the High Veld ; it is this region, however, lying north of the Stormberg (Fig. 49) which has the greatest density of sheep population to be found anywhere in the Union.

ORANGE FREE STATE

A small part of the Orange Free State along the western border has a rainfall of less than fifteen inches and forms part of the High Karroo. All the remainder lies on the High Veld ; the land slopes from the east gently westwards and the rainfall likewise decreases from east to west.

High Veld.—The High Veld is a vast, treeless, rolling plateau of grass. Where once large herds of antelopes roamed we now find vast herds of cattle, and in the drier parts flocks of sheep and goats. This is the chief pastoral region of the Union. The damper part forms a portion of the famous "maize triangle," whilst in the drier parts wheat is produced. All over the High Veld farms are dotted, each with its cattle sheds, apple orchards, and often with plantations of pines or gum trees. Another tree which has been extensively planted is the Australian wattle, the bark of which is used in tanning leather. Owing to the frequently precarious rainfall and the consequent periodic droughts, farming in this region is not always an enviable proposition. Great losses of stock and crops are recorded during the droughts. In addition to this danger there is the locust pest which has assumed alarming proportions. The locusts swoop down in dense clouds, so thick as to darken the neighbourhood, and in a few hours not a green leaf or blade of grass is to be seen over hundreds of acres. The pest occurs periodically, for the female lays hundreds of eggs which may not be hatched for two or three years. Great efforts are being made to exterminate the locust entirely. Near the western border of the Orange Free State is the diamond centre of Jagersfontein, a few miles from Kimberley in the Cape. Near the northern border of the Free State along the Vaal river there are coalfields, but as yet they are little developed, and unfortunately the quality of the coal is not good enough for export. Coal probably underlies the whole of the northern part of the State (see Fig. 53).

Bloemfontein (51,000 inhabitants) is the administrative centre of the Free State, and is the natural collecting and distributing centre for the agricultural produce. It lies in the drier part of the State in the wheat and sheep area and just outside the main maize and cattle region. It is also a railway centre and the legal centre of the Union. *Kroonstad* and *Bethlehem* are two of the principal centres in the maize belt. Great progress has been made in recent years in the

maize industry by the construction of maize elevators throughout the Free State, and the greater part of the maize crop is now handled in bulk and not by the old system of bags.

TRANSVAAL

The development of the Transvaal has depended on its mineral industries, especially gold and coal, rather than on agriculture, though the latter is also of great importance. There have been extensive changes in the scenery of the country by reason of the development of industry in the goldfields of the Witwatersrand.

High Veld.—The High Veld in the Transvaal is very similar to that in the Orange Free State, except in the Witwatersrand industrial region. It forms part of the great maize and cattle area, and extends roughly as far north as Pretoria. There are scattered farms as in the Orange Free State, each with its clump of foreign trees (gum, wattle, or pine) and orchard of deciduous fruit trees.

The Witwatersrand industrial region extends for 70 miles east and west through Johannesburg along the line of the famous banket reef. It is the greatest goldfield in the world, and produces roughly half the world's annual supply of gold. The development of the goldfield has been made possible by the supplies of cheap coal from Witbank and the abundance of cheap native labour. The coal is used for generating electricity, and the supply of cheap electricity has also made possible the development of other industries. There are now seven industrial towns with more than 50,000 inhabitants—Johannesburg, Springs, Germiston, Benoni, Krugersdorp, Brakpan, and Boksburg, and the whole area forms the nearest approach in Africa to a "conurbation," or group of industrial towns, with a total population of about a million. *Johannesburg* is the largest town in the Union and the leading industrial centre. In 1936, there were 475,000 inhabitants of which 252,000 were Europeans and 191,000 natives. The town was founded in 1886 and progressed with remarkable rapidity. The gold-bearing banket is crushed by rollers and stamps and the gold extracted; all round Johannesburg there are huge dumps of waste white sand. One group of mines alone deals with a quarter of a million tons of ore per year. Some of the mines are now as deep as 7,000 feet. The bare veld around Johannesburg has been beautified by plantations of trees, especially gums planted for supplying pit props and mining timber as well as for ornamental purposes. The water supply is derived mainly from the Vaal river. Johannesburg has a focal position, with easy access from the leading ports of Lourenço Marques, Durban, Port Elizabeth, and Cape Town, and good rail facilities for the distribution of manufactured products throughout South Africa. *Germiston* (68,000 people) is nine miles from Johannesburg, almost in the centre of the gold region. It has the largest gold refinery in the

world, and is an important railway junction. Other industries have been developed, including chemicals (carbide), engineering works, cement pipes, agricultural products (cornflour, starch, and cattle foods). *Boksburg* (50,000), *Benoni* (84,000), and *Springs* (87,000) all lie to the east of Johannesburg in the East Rand : they are all gold-producing centres. *Krugersdorp* (55,000) (near where the gold-bearing banket was first worked) lies to the west of Johannesburg in the West Rand. *Witbank* and *Middelburg* are coalfield centres. The coal is sent mainly to the Rand and Pretoria, but a little is now exported. Notice the position of these coalfields on the railway between Pretoria and Johannesburg and Lourenzo Marques. *Potchefstroom*, to the south-west of Johannesburg, is the old capital of the Transvaal. *Vereeniging*, to the south of Johannesburg on the Vaal river, has iron and steel works, but only scrap iron is used.

The Bush Veld.—This region, which occupies the greater part of the Northern Transvaal, is rapidly increasing in importance, though there are still large areas undeveloped. The whole region is often divided into a number of smaller regions :

(a) *Banken* or slopes. About Pretoria the country consists of lines of hills running from east to west, the most important being the *Magaliesberg*. The strata dip northwards, the gentle slopes are grass covered, but the rocky parts have thorny bushes. In this area there are valuable iron ores which are now being developed, lime and cement works. The Premier Diamond Mine lies some distance eastwards from Pretoria.

(6) The bush veld lies farther to the north, and consists of grass land with numerous thorny bushes. In this region is the famous *Haartebeestpoort* Dam on the *Crocodile* river. This is the largest of the irrigation works in South Africa.

(c) The *Waterberg* sand veld and *Pietersburg* Plateau lie to the north of the Transvaal bush veld.

(d) The *Limpopo* bush veld or low veld occupies the broad valley of the *Limpopo* river.

The region as a whole slopes gradually from the neighbourhood of Pretoria northwards to the *Limpopo* River, there is therefore an increase of temperature as lower ground is reached, and near the *Limpopo* the climate becomes tropical, and malaria is prevalent. When compared with the High Veld the agricultural activities of the region give evidence of its warmer character. It is a fine cattle-ranching region, but there are few sheep ; citrus orchards flourish, but not deciduous fruits; cotton, tobacco, pea-nuts (monkey-nuts or ground-nuts) and other tropical or semi-tropical crops are grown. In the extreme north, near the *Limpopo*, lies *Messina*, where deposits of copper are being worked. The *Beit Bridge* has recently been constructed across the *Limpopo* at this point with the object of connecting the Transvaal and Southern Rhodesia by rail and road.

Pretoria.—Pretoria, with 108,000 inhabitants, is the administrative capital of the Union ; it is a fine city, and is situated in a pleasant open valley. Notice its position between two large natural regions. It is 45 miles by rail or good road from Johannesburg, and a short distance from the coalfields. The proximity of the coal to large resources of iron ore has recently resulted in the inauguration of the first modern iron-smelting works in all Africa. At a cost of some £6,000,000, the South African Iron and Steel Industrial Corporation has erected coke-ovens, smelting plant, steel works, rolling mills and sheet works at Pretoria, capable of producing 170,000 tons of steel a year. Smelting actually began early in 1934. Pretoria already possessed extensive railway workshops ; the new iron and steel industry will doubtless attract other manufacturing establishments. North-east of the city lies the Premier Diamond Mine, where the Cullinan Diamond, the largest in the world, was found.

Eastern Low Veld.—This region lies below the great scarp. Frosts are rare, and the region is semi-tropical. It is largely undeveloped, but is similar to the Limpopo bush veld.

NATAL

The whole of Natal lies below the great scarp, which is here called the Drakensberg, but the land rises from the sea by a series of steps due to the horizontal strata (see Fig. 70). The region is wet, the rivers are nearly always full of water, and pass over the steps in a series of waterfalls.

Coastal Strip or Palm Belt.—Along this sub-tropical strip frosts do not occur. There is an excellent soil, and as a result the land supports a big Native and Indian population. The palm belt extends up to a height of 1,000 feet and includes the greater part of Zululand in the north. Maize is the principal grain, but sugar cane is the chief crop grown in European plantations. Tropical fruits, especially pines, are extensively grown, and there are plantations of the Australian black wattle. Cattle are numerous, and dairy-farming is important. A beginning has been made with the cultivation of cotton in Zululand, but the quality needs improving. Durban lies in this belt.

Grass Veld and Thorn Veld.—This belt stretches inland from the Palm Belt to the foot of the scarp. It is often called the sweet veld. It is drier than the Coastal Belt, and Kaffir corn is the principal grain. In this region lies the coalfield of Newcastle, and large quantities of coal are mined for export through the port of Durban.

Mountain Grass Veld (Sour Veld).—The mountain slopes are covered with grass and with forests in the sheltered parts. There is much very fine scenery in the Drakensberg, and the highest point

in South Africa is the Giant's Castle (11,000 feet). The horizontality of the strata is responsible for the characteristic bold scarp landscape (Fig. 70). Great difficulty was experienced in constructing a railway through the mountains into the Transvaal: the railway has recently been electrified.

Durban (Port Natal).—The harbour of Durban is a natural bay with a narrow entrance which was formerly obstructed by a sand bar. The sand bar has been partly removed by constant dredging. The Port is well equipped with grain elevators and has the largest floating dock in South Africa. Durban is the principal coal-exporting centre of the Union. It is the third town of the Union, with 240,000 inhabitants, of which nearly one-third are Natives, one-third Indians, and rather over one-third Europeans. The numerous fine bathing beaches to the north and south of Durban attract large crowds of holiday visitors. A small whaling industry is centred at Durban. Tea is grown to some extent in Natal and prepared at Durban, but the bulk of the tea used in South Africa is imported. The fruit-growing in Natal has given rise to a trade in the distribution and export of fresh fruit, as well as to jam manufacture. More important is the manufacture of sugar and its by-products—syrup and molasses. The cane is grown chiefly in Zululand, but the manufacture of sugar is centred in Durban. Recently the preparation of natalite, a type of motor spirit, from sugar has been tried with considerable success. *Pietermaritzburg* (47,000) is the administrative centre of Natal; its foundation dates from 1839. *Newcastle* is the principal colliery town. There are possibilities in the development of various industries; it has already an iron and steel industry and a large creamery.

Indian Ocean

Near Durban

FIG. 70.—Geological section through Natal from the Plateau of the Drakensberg (Giant's Castle) to the sea.

BASUTOLAND

Basutoland is really a Native Reserve. It is situated on the High Veld, that is, to the west of the escarpment, but the scenery is rather different from that of the Orange Free State. The country is more mountainous, and the rivers, which are usually perennial, have cut deeper valleys. Many of the hills are capped by black lava flows of basalt. The rainfall is inclined to be erratic, but averages 30 inches; its torrential character in summer results in much soil-erosion. Maize, sorghum and wheat are the chief food crops, of which in normal years there is a small export surplus. Sheep, goats and cattle constitute the livestock wealth ; wool and mohair are exported. There are 600,000 Natives, many of whom work in the mines of the Transvaal, 2,000 Europeans, whilst the administration is carried out by a resident Commissioner, aided by a Council of Natives nominated by the Chiefs, Education is in the hands of missionaries.

SWAZILAND

The Swazis are akin to the Zulus who live just to the south-east. Swaziland lies below the scarp and is therefore divided into high, middle and low veld—the middle and low veld are separated by the Ubomba Mountains. Maize is the chief crop, and there are nearly half a million cattle. Cattle are regarded as wealth by the natives, and the stock is in consequence of poor quality ; there is much over-grazing, resulting in soil-erosion and diminution of water supply.

BECHUANALAND PROTECTORATE

This huge area of more than a quarter of a million square miles includes nearly the whole of the so-called Kalahari Desert. Really the whole is a grassland with scattered trees, mainly acacia. It has a fine winter climate but very hot summers ; fever is prevalent, because mosquitoes breed near any water. The great trouble is the scarcity of surface water. The country is flat, except near the Transvaal border where there is fine hilly scenery. Although there are no rivers, there are well-defined watercourses, and a large lake, Lake Ngami, which is, however, very shallow and often nearly dry. Population is 260,000 including nearly 2,000 Europeans, mainly along the Rhodesian railway line. Ranching is the principal occupation ; there are half a million cattle and the same number of sheep and goats. Live animals and hides and skins are exported. Maize and sorghum are the chief crops.

SOUTH-WEST AFRICA

In 1814 the Cape Government sent a German missionary into South-West Africa. He settled in the country and was followed later by other German missionaries and traders. In 1876 the natives asked the British for someone to rule over them, but only Walvis Bay was annexed. The Germans purchased the rest of the coast between 1882 and 1885, the whole country was annexed by Germany in 1890. In the Great War, Windhoek, the capital, was occupied by Union forces in 1915, and later the whole German force surrendered. South-West Africa is now administered by the Union under a mandate from the League of Nations.

The whole country is a third of a million square miles. There are no perennial rivers except the Orange, which forms the southern boundary, and the Kunene, which forms the northern boundary. The population is about 360,000 including 32,000 Europeans ; the numbers of the Bushmen in the north and east are not accurately known. Minerals, especially diamonds, make up the bulk of the export trade, but the large animal population, numbering 3 million sheep and goats (mainly in the south) and 700,000 cattle (mainly in the north) plays a greater part in the life of the people.

The Namib.—The scarp of the plateau is not nearly so well defined in South-West Africa as it is in the east. The part below the scarp known as the Namib is very dry, and of desert-like character. Often there is no vegetation at all. The coast has two ports, Walvis Bay, with a small but good natural harbour, and Luderitz, which became of importance as the result of a discovery of alluvial diamonds near the coast.

Great Namaqualand.—The country above the scarp is rocky or sandy and covered with scrub vegetation. It is essentially a cattle country, and depends on subterranean water supply. The capital of South-West Africa is Windhoek, situated in this region. Copper, vanadium and tin have been worked in the north of the country.

The Kalahari.—The Kalahari occupies the whole of the north and east of the country. In places there are salt pans of which Etosha Fan is the largest. Few crops are possible, maize is the chief. The main railway lines in the territory run from Walvis Bay and Luderitz to join the Union main line at De Aar.

SECTION VI

EAST AFRICA

1. PORTUGUESE EAST AFRICA

Portuguese East Africa, roughly bisected by the lower Zambesi, occupies part of the East African coastal plain and adjoining plateau. It consists of some 288,000 square miles of land, peopled by 4 million inhabitants, of whom about 18,000 are Europeans and over 8,000 Indians. Its alternative name is Mozambique, but care should be exercised in using this name, for it may connote four different things : (1) the whole territory of Portuguese East Africa, (2) the Government-administered territory, known as Mozambique Colony, (3) the territory of the Chartered Mozambique Company, (4) the town of Mozambique.

The Mozambique Company, under a 50 years' charter which expires in 1941, controls the districts of Manica and Sofala, lying between the Zambesi and latitude 22° S., and including the important port of Beira. Their territory comprises about one-sixth of the whole of Portuguese East Africa, with a population of 350,000.

This Portuguese possession, dating from the days of Portuguese ascendancy in the Indian trade, was for long in a backward and neglected condition. Much of its recent development has been the result of foreign investment, for it holds two valuable ocean terminals—Beira and Lourenço Marques—which are the nearest routes to the outside world from the rapidly developing territories of the Rhodesias and Transvaal. Only within the last decade or so has the Portuguese Government instituted a campaign for the closer relationship of the territory with the mother country, and even now only about 25 per cent, of the foreign trade is conducted with Portugal.

Physical Features.—One of the most extensive coastal plains in Africa, comparable in size with the Jubaland Plain farther north, extends from the Zambesi Delta to Delagoa Bay. A large part of Portuguese East Africa south of the Zambesi is less than 600 feet above sea-level, and the western boundary of the territory, between 150 and 250 miles inland, marks roughly the scarp edge of the Rhodesian-Transvaal Plateau. The Limpopo flows through a broad depression in the southern part of this lowland. The Zambesi occupies a narrow trench from the small frontier port of Zumbo

to the Eebrabasa Falls, where it descends in a series of cataracts, about 50 miles long, from the plateau to the coastal lowland. A broad, navigable channel stretches from Tete to the delta. North of the Zambesi the plateau approaches much nearer to the coast, and the central part of the territory, between the Mozambique coast and the Nyasa trough, is occupied by the Namuli highlands, with several summits rising to over 6,000 feet.

With so much of the country formed of Mesozoic sedimentary rocks, mineral wealth is not likely to be of much importance—and communications in the crystalline highland zone are of the meagrest. Actually gold, copper and tin have been located, and gold-workings of considerable antiquity exist, but little or no commercial exploitation has been attempted. Coal, however, is found under easily-workable conditions in the Zambesi Valley near Tete. At least 100 million tons of good quality coal are known to exist, and some 25,000 tons a year are mined for railways and sugar factories, but extensive development awaits the construction of a railway line down the Zambesi valley to the Nyasaland line or Beira.

Climate.—As in the Rhodesias, there are really two types of climate, that of the coastal lowland and that of the highland interior. A characteristic feature of the coastal climate is the warmth derived from the waters of the Mozambique current; the port of Mozambique is slightly warmer than Mombasa, which is 800 miles nearer the equator. The average annual temperature along the coast varies from 72° in the south to 79° in the north, and the range is slight, being mostly under 10°. In the Namuli highlands temperature is of course reduced by altitude, and it is possible that parts of this region may be found suitable for white colonisation. The rainfall shows traces of a very distinct East African feature, namely, a decrease from the coast inland, followed by an increase as the highlands are reached. On the coast the total fall varies from roughly 30 inches in the north and south to nearly 60 inches at Beira. A slightly drier zone is found on the eastern side of the Namuli highlands and in the centre of Gazaland, and then the rainfall increases again on the Namuli-Mlanje highlands and on the edge of the Rhodesian Plateau. The regime is everywhere the same—a normal Trade Wind type: summer is the rainy season, the wettest period being December-May. The late summer season is characterised by severe cyclonic storms originating over the Indian Ocean. (Compare the Japanese "typhoons" and West Indian "hurricanes.") The constantly high humidity of the coastal regions renders them particularly unhealthy, especially for Europeans.

Vegetation and Agriculture.—The markedly seasonal rainfall regime results in a natural vegetation of savana type, varying in luxuriance with the available water supply. Mangroves occur

along the coasts, and are employed as constructional timber and in tanning. Agriculture is of course the natural means of livelihood in such an area, and many tropical and sub-tropical crops are grown. Native subsistence agriculture yields sugar, maize, ground-nuts and various fruits, especially the banana. Production for export depends upon availability of abundant labour and adequate means of transport; whilst in the far south the uncertainty of the rainfall often renders the availability of water from the Limpopo a necessity. Considerable areas will be brought under cultivation in this region when the Limpopo Valley irrigation scheme comes to fruition. The most important agricultural regions thus lie in the immediate hinterland of the chief ports—Lourenço Marques, Inhambane, Beira, Quelimane and Mozambique. Amongst the principal economic crops the following may be mentioned :

Sugar is grown principally in the south behind Lourenço Marques and Inhambane, and in the Limpopo Valley and in the hinterland of Quelimane, especially around Sena, near the new bridge. This is really the only important export which is taken by Portugal, to which country the sugar is sent in the unrefined state.

Cotton is grown principally in the north and in the hinterlands of Mozambique and Quelimane, but an important part of the crop comes from the Lourenço Marques district. Cotton-growing was baken up widely after the war when prices were high, but fallen prices, insect pests, and irregular rainfall have taken their toll of the plantations.

Fruit-growing is increasing. Bananas are widely grown, especially in the south, and plantations of pineapples and of citrus fruits—grapefruit and oranges—are extending, particularly behind Lourenço Marques, where shipping facilities are available.

Other crops are sisal, grown on the uplands in the north, coco-nuts (used mainly for copra), oil-seeds, ground-nuts (grown for export and used also as a native food and as a fertiliser in the fruit orchards), and the ubiquitous maize.

Livestock, owing to the low-lying nature of so much of the territory and consequent prevalence of insect-borne diseases, are comparatively unimportant, except in the cooler south.

Communications and Ports.—The only river of value for transport purposes is the Zambesi, on which a service of steamers plies from *Tete*, below the Kebrabasa Falls, to the port of *Chinde* on the delta. Coal and sugar are the chief traffics. Several highly important trunk railways exist, however, and a number of local lines connect the principal ports with their agricultural hinterlands (Fig. 71). *Lourenço Marques*, on Delagoa Bay, in addition to its local significance as the outlet of a rich agricultural district, is the nearest sea-port to the industrial area of the Band. The Transvaal frontier is only 55 miles distant by the railway, and large quantities of

minerals—coal, chrome ore, asbestos and mica—and of agricultural produce, especially fruit of local and Transvaal origin, are exported. Three short lines serve the needs of the plantations. One runs south

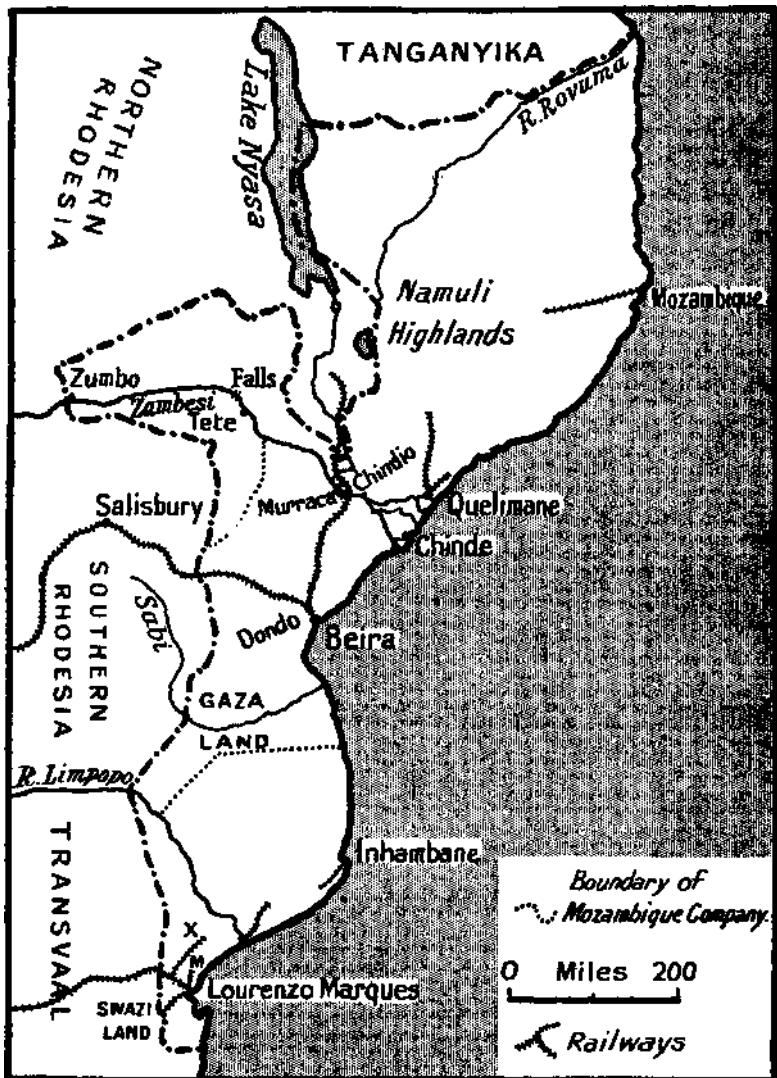


FIG. 71.—Portuguese East Africa.
X—Xinavane; M=Marracuene.

through the rich Umbelusi valley to the Swaziland frontier, one northwards to the banana plantations of Marracuene, and a third farther north to the Xinavane sugar region. Over £1,000,000 have been spent on the improvement of the port, which deals with

nine-tenths of the Colony's trade, and the frequent regular services to South Africa and Europe are an important factor in attracting traffic. Lourenço Marques is also the seat of the Portuguese Governor. It has 43,000 inhabitants.

Inhambane, a port of only local importance, has a short railway serving its small agricultural district.

Quelimane also has local significance only, being concerned with the export of the agricultural produce of the region on the left bank of the Zambesi. Two short railway lines collect sugar, sisal, copra, etc., from the plantations.

Mozambique exports the produce of one of the richest agricultural regions in the territory, and its railway is being pushed farther inland into the Namuli highlands, which it will eventually cross to tap the produce of Nyasaland.

The principal port of Portuguese East Africa, and the third of the whole continent, is *Beira*, on the estuary of the Pungue river. Beira is a port whose hinterland is not immediate, but remote. Local agricultural produce plays but a small part in its extensive trade, over 80 per cent, of which is concerned with the exports and imports of a vast area comprising the Katanga region of Belgian Congo, Northern and Southern Rhodesia, and Nyasaland; it is also the centre of the coasting trade of the territory, collecting produce from many small ports which are not regularly served by steamship lines. The Rhodesian railways operate the main line from Beira to the Rhodesian frontier at Umtali, whence the line proceeds via Salisbury and Bulawayo to the Katanga. The Trans-Zambesi railway runs from Dondo junction near Beira to the Zambesi at Murraca. The new lower Zambesi bridge at Sena, 40 miles above Murraca, completed in 1934, replaces the ferry to Chindio, and through rail connection is thus established with Nyasaland. It is worthy of note that both these main lines from Beira have been constructed with British capital. The future of Beira is obviously bound up with the prosperity of the British territories which use it as their principal outlet. The development of the port of Lobito, much nearer to Europe, may perhaps adversely affect its trade, as also may the further development of road and rail connections between Nyasaland and the ports of Quelimane and Mozambique. The considerable British interests involved, however, will be sufficient to ensure the continued use of the port as an outlet for the British territories, and Beira will always have the advantage over Lobito that empty ships loading with heavy minerals can complete their cargo with a lighter vegetable freight at the Cape ports.

Trade.—The "domestic" trade of Mozambique Colony is summarised in Fig. 72. These graphs do not include the "domestic" trade of the Mozambique Company's territory (chiefly sugar export and cotton and metal goods imports), nor the "transit" trade which

passes over the railways to Beira from Rhodesia and Nyasaland. The large amount of trade conducted with British territories and the Union of South Africa, and the relatively small amount with Portugal, is noteworthy. The almost entirely agricultural nature of the exports is a reflection of the present development of the country, as also is the large import of cotton manufactures and iron and steel wares.

British Empire					Portugal	Un. of S.Africa	Germ.	U.S.A.	Others
COTTON GOODS	IRON AND STEEL	WINES	OIL	COAL	MISCELLANEOUS				
SUGAR	COPRA	GROUND NUTS	SISAL	COTTON	OTHERS				

Physical Features.—Considered in detail, the relief of East Africa is very complex, but in broad outline a number of roughly

¹ The authors are indebted to Major Bale, Commissioner for H. M. East African Dependencies, for helpful suggestions concerning pp. 147-178.

parallel belts may be distinguished running from north to south (Fig. 73). (1) The reef-fringed *coastal plain*, built up of sedimentary rocks, is generally narrow, though it broadens out in the **Rufiji**

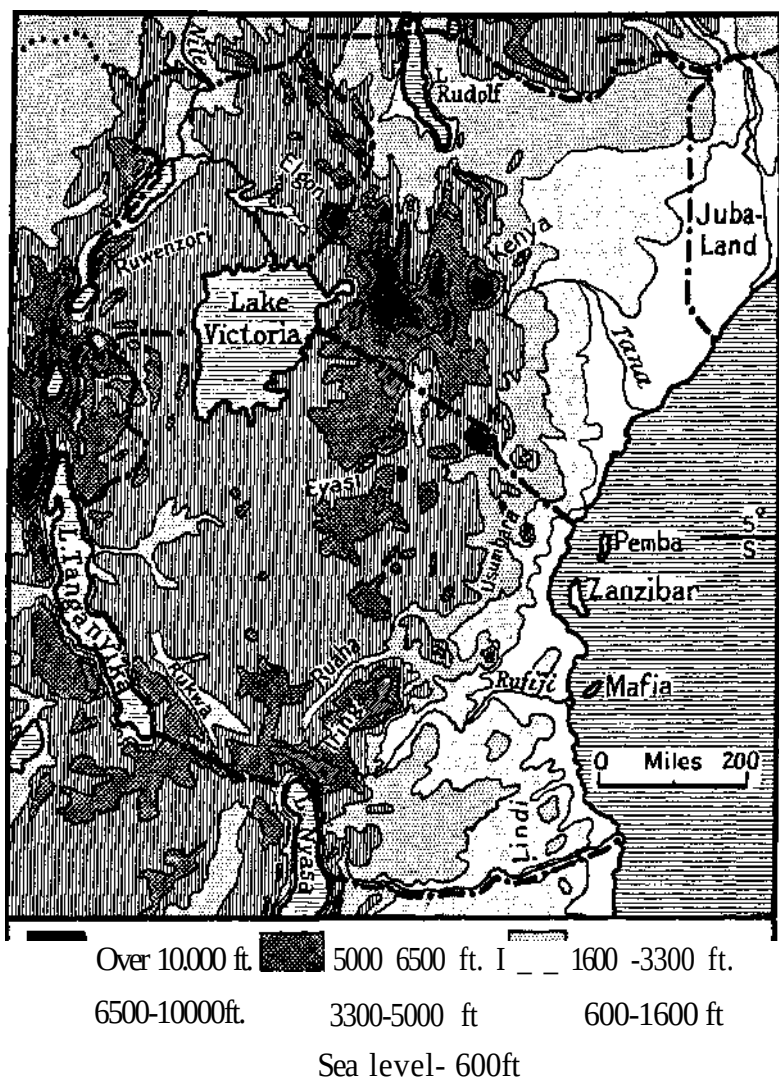


FIG. 73.—East Africa : Relief.

lowland of Tanganyika, and presents vast open expanses in the lower Tana and Jubaland regions of Kenya. In the region of the Tanganyika-Kenya frontier it rises quickly to the Usumbara highlands, and in the south to the plateau of Lindi. (2) The rise to

the old, crystalline continental block is accomplished, as elsewhere in Africa, in a series of terraces. The broad *plateau of the Nyika* is at its widest in the north and south, and is narrowest in the centre, where the eastward bulge of the highlands approaches the westward embayment of the coastline. It rises gradually westwards, but its levelness is frequently interrupted by the occurrence of abrupt upland masses known as "inselberge." (3) The *Eastern Highlands and Rift Valley system* form a complex mountain and plateau belt, largely built of volcanic rocks, separating the Nyika from the Lake Victoria Basin and the plateau of western Tanganyika. The Rift Valley (Fig. 74) is a very marked feature in Kenya, running almost in a straight line—though not as a continuous valley—from Lake Rudolf to the Magadi-Natron depression, and bordered by steep escarpments on either side. Its course is less obvious through Tanganyika Territory to the northern end of Lake Nyasa, but Lake Eyasi lies in a well-defined western branch of the main rift. Bordering the Rift Valley in the north are the Kenya highlands of which the Mau range (west of the rift) and the Aberdares (east of the rift) are the highest parts. Superimposed upon these highlands are the great Volcanic Cones of Elgon (14,000

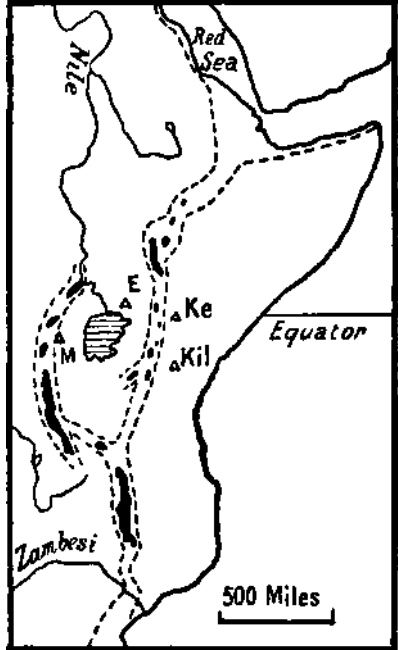


FIG. 74.—The East African Rift Valley system and volcanoes.

feet, west of the rift), Kenya (17,000 feet) and Kilimanjaro (19,000 feet) both east of the rift. In central Tanganyika the bordering highlands, like the rift itself, become less pronounced, but towards the south the Iringa highlands, overlooking the Ruaha trough, and the Livingstone range, overlooking Lake Nyasa, rise to over 7,000 feet. (4) The *Lake Victoria Plateau* and the *plateau of western Tanganyika* lie, as it were, in a saucer between the eastern and western highland rims at a level of roughly 4,000 feet. Lake Victoria is shallow (maximum depth 270 feet), and its extremely irregular shoreline is evidence of its nature as merely the lowest, and so water-filled, part of the plateau. The plateau of western Tanganyika, with its broad, open spaces and dominantly level topography, is an ill-defined watershed between

Lake Victoria and four branches of the great Rift Valley system (Lake Tanganyika, the Lake Rukwa Basin, the Lake Eyasi Basin and the Ruaha trough). (5) The *Western Highlands and Rift Valley system* form the western rampart of the East African highlands, overlooking the vast basin of the Congo. The belt resembles its eastern counterpart in having a double line of highlands, capped with volcanic cones and separated by the deep trough of the Rift Valley, in which lie, in succession from north to south, Lakes Albert, Edward, Kivu and Tanganyika. The great mass of the Ruwenzori range (summit 16,000 feet) is an uplifted block of the crystalline plateau, but Mfumbiro (14,600 feet) is a dormant volcano. The central portion of these western highlands—the provinces of Ruanda and Urundi—was mandated to Belgium after the War.

The drainage of East Africa is rather complicated. The water of the Lake Victoria Basin finds an outlet into and out of the western rift valley *via* Lake Albert and the White Nile. Parts of the central plateau and the eastern highlands are drained by such streams as the Rovuma, Ruliji, Pangani, Athi and Tana to the Indian Ocean. For the rest, there are a number of internal drainage basins in the two Rift Valley systems, and a small part of the water may reach the ocean *via* Lake Tanganyika (which sometimes overflows to the Congo) or *via* Lake Nyasa.

Minerals.—The crystalline plateau in East Africa is not so productive of mineral wealth as it is in other parts of the continent. Gold occurs to the north-east and south-east of Lake Victoria (Kavirondo and Mwanza areas); tin is found in the Bukoba district, west of the lake, whilst mica is widespread, though but little worked. The comparative freedom from mineral exploitation renders the native problem of a rather different nature from, if no less insistent than, that of Central and South Africa.

Climate.—The main features of the climate of East Africa are dependent (*a*) upon its position athwart the equator, and (*b*) upon the existence of so much highland. The temperature range is everywhere small, though the altitude reduces the figures from "equatorial" to "tropical" or "warm temperate" levels—*e.g.* Nairobi, 5,500 feet, 59° to 65°; Entebbe, 3,900 feet, 70° to 73°; Tabora, 4,000 feet, 70° to 77° (*cf.* Mombasa, 75° to 82°). The prevailing winds are not simply explained, either as to cause or effect, but in general it may be said that the dominant direction from May to October is south-easterly, and the air-stream forms part of the great Abyssinian-Asiatic monsoon. At the opposite period of the year the direction is mainly north-easterly, in response to the low-pressure system over southern Africa. Generally speaking, however, the rainy seasons do not correspond to the seasons when these Trade Winds are at their height. Most of the rain falls in convectional storms in the transition seasons, when the sun is nearly

overhead and the air-streams are in an unstable condition. Thus the chief rainy season lasts from February until May and the lesser rains fall between October and December.

But British East Africa stretches from 5° N. to 12° S., and so several minor differences of rainfall regime are apparent (Fig. 75).

(1) A true equatorial regime, with two rainfall maxima and no

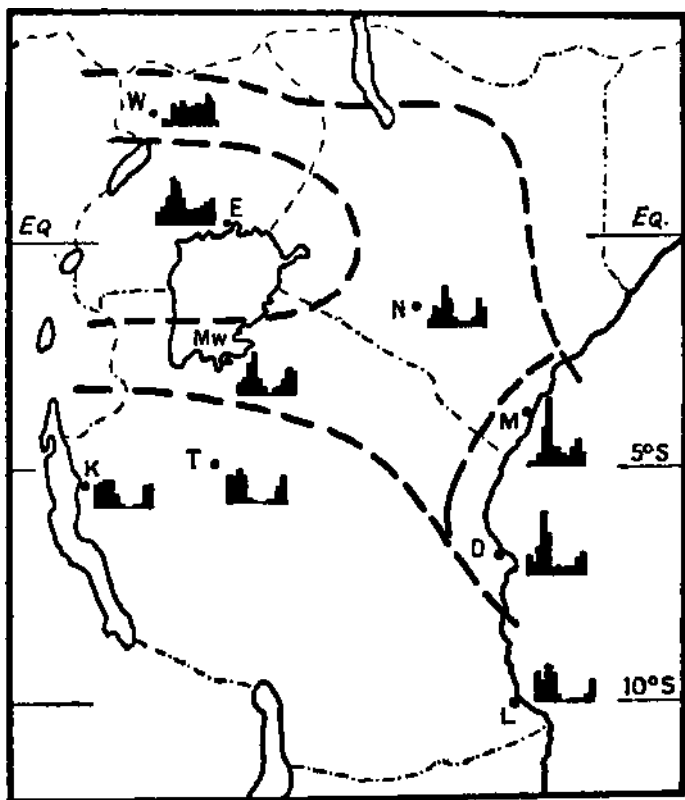


FIG. 75.—Suggested rainfall regions of East Africa (explained in text).

The student should attempt to make further climatic subdivisions based upon annual rainfall totals and temperature.

M=Mombasa. D=Dar-es-Salaam. L=Lindi. N=Nairobi. W=Wadelai. E=Entebbe.
Mw=Mwanza. T=Tabora. K—Kigoma.

dry season, is found around Lake Victoria, in southern Uganda and south-west Kenya. The total fall is between 40 and 70 inches, and the rainiest months are April and November, with minima (but not drought) in August and January.

(2) A modified equatorial regime, in which the two rainy seasons are separated by months of marked dryness, occurs outside region (1), i.e. in northern Uganda, in the eastern highlands and Nyika of

Kenya, and in northern Tanganyika. The months of heaviest rainfall remain the same as before, but the dry seasons are much drier, and the total is, in general, between 20 and 40 inches. In Uganda, north of the equator, the northern summer is the less marked of the two dry seasons; in Kenya and Tanganyika south of the equator, the southern summer is the less marked.

(3) A modified equatorial regime, in which the first rainy season is very much more pronounced than the second. This occurs in the coastal belt from the Tana to the Rufiji. A gradual transition is observable. In the north, the regime shows distinct traces of northern hemisphere influence (the main rainy season at Mombasa is from April to July); in the south, a southern influence obtains (at Dar-es-Salaam the two maxima are approaching one another, and the rainy season really lasts from November to May, with a break in February).

(4) The southern tropical or "Trade Wind" regime, with a rainy season lasting from November to April, is found over the greater part of central and southern Tanganyika.

(5) The northern tropical regime with a rainy season from April to October, obtains in northern and north-eastern Kenya, although the total rainfall in this area is not great (mostly under 20 inches).

The coastal belt is everywhere hot and damp, though the total rainfall (between 35 and 50 inches) is surprisingly low, considering the latitude and the exposure to the moist winds from the Indian Ocean (Fig. 76). The highlands are the most populous parts, by reason of the lower temperatures and good rainfall. The dry belt of Jubaland and the Nyika is continued into central Tanganyika, vast areas of which could never support a dense settlement.

Natural Vegetation and Agriculture.—The natural vegetation in East Africa depends upon rainfall and altitude, and there is in consequence a great variety of types, though some of them occupy **but** small areas. The most striking contrast with the Congo Basin, **on** the other side of the western highlands, is the almost complete absence of equatorial jungle. North-eastern Kenya, actually on the equator, is for the most part a semi-desert waste, and the only coastal forests are of small extent and of drought-resisting character. Most of the area, apart from the mountain slopes, is covered with **some** form of savana, with open, dry woodland of acacias and thorny trees and bushes. Of a total area of over 700,000 square miles, only 10,000 are actually forested. The comparatively low rainfall, **and** its markedly seasonal distribution, are, of course, responsible **for** this feature.

Mangroves cover most of the deltaic swampland at the mouths **of** the rivers, and the production of poles and bark is an important, **if localised**, occupation. Behind the swamps and coastal palm-groves, **on the** coastal plain, lies **a** belt of patchy dry *bash*, **with** thorny

acacias. Maize, cassava and yams are the chief native crops, with coconuts and sisal as the most promising plantation crops.

Separating the coastal plain from the highlands is the broad belt of *dry savana*, interrupted by the forests of the Usumbara highlands. The Nyika is a desolate, uninhabited waste of thorn scrub, but farther south, in Tanganyika, the quality of the savana improves and the grasses are taller and more capable of supporting large **herds of** domesticated and wild animals.

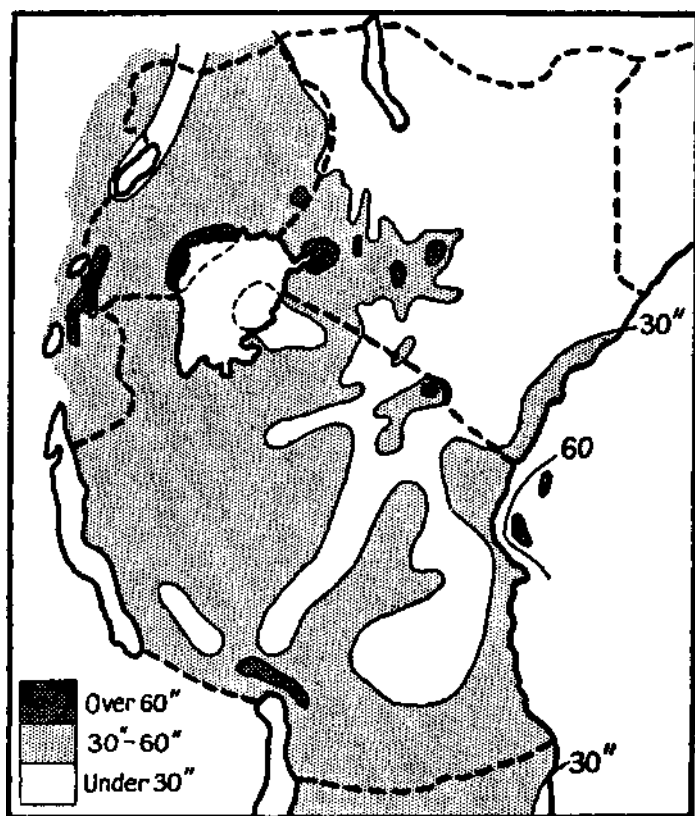


FIG. 76.—Rainfall map of East Africa.

The vegetation of the higher altitudes is largely dependent upon altitude and rainfall (Fig. 77). The lowest 2,000 feet, *i.e.* up to about 5,000 or 6,000 feet, supports good savana for the most part, especially on those areas which are floored by volcanic rocks. Occasional areas of bush, especially along the watercourses, diversify the landscape. This is a valuable pastoral region. Between 5,000 and 10,000 feet in the Kenya highlands lie the principal forests of East Africa, and also, where clearings have been made, most of **the**

best agricultural land. Roughly, between 5,000 and 6,000 feet are the evergreen forests, large areas of which have been destroyed or reduced to bush by native shifting agriculture and by clearings for coffee plantations. These pass upwards into dense "temperate rain-forests," with cedar, juniper, podocarp and camphor trees. As with the evergreen forests, large areas of this type have been cleared for native and plantation agriculture, and vast areas of dense bush and mountain grassland supervene. The native agriculture in the forest belts is very varied. Maize, millets, yams, peas and beans, and a great variety of vegetables are grown, whilst in the lower parts the banana is one of the vital necessities of life. Banana groves sometimes occupy large areas in the forest zone. Temperate fruits could be produced in abundance, but the absence of much level land prevents extensive planting.

The forests pass upwards, above about 9,000 feet, into a dense belt of bamboo thickets, frequently almost impenetrable. Then

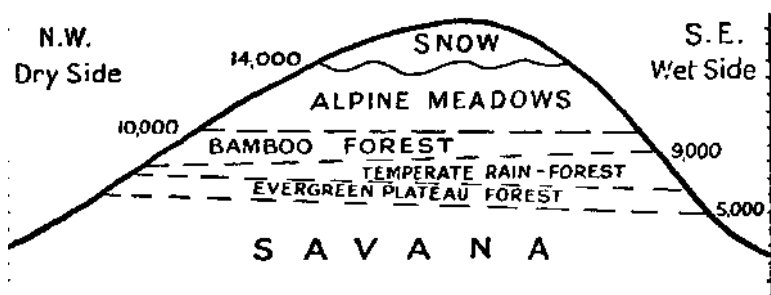


Fig. 77.—Vegetation belts (generalised) on East African mountains.

follow comparatively restricted areas of "alpine" pastures, with a rich flora of grassy, bulbous and leguminous plants. The snow-line is reached at about 14,000 feet.

The level at which the various vegetation zones begin and end varies, of course, from place to place; there is also a noticeable tendency, especially in the eastern highlands of Kenya, for the south-eastern sides of the highlands to be wetter than the north-western, and so for the forest belts to be broader on the western side (Fig. 77).

Over the highlands of the western Rift Valley there are much more extensive stretches of mountain grassland and less forest, since the rainfall is less. These areas make extremely good grazing ground.

The plateau of western Tanganyika is covered for the most part with dry savanas and dry thorn-forest or bush. North of Lake Victoria, however, where the rainfall regime is more even, high savana comparable with that of the Congo Basin occurs. This is the rich agricultural land of Uganda, where cotton is the most important

economic crop, and a varied native agriculture yields bananas, rice, sugar-cane, maize, cassava, etc., in abundance.

Population and Development.—The Native population of the three countries of British East Africa is ethnologically varied and is

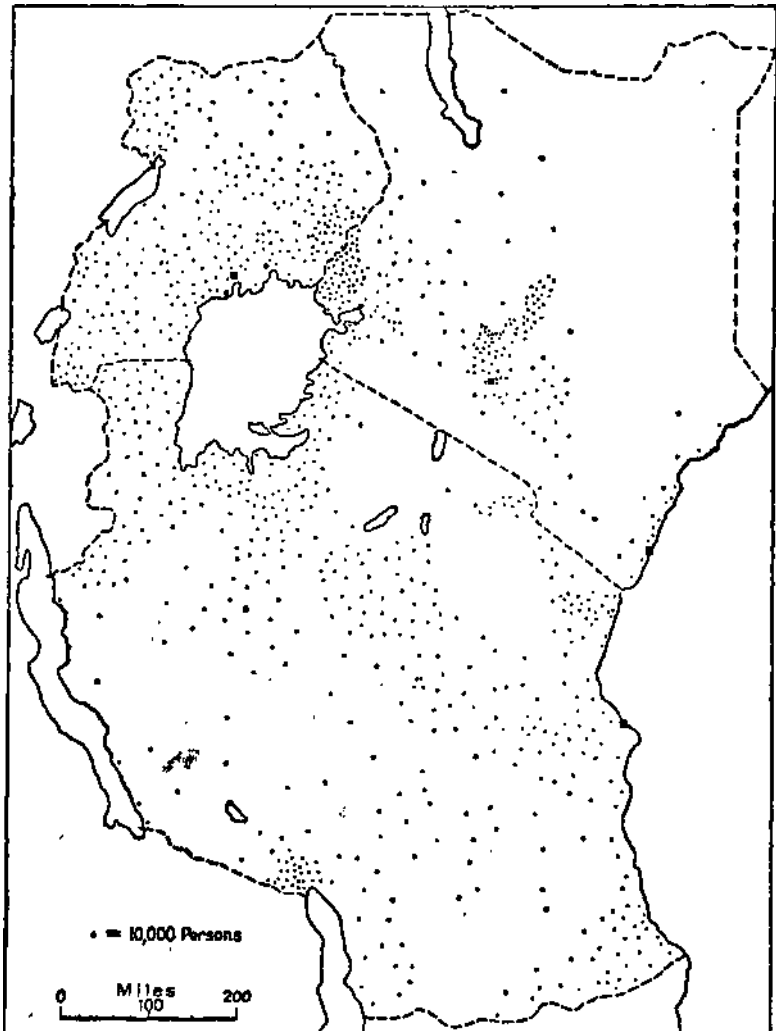


FIG. 78.—Distribution of population in British East Africa. Based upon the latest (1931) native and non-native censuses.

by no means evenly distributed over the territory, as a result of the limits imposed by rainfall and natural vegetation (Fig. 78).

Three principal ethnic groups may be distinguished. All belong to the great Negro-Hamitic stock which peoples so much of the

continent. The southernmost of the *Nilotic* tribes are found in northern Uganda. They are tall, dark-brown people, mainly pastoral but also practising agriculture. In great contrast with these are the *Half-Hamites*, whose principal representatives are the Masai of the Kenya-Tanganyika border country—a fine race of warriors, mainly semi-nomadic pastoralists whose wealth is expressed in head of cattle. These people are almost bound to deteriorate through being confined within the limits of native reserves, and not being allowed to indulge in their hereditary practice of raiding their neighbours. The great group of the *Eastern Bantu* dominates most of East Africa. The Baganda,¹ who give Uganda its name, are amongst the most advanced African peoples. In the highlands the Kikuyu and other tribes are agriculturalists and animal-rearers. In the coastal belt are the Swahili, a group which has suffered much Arab admixture, and now deserves to be remembered principally because its language is an East African "lingua franca."

The development of these territories forms one of the latest chapters in the history of Africa. Arab and Portuguese rivalry in the ivory and slave trade had, of course, exercised an important influence in the coastal districts since the fifteenth century, but the interior of the country—the Lake Plateau and the highlands—was virtually unknown to any people but the occupiers until the British explorers Speke and Grant reached Uganda in their search for the Nile sources in 1862. Effective penetration by British and Germans dates only from the late 'eighties. The German East Africa Association took control of Tanganyika in 1887, and the British East Africa Company was formed in 1888. Neither company was long-lived; a German protectorate was formed in 1889, Uganda became a British protectorate in 1894, and the British East Africa protectorate was established in 1895.

As elsewhere in Africa, settlement and development have followed the construction of railways. The main object of the East African railways has not been the tapping of mineral wealth, however, but the facilitating of agricultural development and white settlement. The Kenya and Uganda Railway main line from the coast to Lake Victoria was completed in 1901; subsequent construction has extended the main line in Uganda and has opened up new areas of the highlands by branch lines. The Central Tanganyika Railway was built between 1905 and 1914, connecting Lake Tanganyika with the coast at Dar-es-Salaam. This was partly a "strategic" line, built to facilitate the movement of troops and so the subduing of the territory. Its most important branch taps the Mwanza mining and agricultural region.

After the upheaval of the War years, development has been rapid. The British East Africa protectorate became Kenya

¹ Baganda = the people, Buganda the kingdom.

Colony in 1920, and in 1922 the greater part of German East Africa, with the exception of Ruanda and Urundi provinces, was assigned to Britain under the title of Tanganyika Territory. The post-War years have witnessed great strides in the improvement of the communications, especially motorable roads, and in the application of science to agriculture. A new problem has been introduced by the competing power of the motor lorry, and the railways are being hard pressed in their search for revenue-earning traffic.

The Native problem, despite the comparative freedom from mineral development, is as insistent as anywhere else in Africa, though it varies from country to country. It has two aspects—land and education. It is perhaps most difficult in Kenya, for in Uganda the standard of native civilisation is comparatively high and, owing to the climate, much permanent white settlement is not possible, and in Tanganyika the development of communications has not yet permitted white colonisation to extend very far. In Kenya the rainfall confines the densest native population to the highlands—just where white settlement is most favoured by altitude. The problem is further complicated by the existence in all the territories of an important group of Asiatics, mainly Arabs and Indians—important because, although they take little or no part in farming, they control much of the native trading facilities. They are the shopkeepers of East Africa.

UGANDA

In many ways, as regards climate, vegetation and people, Uganda seems to be naturally linked with the great Congo Basin to the west. Yet its highland character links it distinctly with Kenya, as also does its British administration and its outlet to the coast.

For administrative purposes it is divided into four provinces—Buganda, Northern, Eastern and Western provinces. Buganda differs from the others in being to a much greater extent under native control.

Physical Features.—Uganda extends from 1°S. to 4°N. About 14,000 of its 94,000 square miles are under water. The bulk of the country falls within the lake plateau division of East Africa, and lies at an elevation of roughly 3,500 to 4,000 feet, dipping towards the Nile Valley in the north-west. The eastern boundary is formed by the gigantic mass of Mt. Elgon and by the highland belt which, continuing the line of the western highlands of Kenya, separates the Nile drainage from the Lake Rudolf Basin. (The Lake Rudolf Province was transferred from Uganda to Kenya in 1926.) The western boundary is roughly the line of the western Rift Valley, from Mfumbiro to Ruwenzori, and then via the Semliki River **and Lake**

Albert to the Welle-Nile Watershed. A narrow belt of undulating country dams up the waters of Lake Victoria on its northern shore, and separates the lake from the north-flowing streams. This dam is breached only at one place, Jinja, where an overflow takes place over the Ripon Falls into the stream of the Victoria Nile. The Nile spreads out into the vast, marshy backwaters of Lakes Kioga and Kwania, and then flows northwards and westwards over the

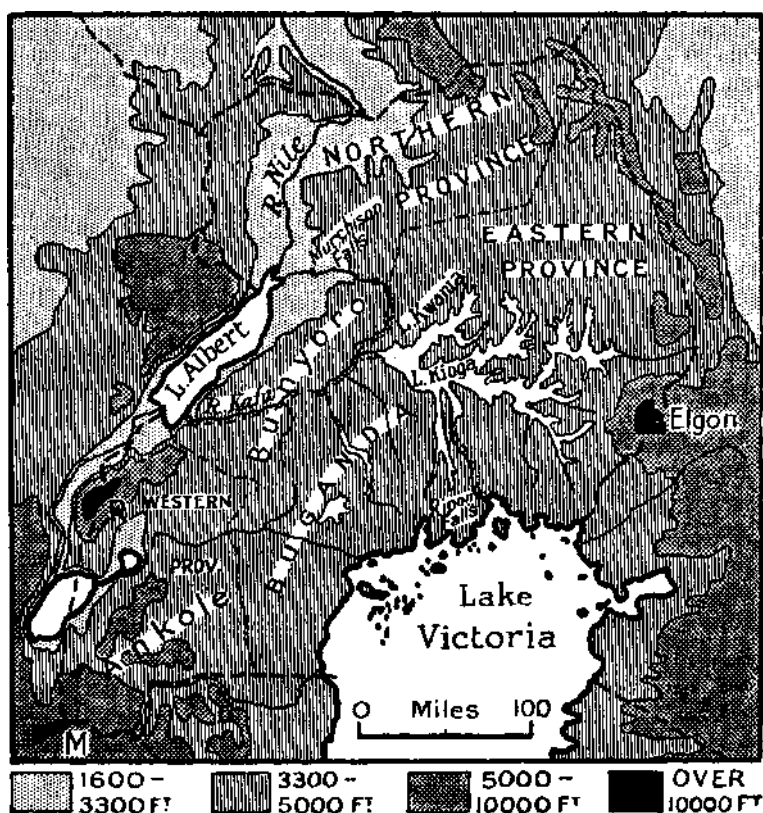


FIG. 79.—Uganda, : Relief.
R = Ruwenzori. M = Mfumbiro.

Murchison Falls into, and out of, the northern end of the shallow Lake Albert, passing northwards as the Bahr-el-Jebel, through more swampy areas into the Anglo-Egyptian Sudan. A second stream, the Kafu, flows into the western end of Lake Kwania, and its headwaters connect with those of another stream flowing westwards into the southern end of Lake Albert.

The lake plateau as a whole is frequently undulating and even billy, but there are vast areas of swamp, especially south of **Lake**

Kioga. The Bunyoro Plateau, its western portion, overlooks with frowning scarps the rift valley trough of Lake Albert.

Climate.—The 4,000 feet elevation of the plateau sensibly reduces the average temperature; but the equatorial characteristic of small range remains (Entebbe, 3,900 feet, 70° to 73°: contrast Wadelai, farther north but only 1,900 feet, 76° to 82°). Interest thus centres mainly on the amount and seasonal incidence of the rainfall (Figs. 75 and 76). The annual fall is apt to be variable in amount, a fact which, no doubt, could be connected with the variability in strength of the various wind systems which converge on this part of Africa (*cf.* Figs. 4 and 6 and p. 13). On an average, however, some 40 to 60 inches are experienced over most of Uganda, the amount increasing south-westwards from the arid Lake Rudolf Basin, with a maximum on the slopes of Elgon and on the highlands of Ankole in the far south-west. Much of the rain is convectional in type, falling during the thunderstorms which are of almost daily occurrence in the rainy seasons. These storms, especially near Lake Victoria, may be extremely violent.

Two rainy seasons occur, the first about April-May and the second about October-December (Fig. 75). A fairly rapid transition occurs, however, going northwards from Lake Victoria. In the south the intervening "dry" periods are by no means dry (at least 3 inches a month at Entebbe), but in the north a distinct northern hemisphere tropical regime begins to appear with a marked "winter" drought in December-February.

The absence of any relief from the constant heat and humidity, *i.e.* of any invigorating dry season, over most of Uganda, renders the climate distinctly enervating for Europeans, and the presence of so much swamp is conducive to the spread of insect-borne diseases, which, however, are being gradually conquered by scientific medicine. "Sleeping sickness" took a terrible toll of the natives in the early years of this century. The mountain climates of Elgon and Ruwenzori, however, hold much more prospect of being able to support a flourishing white population.

Natural Vegetation.—High savana with an abundance of tree-growth comparable with that of the Ubangi-Welle Basin (farther north but at a lower level) characterises most of the country. There is a good deal of swamp-forest in the Lake Kioga region. Like the rainfall, the savana becomes poorer towards the north-east. The usual East African belts of vegetation occur on the slopes of Elgon, but comparatively little forest exists on the highlands of the west and south-west, a luxuriant grassy growth taking its place. An important exception is the Bunyoro Plateau, east of Lake Albert, which has areas of almost equatorial jungle, with mahogany. Grassy downlands characterise much of the rolling country of the Western Province between Lake Victoria and Ruwenzori.

Agriculture.—Agricultural activities, in a well-watered equatorial highland area such as this, naturally hold pride of place, in the absence of any considerable mineral wealth, in the economy of both natives and Europeans. Native subsistence agriculture must obviously occupy a large proportion—actually two-thirds—of the cultivated area, but it is noteworthy that the natives are almost entirely responsible for the cultivation of the cotton crop which provides the country with nearly 80 per cent, of the total value of its exports. Europeans are most concerned with those typically "plantation" tree-crops, coffee, rubber and tea.

The principal native food crops are bananas (plantains) and cereals, chiefly various kinds of millet.

Cotton, the acreage of which doubled between 1927 and 1933, and has since risen to over $1\frac{1}{3}$ million acres, is grown by the Natives in small plots of between $\frac{1}{4}$ and 5 acres in extent. Native varieties were formerly grown for local use, but the import of Egyptian and American seed in 1903 inaugurated the modern era of production for export; Government control of seed-distribution is still an important factor in the maintenance of the industry and of the quality of its produce. Most of the crop is of the American "upland" variety. It is grown all over the country, except in the south-western highlands. The acreage naturally tends to be greatest and to increase most rapidly near the railway lines between Lake Kioga and the Kenya frontier, in the Buganda and Busoga districts. Upwards of 200 local ginneries exist, and the whole of the crop is exported.

Coffee, of both "arabica" and "robusta" varieties, is grown by both Natives and Europeans, but its value is insignificant when compared with that of cotton. The "robusta" type, giving a higher yield, and more resistant to disease, seems to be increasing more rapidly than the other. Most of the plantations are in the western highland zone in the Toro and Ankole districts, but some native plots exist on the north-western slopes of Elgon.

Ground-nuts and *Simsim* are much grown by natives for the edible oil yielded by their seeds. Attention is now being paid to the possibility of ground-nuts as an economic crop.

Tobacco, like cotton, is an introduced crop grown by the natives but not for their own use. Some of it is sold to the factories at Jinja and Kampala and the rest is exported. It is grown in the Northern Province (Bunyoro Plateau and Nile Valley).

Rubber has almost ceased to be produced, owing to the poor returns that are obtainable; attention is being given by European planters to the growing of *tea*, and good yields have been obtained from plantations in the central part of the Buganda Province.

Sugar is grown near Lake Victoria, mainly by Indians, and the two factories now produce an exportable surplus over local requirements.

Livestock in such an area as Uganda, with its large areas of tse-tse infested swamps, are bound to be of low-grade native varieties. Cattle, numbering about two millions, are few in the south and south-east, but large numbers are to be found on the upland grasslands of Ankole. There are also some 3 million goats and sheep. Methods of stock-raising amongst the natives are still primitive, although great strides have been made since the War in the improvement of breeds and in the reduction of the losses through rinderpest and other diseases. Jinja and Kampala are the principal native stock-markets.

Minerals.—Although the existence of a wide range of minerals has been proved, only tin-ore has so far been found in quantities sufficient to withstand the high cost of transport to the coast. One mine in the Ankole district produces the bulk of the small output of several hundred tons of ore per annum. Gold (of which very promising deposits have recently been struck) and copper are the only other ores likely to yield profitable results.

Communications and Towns.—The development of agriculture for export in Uganda would not have been possible but for the railway which connects the country with Mombasa. It is interesting to speculate what the condition of Uganda might have been at the present had Kenya Colony been in foreign hands and the railway not been built. The original connection between Lake Victoria and Mombasa terminated at Kisumu, on the Kavirondo Gulf in Kenya, so that a service of steamers was required to give an outlet to Uganda. The first railway in Uganda ran from Jinja to Namasagali, the head of navigation on the Victoria Nile. An all-rail link with Mombasa was only established a few years ago by the construction of a branch of the Kenya Railway from Nakuru, entering Uganda at Tororo, on the south side of Elgon, and linking with the Jinja line at Mbulamuti. Still more recently (1931) Jinja has been connected, by a magnificent bridge across the Nile, to Kampala and its outlet of Port Bell, and the steamer traffic on Lake Victoria has decreased in consequence.

The railway administration is responsible for the working of the lake steamer routes. The principal lines, as shown on Fig. 80, ply on Lakes Victoria, Kioga and Albert, and from the last-named lake down the Bahr-el-Jebel to Nimule, whence a motor service runs to Rejaf, the southern terminus of the Sudan steamers. The Lake Albert service affords an outlet for the Kilo highlands of Belgian Congo (*cf.* p. 82). A motor service connects the western end of Lake Kioga with Lake Albert, since the Victoria Nile is unnavigable over this section.

There are some 2,500 miles of main roads suitable for motor traffic at all seasons. Here, as elsewhere in Africa, the motor-lorry is proving a great asset in transporting bulky agricultural produce.

The aeroplane has rendered an immense service to the external

fine site on a series of hills not far from the small gulf of Lake Victoria on which stands Port Bell, its harbour.

Entebbe, on the lake, is the British administrative centre. *Jinja* was another important lake port, but lake traffic has diminished now that the new railway to the coast is complete.

Trade.—The importance of cotton, both raw and manufactured, in the trade of Uganda is apparent from Fig. 81.

KENYA ¹

The British East Africa Protectorate was proclaimed a Crown Colony in 1920, taking the new title of Kenya Colony from the famous volcanic peak, almost exactly on the equator, which is its highest point. A small strip of the coastland, including Mombasa island, forming the mainland dominions of the Sultan of Zanzibar, remains as a protectorate. Two frontier adjustments have been made. In 1924 some 33,000 square miles of Jubaland were ceded to Italian Somaliland, and in 1926 the Rudolf Province was taken over from Uganda.

To many people "East Africa" and "Kenya" are synonymous terms. This prominence to which the colony has attained in the public mind is very largely due to the fact that it possesses a considerable area suited to white colonisation. It may not be so generally realised, however, that three-quarters of Kenya Colony is largely unsuited, owing to its low rainfall, to settlement of any kind; and that the 11,000 square miles of land in the colony alienated for the use of Europeans represents but one sixty-fourth part of the total area of the three territories forming British East Africa.

Physical Features.—The simple division into coastal plain, Nyika, Rift-Valley highlands and lake plateau has already been outlined. The physical features of the highlands may now be treated in more detail (Fig. 82).

The highlands may be considered as that portion of south-western Kenya lying above about 4,500 feet. Most of the highland area owes its elevation above the general level of the crystalline plateau to being built up of volcanic rocks poured forth from the craters of which remnants remain to-day in Kenya, Elgon and others.

The symmetrical arrangement of the relief about the Rift Valley is apparent from Fig. 82. The Rift Valley itself is not a single, straight, even-floored trough. In the north it is duplicated by the great gash of the Kerio Valley, and the floor falls into several distinct basins, highest in the centre (Lake Naivasha, 6,100 feet), and dropping in steps to the north (Lake Baringo, 3,300 feet),

¹ The authors are indebted to Professor L.I. Rodwell Jones for comments on this section.

and to the south (Lake Magadi, 2,500 feet). Several volcanic cones stud the floor of the Rift.

From the central portion of the Rift the sides rise in a series of scarps to the Aberdares on the east and to the Mau Plateau on the west. Both these highland masses rise to over 10,000 feet, and they drop northwards and southwards to rolling plateau country.

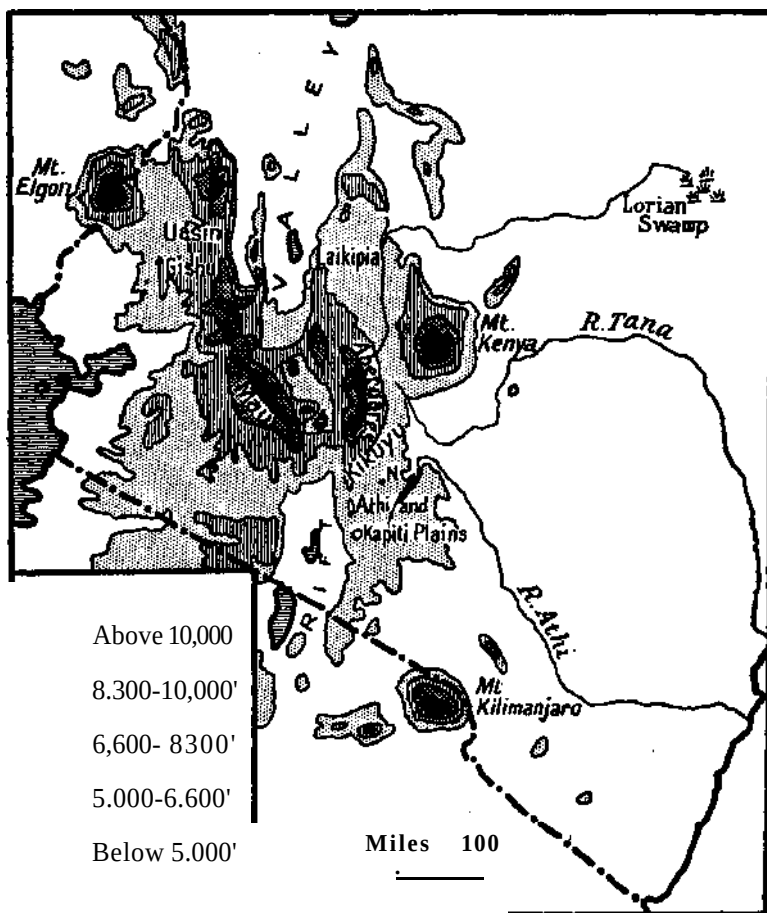


FIG. 82 —The Relief of the Kenya highlands.
N - Nairobi.

Thus to the north are the Uasin Gishu and Laikipia Plateaus and to the south the Masai steppe on the west, and the Kikuyu Plateau, dropping to the Athi and Kapiti " plains " on the east.

On the outer edges of the highlands, not quite so symmetrically placed, are the giant conical masses of Elgon and Kenya.

The volcanic highlands drop westwards in a series of scarps to

the 4,000 feet level of the ancient crystalline plateau around the Kavirondo Gulf of Lake Victoria.

Climate.—The salient features of the climate have already been described and are apparent from Figs. 75 and 76. The most noteworthy points are the cooling effect of altitude, and the fact that more than three-quarters of the country having less than 25 inches of rainfall and a very high rate of evaporation, may be considered as semi-arid and to all intents and purposes non-productive. The suitability of the highland areas for white settlement is partly a result of the fairly large *daily* range of temperature, which entails cool and bracing evenings and nights, especially during the dry seasons (*e.g.* 35° to 80° at Nairobi).

Natural Vegetation.—Mangrove swamps fringe the coastal deltas in the south around Mombasa. North of the Tana river, the semi-desert vegetation of Somaliland reaches the coast. A long, narrow belt of rather dry, equatorial forest follows the main rivers, Sabaki and Tana, inland, but most of the coastal plain has a cover of dry bush with acacias and baobabs. The thorn-scrub of the Nyika becomes extremely dry in character north of the Sabaki, where the annual rainfall drops below 20 inches (Fig. 83). The Athi and Kapiti Plains, slightly better watered, have a good cover of grass, with acacias along the watercourses and dry bush on the higher parts. A similar acacia grassland characterises the Laikipia Plateau on the drier north-western side of Mount Kenya, and the Masai steppe. The Kikuyu Plateau has a natural vegetation of low bush developed on rich red, volcanic soils with a rainfall of about 40 inches ; but much of this area has been cleared for agricultural purposes. The highlands of Mau and the Aberdares, and the slopes of Elgon and Kenya bear the forest belts already described (Fig. 77). The high-level plateau of Uasin Gishu (6,000 to 8,000 feet) has grassland of almost temperate character—damper in aspect and without the dry acacias of the savana grasslands of lower altitudes. The Rift Valley, noticeably drier than the areas on either side, is floored with a scrubby vegetation of thorn acacias and dry tufty grasses, which improves to quite good pasture grass in the higher and better watered central portion. A salt semi-desert occupies the Magadi-Natron depression in the south. Finally, good savana grassland, with plenty of wood, occupies the Kavirondo region bordering Lake Victoria.

Forestry.—Only about 2 per cent. of Kenya Colony is forested, and less than a half of this area can be classed as real timber forest, the remainder being mainly bamboo. Almost the whole area of the forest belongs to the State, and the forests are carefully conserved, for already the shortage of timber is becoming apparent since, in the absence of either coal or oil, wood must be used as a locomotive fuel. Thus many eucalyptus plantations have been developed

along the railway line to serve future needs. A further reason for forest conservation is the prevention of soil erosion in such a hilly and mountainous region. There are really four types of forest present—(1) the evergreen forests of the Kikuyu Plateau (5,000 to 6,500 feet); (2) the temperate rain-forest on the mountain slopes between 7,000 and 9,000 feet, dense and evergreen, with many species of large trees, notably "camphor" and podocarp; (3) the bamboo forests at the top of the main forest belt, 7,500 to 10,000 feet. The chief economic timbers are the coniferous cedar and podocarp, the former being especially important as a constructional timber, for it is immune from the attacks of white ants, and as being the only British resource of pencil cedar; and the hardwood "camphor" tree. • Eucalyptus and bamboo (for paper pulp) may increase in importance.

Several saw-mills exist, but the export of timber is naturally severely handicapped by the distance of the forests from the coast.

Agriculture.—(1) *Crops.* Three agricultural regions may be distinguished—the coastal belt, the highlands and the Kavirondo region.

In the coastal belt, maize, cassava and yams are the principal native food crops; and rice is grown in the narrow populated belt of the Tana lowland. The coconut palms, formerly important for copra, are now used mainly for native beer. There are some sisal plantations, and native-grown cotton is increasing in acreage.

In the Kavirondo region a similar native agriculture reappears at a higher altitude but on the equator and with 50 inches of rainfall. Bananas, sugar-cane, cotton and rice are cultivated.

Agriculture in the highlands is a function of altitude and rainfall, though when plantations are considered, distance from transport media must be borne in mind. This area was densely peopled by soil-tilling natives before the advent of white men, for the red volcanic soils and the adequacy of the rainfall combine to render the environment particularly favourable to agriculture. Most of the area away from the railway lines still remains in native hands. A wide variety of crops can be grown, including maize, peas and beans, cassava and yams. The principal European plantation crops are coffee, sisal, tea, maize and wheat.

Coffee.—About 100,000 acres have been planted with coffee, which forms the chief export crop of the Colony. A large proportion of this acreage is in the Kikuyu region, on the red, volcanic soils. The coffee is of good quality and fairly high yield.

Sisal plantations, to the extent of some 140,000 acres are mainly under company management, for small-scale production is uneconomical; the inland position is a disadvantage.

Maize is grown in large quantities and an exportable surplus now exists. It is the principal native-grown export crop. The chief hindrance to the export trade is the cost of transport to the coast.

Wheat-growing, protected by import duties, can be successfully carried on in many parts of the highlands, particularly at a high

level (e.g. 7,000 to 8,000 feet) in the " temperate grassland " belt, and in the wetter part of the Rift Valley. The chief trouble is rust, due to excessive rainfall, and the yield is low.

Tea.—Plantations, situated in the wettest parts of the colony—at about 7,000 feet in the Kericho district on the western side of the Mau Plateau and in the Kikuyu district—seem to be meeting with success ; about 12,000 acres are now planted, and the produce is exported to Britain.

Many kinds of *fruit* can be grown, of tropical, sub-tropical and temperate varieties, and the establishment of orchards and canning factories offers considerable possibilities for the future. Over 100,000 acres, mainly in the native reserves, are now devoted to *wattle*, grown, as in South Africa, for its bark.

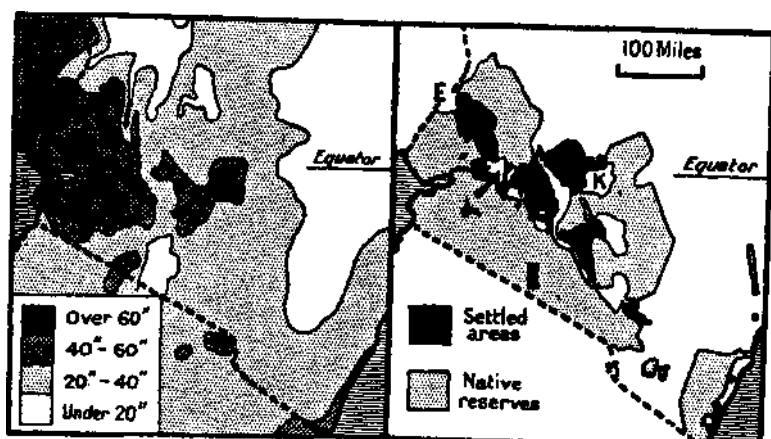
(2) *Livestock*.—The area capable of supporting livestock is naturally very much larger than the crop-bearing area. Over most of the arable area good cattle pastures are either natural or can easily be grown, and the water supply is adequate. There are also extensive areas of dry savana, such as the Masai " steppe," which offer good grazing for a limited period of the year, and thus conduce to a semi-nomadic life in the people who inhabit them. The native cattle are mainly of the zebu type, rather poor and subject to disease, and reared as much to act as wealth and currency as for food. There are nearly 5 million native cattle, as well as over 7 million sheep and goats. Hides and skins and ghee are the chief animal products, and hides are exported. On the European estates are a quarter of a million superior cattle bred up from native stock by imported British bulls. Oxen are valuable for draught purposes, and the dairying industry is progressing.

Minerals.—The Kavirondo goldfields have been opened up fairly rapidly since about 1932 ; whilst about 40,000 tons of sodium carbonate (much of which goes to Japan) are obtained every year from Lake Magadi.

Settlement, Communications and Towns.—That one quarter of the area of Kenya Colony which can be considered as productive is divided between the European estates (11,000 square miles) and the native reserves (47,000 square miles). The remaining three-quarters is very sparsely peopled, with few permanent settlements. It is probable that at least two-thirds of the people live in the area having more than 30 inches of rainfall (Figs. 83 and 84). The densest population occurs in the native reserves on the Kikuyu Plateau, and about the southern flanks of the Mount Kenya massif, where the density in parts is as great as in the more populous parts of Bengal. Over two million natives live in the reserves, whereas only 17,000 Europeans occupy one areas alienated for them. It must be remembered, however, that a large number of natives is actually employed in the European zone on the estates. The proportion of Asiatics—mainly Indians -is greater in Kenya

than in either of the other two countries. They were introduced into the colony as labourers during the building of the railway, and they have remained. As usual they are commercially occupied, and are not agriculturalists.

As in Southern Rhodesia, the European lands are strung out in a belt along the main line of the railway, and the native reserves occupy the outer, but often not less fertile, parts of the highland region (Fig. 84, cf. Fig. 45). There are large native reserves in the southern part of the coastal plain, and a narrow strip of cultivable land in the Lower Tana Valley. The curious rectangular block in the southern part of the Rift Valley is not arable land: it is the reserve of the company which undertook to work the Magadi soda deposits.



FIGS. 83 and 84—Rainfall and occupied land in Kenya.

E=Mt. Elgon; K=Mt. Kenya.

The construction of the main railway line in Kenya, from Mombasa to Kisumu, was embarked upon as part of Britain's campaign for the suppression of the slave trade, but it soon became a revenue-earning undertaking, and has played a very important part in the development of the highlands and of the Uganda cotton-growing industry. Some minor additions to its mileage were made before the war, but a considerable length of new lines has been added since 1921, and 1,625 miles are now open (Fig. 85). The first branch affords a link with the Usumbara Railway of Tanganyika. Of military origin, this line has been reconditioned to serve the Kilimanjaro agricultural region. A second runs down to Lake Magadi—built to transport the soda. A third runs from Nairobi through the Kikuyu Plateau to the western foothills of Mt. Kenya, serving some of the richest agricultural lands. The latest and longest branch has now virtually become the main line to Uganda. Leaving the main line near Nakuru, it crosses the Uasin Gishu

Plateau and descends to the lake plateau of Uganda, eventually linking with the Namasagali-Jinja Une. Branches from this line run to the Rift Valley and to the Trans-Nzoia district at the northern end of the Uasin Gishu Plateau.

Most of the roads are of course difficult during the rains, but the mileage of metalled roads is increasing (about 800 out of 10,500 miles in 1936). Lorry transport is superseding the ox-wagon for carrying goods between the railway and the estates and in certain classes of traffic is competing seriously with the railways.

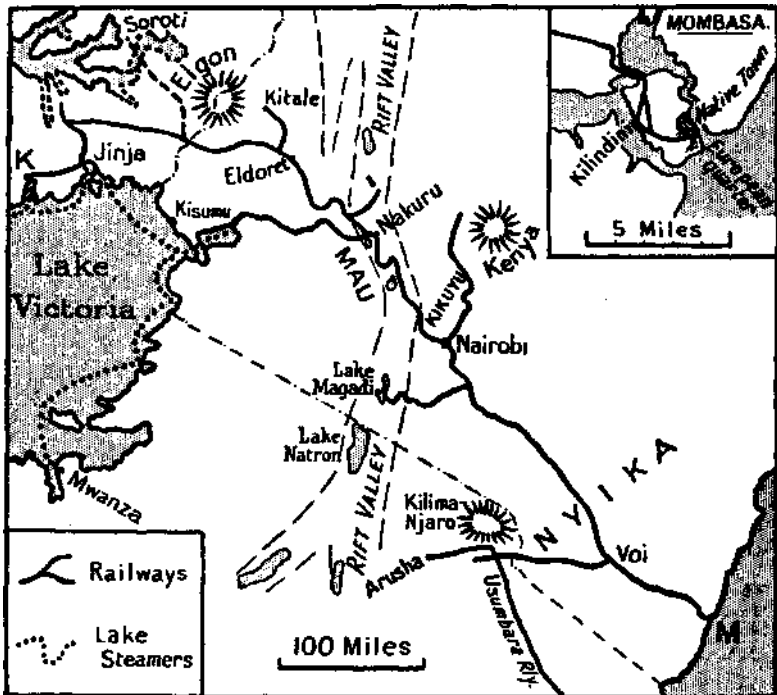


Fig. 85.—The railways of Kenya, and connections.

K-Kampala; M=Mombasa. Inset map of Mombasa Island.

Two towns in Kenya overshadow all the rest in size and population.

Mombasa, situated on the eastern side of a small island in a coastal inlet, is the only considerable port and the gateway to Kenya. The island is intensively cultivated and supports a population of nearly 40,000, including 6,000 Arabs and nearly 10,000 Indians. Mombasa itself, with its fort, is a port of some antiquity. The modern deep-water harbour of *Kilindini*, on the opposite side of the island, equipped with up-to-date shipping

United Kingdom				Japan		[Tanganyika]USA Ind		Ger	Others				
COTTON	OILS	COFFEE	MACHINERY	VEHICLES	TOBACCO	TEXTILES	MISCELLANEOUS						
C O T T O N							COFFEE	SISAL	SUGAR	OIL SEEDS	HIDES	SODA	OTHERS
I n d i a				United Kingdom		Japan	T.T	USA	Others				

FIG. 86.—Trade of Kenya and Uganda. (Average 1933-35.)

Average value of Imports, £5.6 millions (*cf.* 1928-29, £8.2).

Average value of Exports, £5.9 millions (*cf.* 1926-29, £0.6).

by the main railway. *Kitale* is another recent growth, serving like Eldoret as the focus of the Trans-Nzoia agricultural district. *Kisumu*, the terminus of the old main line, is a somewhat declined lake port.

Trade.—Trade statistics for Kenya and Uganda are usually combined, since almost the whole of Uganda's trade passes through Kenya, and there is a customs union between the two territories. Fig. 86 shows the average of some recent years. The exports are almost entirely from Kenya, with the very important exception of cotton and small amounts of coffee, sugar and tin ore (*cf.* Fig. 81). The large part played in the import trade by cotton goods and clothing, metal manufactures and vehicles, is a typical African feature exaggerated in an area of European settlement. The bulk of the trade is with the United Kingdom and other countries of the British Empire, but Japan is making great inroads, by means of cheap textiles and metal goods, into the trade of this as of many other parts of Africa.

TANGANYIKA TERRITORY

To some extent Tanganyika Territory partakes of the characteristics of both Uganda and Kenya. It has samples of all the principal environments of those countries, but it is larger than the other two combined. It lacks the great semi-deserts of northern Kenya, but the vastness of its comparatively dry area is a great hindrance to the development of communications and pastoral industries. It contains several areas suitable to white settlement—areas which before the war were subjected to a considerable amount of development by German colonists. The upheaval caused by the military occupation and the change of administration greatly hindered the prosperity of the territory, and recovery during the last decade of economic uncertainty has been rather slow. It is worthy of note that over 2,000 Germans (over half the total of British) have re-settled in the territory.

Physical Features.—The physical regions have already been outlined. The central and western plateau lies at an elevation of about 4,000 feet, but there are many hilly areas which rise above 5,000 feet. The principal highland areas suitable to white settlement are the Usumbara highlands in the extreme north-east, the slopes of Kilimanjaro and Meru, and the Iringa highlands, Livingstone Mountains and Ufipa highlands in the south and south-west. The northern highlands, which continue the line of the Kift Valley highlands of Kenya, tend to be too dry for profitable agricultural settlement.

Climate.—Tanganyika stretches over nearly 11 degrees of latitude (1° to 12° S.), and consequently, since highlands occur both in the north and in the south, a considerable variety of temperature and rainfall conditions is to be found. Temperatures, except on the coastal plain, are tempered by altitude, and although the annual range may still be small, a considerable daily range may occur, especially during the dry season. (Thus Tabora, at 4,000 feet, has an annual range of 8° (70° to 78°)—but a daily range of over 30° is not uncommon at times.) Three types of rainfall regime have been distinguished in Fig. 75.

Considering total annual fall, which is low for a tropical country, four main climatic divisions may be demarcated (*cf.* Fig. 76). (1) *Coastal lowlands*, hot all the year round, not too unpleasant in the dry season, but very wet and somewhat unhealthy during the rains. Total fall about 40 to 50 inches. (2) The hot, moderately dry belt (*cf.* the Nyika of Kenya) lying between the coastal belt and the highlands. (3) The hot and dry zone of the *central and western plateau*, where a rainfall of roughly 30 inches is accompanied by

very low humidity during the dry season and a considerable daily range of temperature. (4) The *highland zones*, exhibiting many local variations, but generally characterised by over 50 inches of rain and temperatures of "warm-temperate" level with low nightly minima and a rather bracing atmosphere. Too much exposure to bright sunlight in regions (3) and (4) leads to nervous strain in Europeans.

Vegetation.—Latitude, rainfall and altitude combine to produce a complicated vegetation map (Fig. 87). At least six major types may be distinguished. (1) Mangrove swamps fringe the coastal estuaries. Behind them are groves of coconut palms. (2) Thorn forests, open woodland with thorny, drought-resisting hardwood trees and some dry varieties of mahogany and ebony, occur in patches on the coastal plain. (3) Dry forests, mainly open savanas with abundant dry tree growth, characterise the greater part of the central plateau. (4) Acacia-savanas of varying quality occupy the dry belt behind the coastal thorn forest and are found also in the drier north-eastern part of the plateau. (5) Fairly luxuriant tropical forests, with bananas, clothe parts of the slopes of the Usumbara Highlands and Kilimanjaro. (6) Most of the mountain areas support some forest and a great deal of open grassland, temperate in type and of varied luxuriance.

Agriculture.—Types of agricultural economy naturally vary with the vegetation belts. In the more humid areas native subsistence agriculture yields millets, maize, beans, and ground-nuts. Much of the plateau—a continuation of the Masai steppe—must of necessity be confined mostly to pastoral activities. Two of the greatest obstacles to agriculture in the territory are soil-erosion—the results of forest destruction and of the alternating dry and wet seasons—and plagues of locusts.

One great agricultural region is the coastal plain. Products from this belt include sisal, coconuts (copra), rice and sugar-cane. A second region is the shorelands of Lake Victoria (Mwanza Province), where rice and sugar again appear, and native *cotton* plantations have recently spread with great rapidity. A third region comprises the various highland areas. *Coffee* ("arabica" variety) is the most important economic crop in these areas, particularly in the north-east, and at the northern end of Lake Nyasa. Both native and European planters are established in the Usumbara highlands and on Kilimanjaro. Increasing quantities of native-grown coffee are entering commerce from the Bukoba Province in the highlands west of Lake Victoria. *Sisal* plantation has been important, but as in Kenya, the fall in prices has for the moment prevented further expansion. Considerable areas were developed by the Germans in the Usumbara highlands, and more recently production was extended to the highland region of Lindi Province. More than

twenty factories have been established, employing 19,000 people. *Tobacco* is grown in the Iringa highlands by European planters, and by natives in other parts of the south. *Tea* would seem to be well suited to the Usumbara highlands, where its cultivation is extending.

On the plateau pastoral industries predominate, but the growing of millets and ground-nuts for human food (and some of the latter

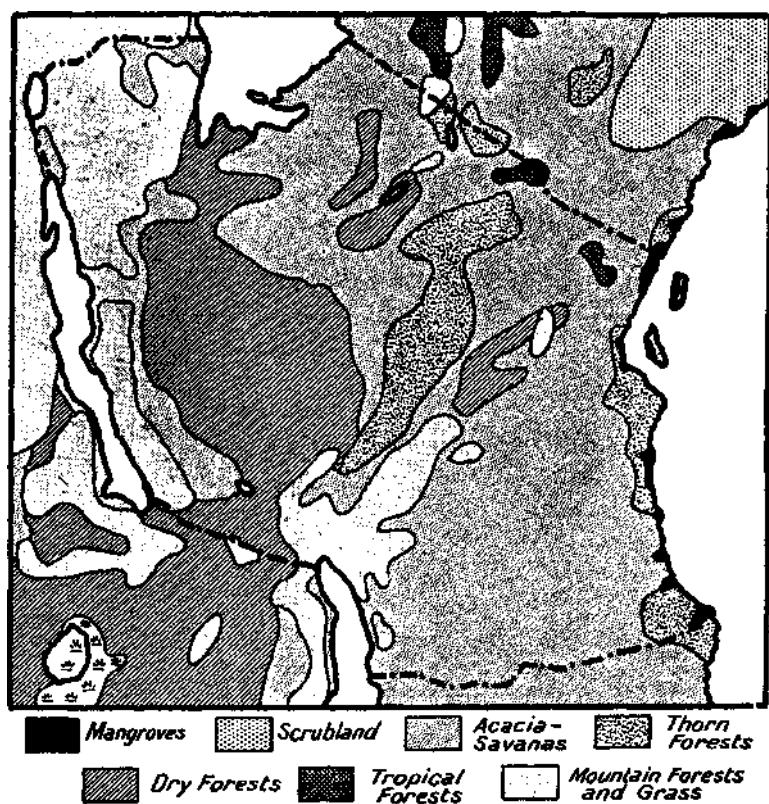


FIG. 87.—Vegetation of Tanganyika Territory and adjoining regions.

for export) are important agricultural occupations. The five million native cattle are not of good quality, and as two-thirds of the country are unsuited to stock-raising owing to the presence of tse-tse fly (Fig. 88), much of the land is over-stocked, with a consequent reduction in productive capacity.

No survey of farming in Tanganyika would be complete without reference to the important Biological Research Station at Amani, in the Usumbara highlands. Much valuable experimental work on agriculture and animals is being carried on here.

Minerals .—The rocks of the ancient crystalline plateau are not very highly mineralised, but occurrences of economic minerals on a small scale are frequent. *Gold* is at present the most valuable (the production in 1935 was worth £370,000). Both alluvial deposits and reefs are being worked on an increasing scale in the Mbeya district (S.E. of Lake Rukwa), S.E. of Lake Victoria (Musoma), and in an area about 100 miles N.E. of Tabora (Sekenke). Very small amounts of alluvial *tin* are produced in the Bukoba region (a continuation of the Ankole tin-field of Uganda). *Mica* is widespread but there is little or no production. Numerous indications of *coal* have been recorded, notably south of the Central

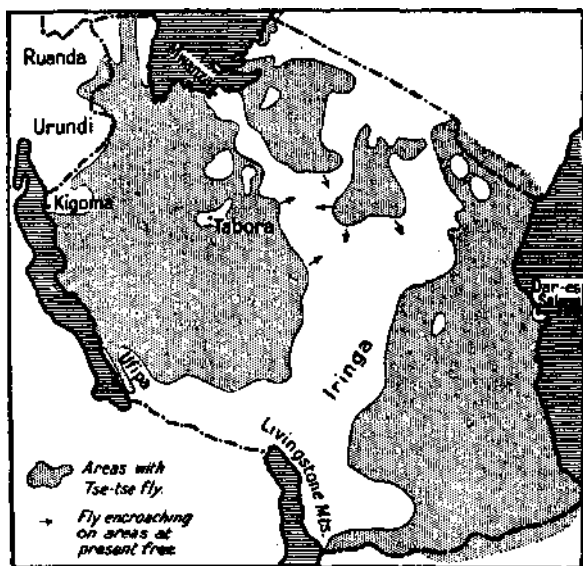


Fig. 88.—The tse-tse infested areas of Tanganyika Territory (after J. Huxley's "Africa View.")

Railway in the Morogoro district, but lack of transport facilities prevent present exploitation.

Communications and Towns.—Considering its great area, Tanganyika has an absurdly small railway mileage—only 1,400. Moreover, the Central Railway, which was built by the Germans for political and strategic reasons, passes for many hundreds of miles through country which is not productive of any traffic. Its value has been greatly increased, however, by branches from Tabora to Mwanza, serving the growing agricultural district and the developing gold mines (Fig. 89), and from Manyoni northwards towards the Sekenke goldfield. It also provides the final link in a rather difficult outlet for the products of the Katanga and Northern Rhodesia, for

services of steamers ply on Lake Tanganyika from Kigoma, the terminus of the railway, to the southern end of the lake (Northern Rhodesia) and to the Belgian Congo port of Albertville (see Fig. 37).

The second main line runs from the port of Tanga through the rich agricultural lands of the Pangani Valley at the foot of the Usumbara highlands to Moshi and Arusha in the heart of the similar belt on the southern slopes of Kilimanjaro. This line is connected with the Kenya and Uganda Railway by a branch to Voi,

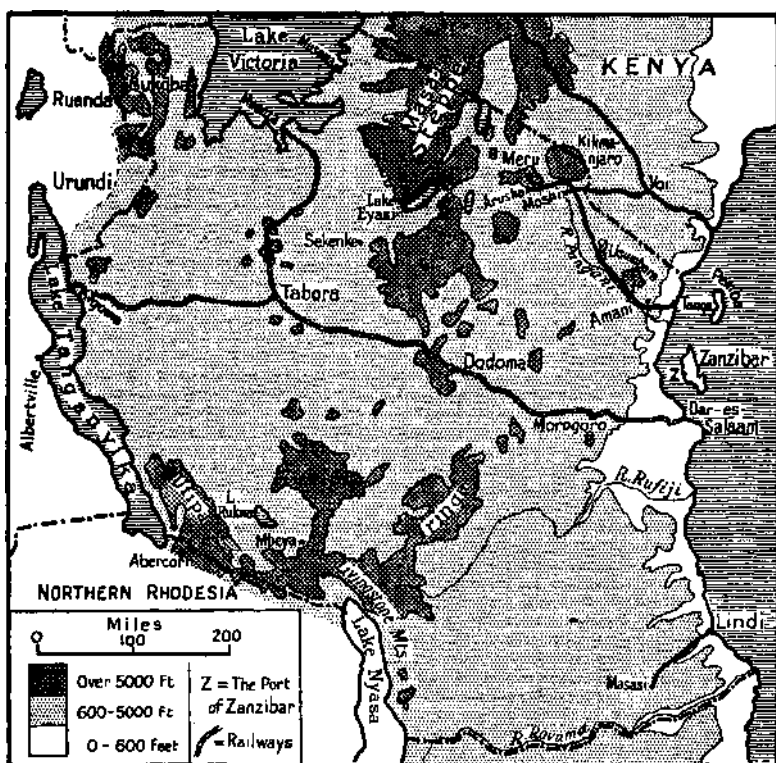


FIG. 89—Tanganyika Territory: Relief and railways.

on the latter line. The only other railway is a narrow-gauge line from Mingoyo (near Lindi) to Masasi, serving the cotton and other plantations of the Lindi highlands.

The mileage of metalled roads is very small, and most of the 14,000 miles of dirt roads are only available in dry weather. As elsewhere, communication becomes difficult during the height of the rainy season.

Tanganyika is served by two main ports, each the terminus of one of the main lines of railway. *Dar-es-Salaam*, with 33,000

people, lies along the north and north-west shores of an almost land-locked harbour about three miles long. It is the capital and principal port of the territory, and its hinterland may be said to extend even as far as the Katanga. *Tanga* is the second port; it has not such good deep-water facilities as Dar-es-Salaam, but it is the outlet for the sisal and coffee estates along the railway line. *Lindi* is the only other port of note; it serves, by means of the light railway, a fairly prosperous agricultural hinterland. Of the inland towns, *Tabora*, with 25,000 people is the largest—and most sprawling. Its central position made it an old caravan centre for slave traffic between the African lakes and the coast. The environment is not very productive, however, and the new railway line to Mwanza will relieve it of some of its former distributive traffic, so that *Dodoma*, situated in a better watered area, and also a route node, may be expected to increase at its expense. *Dodoma*, also on the Central Railway, is a road focus and has recently achieved a new importance as an air-port on the Cape to Cairo route.

United Kingdom		Japan		Kenya {Germany}		Ind	
I	COTTON GOODS	MACHINERY	OILS	IRON AND STEEL	VEHICLES	MISCELLANEOUS	
	S I S A L	COFFEE		COTTON	GROUND NUTS	HIDES	RICE OTHERS

Kenya & Uganda | United Kingdom | Belgium | Germ. | Others

FIG. 90.—Trade of Tanganyika Territory. (Average 1933-35.)

Average value of Imports, £24 millions (cf. 1925-29, £3.6).

Average value of Exports, £2.6 millions (cf. 1925-29, £3.5).

Trade.—The trade of agricultural countries may fluctuate considerably, just as that of mineral-producing countries, for the volume of exports will fluctuate with world prices and with the yield of the crops. In the case of Tanganyika, irregular rainfall and locusts combine to reduce yields, and over-production with low prices to affect the quantities exported. In particular, sisal, which is the greatest export, has been seriously affected by the low prices obtainable during the great depression. The diagram (Fig. 90) is given as an average of recent conditions.

ZANZIBAR

The dominions of the Sultan of Zanzibar, constituting a British Protectorate, comprise the islands of Zanzibar and Pemba and a small portion of the coastland of Kenya.

Zanzibar Island, covering 640 square miles, is a detached portion, about 20 miles from the mainland, of the alluvial and coralline coastal lowland. So also is Pemba, 25 miles to the north-east and

380 square miles in extent. The total population of the islands is over 230,000, of which nearly 50,000 are Asiatics—Arabs and Indians, the latter constituting the trading class. This large foreign population is a reflection of the long history of the port of Zanzibar as an Arab trading centre and one of the principal entrepôts on the shores of the Indian Ocean.

Climate and Vegetation.—The climate of the islands resembles that of the neighbouring mainland coast, but tends to be rather wetter. There are two rainy seasons, the first from March to May and the second in November, but the annual total is about 60 inches in Zanzibar and perhaps 80 or 90 inches in Pemba, and rain may really be experienced in any month. The temperature is perpetually high owing to the latitude and low elevation, and the range is naturally small—about 76° to 82°.

The vegetation, in contrast to that on the mainland, is very luxuriant, especially on Pemba, and during the course of centuries

RICE	COTTON GOODS	OILS	SUGAR	MISCELLANEOUS
				

FIG. 91.—Trade of Zanzibar. (Average 1933-35.7)

Value of Imports, £811,000 (*cf.* 1930, £1,450,000).
Value of Exports, £628,000 (*cf.* 1930, £1,480,000).

many tropical plants from other shores of the Indian Ocean have been introduced (as from Ceylon and Malaya), so that the islands resemble large-scale tropical botanical gardens.

Agriculture.—For no very good geographical reason, Zanzibar and Pemba are the producers of the bulk of the world's supply of *cloves*. There are over three million trees in large plantations owned by Arabs and in native small-holdings. Cloves represent over half the total value of the export trade. Second in importance is the *coconut*. Again there are over three million trees and large quantities of copra are exported, whilst coir-picking, the manufacture of rope and matting and the preparation of coconut oil are amongst the chief native industries. Intensive cultivation of many varieties of native foodstuffs is practised, and every available piece of ground is made to yield a crop of some kind.

Trade.—The port of Zanzibar has receded somewhat from the dominating position which it formerly held in the trade of East

Africa. This position was built up in the days of the slave **trade** and in the days before the trade of the mainland became concentrated at a few large railway terminals. It depended largely on the distribution and collection of produce and merchandise in small boats (dhows) to and from the mainland, and their transference to larger ocean-going vessels. Zanzibar is still an important port of call for liners, and though its entrepot traffic may decline, it will continue to be the great local trade focus.

The port of *Zanzibar* lies on the sheltered western side of the island. It has a population of about 45,000. The Arab city, built mainly of tall whitewashed houses, occupies the sea-front. Behind is the European quarter, and on the outskirts are the native wattle and daub huts. There are several other good harbours on the two islands, but they are of local significance only.

SECTION VII

THE EASTERN HORN

The " Eastern Horn " of Africa is that great cornute peninsula which has its " roots " in the Abyssinian highlands and terminates in the 1,000-foot precipice of Cape Guardafui. Although, by reason of the great variation in altitude, from below sea-level to 15,000 feet, and in rainfall from practically nothing to over 70 inches, a considerable variety of environmental conditions might be expected, in broad outline one may say that two types are characteristic. One is that of the well-watered mountains and the other that of the arid or semi-arid plateaus and plains. The geographical boundaries of the area coincide very largely with political boundaries ; only in north-eastern Kenya does a frontier cut off a portion of the real Eastern Horn and link it with a different environment.

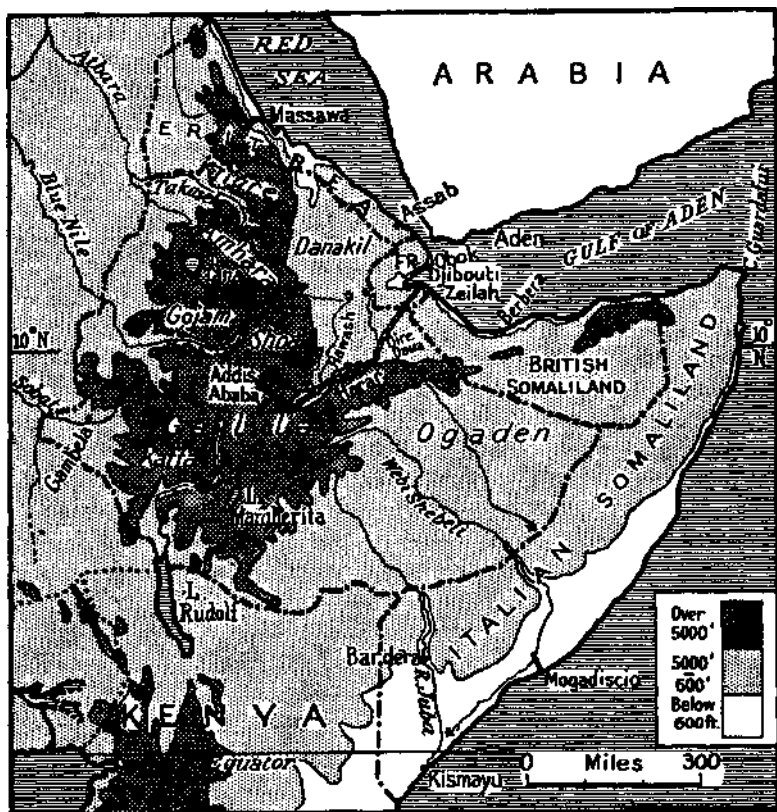
Politically the Eastern Horn falls into five divisions, held by three different powers, Italy holding three separate territories. Ethnically, a number of different races are represented. Again despite the apparent diversity, however, the Eastern Horn can be treated as a whole, because of its comparative freedom from modern economic development and European influence. This freedom is partly due to the isolating effect of the highland environment of Abyssinia and partly to the meagre economic resources of the arid plateaus and plains.

Country	Area in sq. miles	Population
Abyssinia	350,000	7,600,000 (1937, est.)
Eritrea (Italian)	45,000	600,000 (1931)
Italian Somaliland	194,000	1,021,000 (1931)
British Somaliland	68,000	347,000 (1935, est.)
French Somaliland	8,500	45,000 (1936)

Physical Features.—The Abyssinian highlands form a compact block of mountainous country several times as large as the Kenya highlands, but built up, like the latter, of volcanic rocks superimposed upon the ancient, crystalline foundation of the African continent and associated with the great Rift Valley system. Although once, no doubt, forming a lofty, volcano-crowned plateau,

the highlands have been rendered rugged and mountainous by the intense dissection of many seasonal streams, which, fed by the monsoon rains, are alternately raging torrents and practically dry. They can be divided into northern and southern sections, the zone of division lying roughly in the latitude of the capital of Abyssinia, Addis Ababa (Fig. 92).

The northern section is far more rugged and deeply dissected than the southern. It occupies the territories of Tigre, Amhara,



* FIG. 92.—The Eastern Horn.

Gojam and Shoa. Rising in a 7,000-foot wall from the faulted trough of the Red Sea and the plains of Danakil, it has an average elevation of 8,000 to 10,000 feet, dropping in broad terraces north-westwards to the plain of Meroe, in the Sudan, and gradually south-westwards to the Blue Nile. The plateau character is almost obliterated here by the ruggedness. Towering snow-clad peaks, comparable in some respects with Elgon and other East African giants, rise 6,000 or 7,000 feet above the general level to over 15,000

feet, whilst deep trenches, anything from 2,000 to 6,000 *feet* deep, cut great gashes across the coimtry. The longest of these clefts is that of the Takaseh river, a tributary of the Atbara. In the heart of the mountains is the remarkable crater-like depression which contains Lake Tana, 45 miles long and 25 miles broad, lying 3,000 feet below the plateau level. This lake is drained south-eastwards and then westwards by the deep trench of the Blue Nile.

The highlands of Galla, which form the southern section, are not nearly so rugged, nor so seamed by deep trenches. They present a marked edge towards the vast basin of the Bahr-el-Jebel on the west and towards the plateau of northern Kenya on the south, but descend more gradually to the broad Somaliland Plateau on the east. They are crossed from south-west to north-east by the great African Rift Valley. This trench, as in Kenya, is not a continuous valley, but is divided into a number of inland drainage basins—Lakes Rudolf, Stefanie, Margherita and others. At its north-eastern end it is utilised by the Hawash, the most considerable eastward-flowing stream in the country. Here the Rift Valley suddenly opens out; in fact, two great rifts—the Red Sea trough and the Gulf of Aden—meet at right angles (Fig. 74). Steep fault scarps overlook the Danakil Plains on the west and south. The plains themselves are broad expanses, diversified by occasional volcanic cones and by depressions, water-logged in the rainy season only, the floors of which may descend to sea-level or even below.

Overlooking the Danakil Plains on the southern side of the Aden Rift are the highlands of Harar, continued eastwards through British Somaliland, overlooking the narrow coastal plain which borders the Gulf. These highlands have very steep northern faces and descend more gradually to the 2,000 to 3,000 feet level of the Ogaden-Somaliland Plateau on the south.

The broad plains of Jubaland are continued north-eastwards for many hundreds of miles; but beyond about latitude 7° the plateau comes closer to the shore, and at Cape Guardafui it is sandwiched out completely. Much of this long south-eastward slope of the Eastern Horn has little or no drainage. There are two great rivers, the Juba and the Webi (=river) Shebeli. The Juba reaches the sea at the equator, and in its lower course is actually navigable for small steamboats. The Webi Shebeli is baulked by sand-dunes when only 12 miles from the sea, and turns parallel to the coast for 150 miles, only to lose itself in a swamp just before reaching the Juba.

Minerals.—The volcanic lavas of the highlands and the sedimentary sandstones which form the plateau of Somaliland could hardly be expected to be productive of a great deal of mineral wealth. Many metalliferous ores and much mica have been located in

Abyssinia, but not in large bodies. Only a little of the most valuable—gold and platinum—has been worked to any extent, though native metal-working for domestic purposes has existed as an industry for centuries. In Somaliland salt and potash are mined and coal has been located.

Climate.—The climates of the Eastern Horn present considerable differences and several rather extraordinary features. The whole area experiences a monsoonal wind reversal, the existence of which is bound up with conditions obtaining in the desert regions of south-western Asia, but the lie of the land causes some curious inequalities in the amount of rain which falls over different sections. The summer monsoon air-current is south-westerly. That part of it which reaches the Abyssinian Mountains probably originates in the South Atlantic Ocean (*cf.* Fig. 6), and drops a considerable amount of rain in heavy thunderstorms. Over Somaliland the Indian Ocean air-current is blowing parallel with the coast and so, not being forced to ascend to the plateau, drops little moisture, and the region remains arid.

The real monsoon season lasts from June until October in the highlands and during July and August only in Somaliland. In the highlands the rainfall naturally diminishes from south to north. In the south the rainy season begins for some as yet unexplained reason as early as February or March. The southern part of the Galla highlands probably receives 70 inches, Addis Ababa gets 50 inches, and the Tigre region only about 20 inches. East of the highlands is a very marked "rain-shadow," the result of descending air-currents—the Red Sea coast has about 3 inches only.

The highlands are naturally cooler than their latitude (5° to 15° N.) would suggest. Moreover, the monthly range of temperature is there much lower than in the coastal regions where, despite maritime influences, summer heat may be excessive. (Compare Addis Ababa, 8,000 feet, 57° to 64° ; Berbera, on coast, 76° to 97° .)

A last curiosity is the slight cool season rainfall of the British Somaliland and Red Sea coasts derived from the north-east Trade winds. (Berbera, 24 inches, 1'9 inches between February and May.) The interior of Somaliland receives anything up to 20 inches of rainfall on the higher parts, mostly from the summer monsoon.

Natural Vegetation and Agriculture.—Outside the Abyssinian highlands the low rainfall in latitudes so near the equator is responsible for a very meagre vegetation over most of the area. Patches of dry thorn forest with gum-yielding trees clothe the damper slopes of the Harar and British Somaliland highlands, and follow the course of the principal streams, but over the greater part of the region dry acacia savanas, getting poorer and merging into semi-desert scrub, or even absolute desert towards the coasts, are characteristic. Agricultural pursuits are obviously impossible without the aid of

irrigation water, and nomadic or semi-nomadic pastoralism will be dominant. With irrigation millets and cotton may be grown, but the collection of gum from trees and the rearing of sheep, oxen, asses, mules and camels, and the production therefrom of hides and skins, are the main sources of wealth.

The wetter south-western slopes and valleys of the Abyssinian highlands support fairly dense forest of semi-tropical character, sometimes with rubber trees; many of the deeper valleys are followed by belts of similar forests or woodlands. Wild coffee trees are found in abundance, and agriculture is concerned with small coffee plantations and with such tropical crops as rice, cotton and sugar. The highlands themselves range over a considerable altitude, and consequently there is much variety of natural vegetation. Generally speaking, however, woodland of drought-resisting type prevails, with the olive, fig, yew and juniper—giving the vegetation almost a Mediterranean aspect—as characteristic trees. Warm temperate crops such as millet, tobacco and the vine can be grown. On the higher parts of the highlands a temperate grassland vegetation prevails, and the temperate cereals, wheat and barley, can be cultivated up to 12,000 feet or more ; grass-crops grown for animal feed are also important.

Population and Development.—The isolation of the highlands, and the semi-desert character of most of the rest of the Eastern Horn, have resulted in the existence of a curious mixture of peoples, including some interesting survivals and some comparatively recent intruders. As a whole the various races are dominantly Hamitic, with varying admixture of Semitic and Negro blood. The *Ethiojjians* of the northern highlands are of this character. They are curious as forming an outpost or " island " of the Christian religion in an area which is almost uniformly Mohammedan. The *Gallas* of the southern highlands are amongst the most recent immigrants into Africa (apart of course, from Europeans). Their entry dates only from the fifteenth century. They are a pagan people for the most part, agriculturists and cattlemen. A third and smaller highland group is the *Falashas*, or " Black Jews," a people ethnically and culturally unlike their neighbours. They comprise an important part of the population in the north-east. Many *Negroes* are found in the south-west on the borders of the Nile country. In Somaliland the *Somalis* are the most numerous—tall, desert people, pastoralists and camel-men.

Amongst " foreigners," most in evidence are Arabs and Indians—again, as in East Africa, forming the commercial element in the population.

European interest began to turn towards this part of Africa in the 'eighties, just at the time when the revolt of the Mahdists was causing the withdrawal of the Egyptian forces which occupied the

region. Britain, France and Italy occupied parte of the coast, and Britain and Italy established protectorates over the coastal regions, very largely to prevent the territories from relapsing into barbarianism. Italy's " sphere of influence " was held to include the Abyssinian highlands. In 1896, however, the then Emperor of Ethiopia defeated the Italians and until 1936 Ethiopia, known to the outside world as Abyssinia, was an independent state ruled by an Emperor (or Empress). The Italian conquest of 1935-6 is still not recognised by many countries of the world, including Britain, but, whether we acknowledge it or not, Abyssinia is now part of the Italian Empire in East Africa, the remainder of which consists of Eritrea and Italian Somaliland.

Until now, Abyssinia has been almost beyond the reach of European influence. It is true that a railway was built to Addis Ababa, but difficulty of communication in the highlands, and the primitive nature of the people, who are to all intents and purposes self-sufficing, made for a minimum of economic activity.

The development of the other territories is likewise inconsiderable. Natural conditions are against any great agricultural, mineral or industrial activity. Italy is attempting to introduce agriculture into Eritrea by means of irrigation works, but the principal economic occupation in the Somaliland region is the conducting of the small trade in hides and skins and coffee that emanates from the hinterland of the few small ports.

ABYSSINIA

Regional Division and Agriculture.—The people of Abyssinia, estimated by the Italians in 1937 to number seven and a half millions, are mostly to be found above 5,000 feet. The plateau of Ogaden in the south-east, and the plains of Danakil in the north-east, are much less densely peopled than the highlands.

The highlands may be divided, according to agriculture and altitude, into three zones. The lowest zone, called the *Kolla*, comprises the lower slopes of the plateau edges and the deeper valleys up to about 5,000 to 6,000 feet. It is best developed in the wetter south-west, and to a certain extent, though of drier character, in the Harar highlands. Forests of varying density and type occur according to the amount of rainfall, but a tropical character is always present. Within this belt are found rubber and ebony trees and bananas, representing the truly tropical flora, and coffee shrubs, date palms and gum-acacias in the drier and higher parts. *Coffee* is the principal natural and cultivated product. It grows wild in abundance, especially in the province of Kafia in the south-west, and in the Harar district. If it were seriously cultivated as well the output might reach enormous proportions. Most of it is closely akin to the " mocha " coffee of Arabia and passes

as such into commerce. Almost the entire collected and cultivated output is exported, reaching the outer world *via* the French-built railway to Djibouti, or *via* the various transport media of the Anglo-Egyptian Sudan.

The zone above the Kolla is the *Voina Dega* (=wine highland), or warm temperate zone, extending up to 8,000 or 9,000 feet. This is the healthiest and most habitable region. Continuous woodland is not common except in the wetter Galla country, but trees are abundant. Bamboos fringe the river-banks, and the sycamore, juniper and olive are characteristic, besides "Mediterranean" fruit trees, such as the orange, fig and apricot, and also the vine. Everywhere the soil is arable or affords rich pasturage; cereals are grown and cattle and sheep reared in large numbers. The vegetation of this zone is far more diversified in the south, where the rains are heavier and last longer; in the north the trees are fewer and the pasturage poorer.

Above the *Voina Dega* rises the "*Dega*" proper, from about 8,000 feet to about 13,000 or 14,000 feet. The *degas* are the more elevated plateau and mountain slopes, with little wood and a cover mainly composed of open grassland with bushes, merging upwards into an alpine flora. Temperate cereals, wheat and barley, can be cultivated up to 12,000 feet and there is plenty of pasture for cattle and sheep.

All agriculture in Abyssinia is of a primitive character, carried on for domestic food supply. Of the products which reach the outside world, almost all are merely collected. *Coffee* has been mentioned above. *Hides* and *skins* are but the casual by-products of animals which are used for food. If foreign demand slackens or prices fall too low to withstand the costs of transport the skins are just wasted. *Beeswax* is collected from wild honeycombs, and *ivory* is obtained from wild animals killed for meat. In the arid parts gum arabic and gum tragacanth are collected, and also, the aromatic substances, frankincense and myrrh. One occupation which most nearly approaches to a definite economic activity is the breeding of civet cats in the Kaffia district. These animals are reared for their skin, known in the trade as musk.

Domestic industries are numerous. Metal-working in gold, silver and iron, the weaving of cotton cloth, pottery and flour-milling may be mentioned. An enormous amount of water-power exists which could be utilised for both small and large industrial establishments.

Communications and Towns.—Transport is extremely difficult in Abyssinia. The ox-wagon is the principal means over most of the highlands, and mules and camels are also employed. The pastures of Ogaden in the south-east are said to support one of the finest breeds of camel in Africa. The most vital link with the

outside world is the Franco-Ethiopian railway, constructed at intervals between 1897 and 1917, which traverses the 495 miles from Addis Ababa to the French port of Djibouti (Fig. 92). Two trains a week in each direction are sufficient to cater for the meagre traffic. These trains take three days for the journey, running by day only ! Other outlets for Abyssinian trade are : (1) Westwards to Gambeila, on the Sobat, where the Sudan Government has leased a trading station, and from which a service of steamers runs between June and November to Khartoum. (2) To Berbera (mainly from the Harar district). (3) To the Italian ports of Massawa and Assab. (4) South-eastwards to the head of navigation on the Juba river, and so to Kismayu.

Addis Ababa is the largest town, with about 100,000 people amongst whom are 1,000 foreigners, chiefly traders' of Indian, Arab or Greek nationality. As the terminus of the railway it naturally has a considerable influence on the trade routes of the country. *Harar* is an ancient walled city, the centre of the coffee district and a starting point for caravans to the coast. *Dire Dawa*, formerly the terminus of the railway, retains some of the nodal importance which it acquired as such.

ERITREA

The Italian colony of Eritrea, established first as a protectorate in 1889, consists of two quite distinct regions. The narrow *coastal plain* is backed in the north by the wall-like fault-scarp of the Abyssinian highlands, and in the south by the uplands of Danakil. The *highlands* slope westwards towards the Nile plain, and are dissected by the upper portions of two rivers which subsequently lose themselves. The Mareb, in the south, known lower down as the Gash, fails to reach the Atbara, and the Baraka, which collects most of the highland drainage, flows north-westwards and ends in a swamp before reaching the Red Sea.

The population is mostly semi-nomadic, engaged in animal rearing and in the collection of gums and resins, beeswax and honey. Agriculture is only possible in the wetter parts of the highlands, and in small patches in the coastal plain where the Italians have developed irrigation schemes. In the latter areas cotton and millet are grown.

Pearl-fishing is an important occupation in the shallows around the islands off the coast near Massawa, where also there are salt-pans. Some gold has been mined in the highlands near Asmara.

The principal towns are *Asmara*, the administrative centre, situated at 7,700 feet above sea-level, and numbering 3,000 Italians in its population of 18,800 ; *Massawa*, the chief port through which most of the trade passes; and *Assab*, a small port in the south

serving as one of the several outlets for Abyssinian trade. A 200-miles railway line connects Massawa with Asmara and beyond ; it is being extended to Tessenei, near the Sudan frontier. Most of the internal transport in Eritrea, however, is by asses and mules, or by camel caravan, and some traffic passes westwards into the Sudanese market of Kassala. The principal items in the export trade are hides and skins and pearls.

FRENCH SOMALILAND

The French colony of the Somali coast has very little economic value apart from the important port of *Djibouti*. It is entirely arid, and the only product of note is salt, which is mined and sent inland to Abyssinia. The original French port in this region was Obok, which has been surpassed by Djibouti since the latter was chosen as the terminus for the French-built railway to Addis Ababa. Djibouti, with a population of about 15,000 (including 1,200 Europeans) acts as an entrepot for Abyssinian traffic, and exports the coffee, hides and skins which arrive from the interior by rail.

BRITISH SOMALILAND

A narrow coastal plain, about 12 miles wide, is backed by the steep fault-scarp of the Aden rift. The highlands rise to between 4,000 and 7,000 feet and then drop gradually southwards over the Somali Plateau. The population is almost entirely nomadic except on the coast. The small amount of cultivation which is carried on yields maize, millet, barley and ground-nuts. Occupations are chiefly of a pastoral and "collecting" type. Sheep, goats and a few cattle are reared by nomadic or semi-nomadic people, and the animals and their skins form the bulk of the export trade. Gums and resins of various kinds (gum arabic, tragacanth, frankincense and myrrh) are collected.

Salt is mined near Zeilah and traces of coal and precious metals have been observed.

Transport is almost entirely by camel caravan, for there is no railway and few roads.

The principal port is *Berbera*, with a population varying between 15,000 and 30,000, and fluctuating considerably according to the marketing seasons for the animals and their products. A very old port, acting as outlet for parts of Harar and the Somali Plateau, its facilities have been subjected to considerable improvement by the British authorities. Live animals (sheep and goats), hides and skins, gums and resins and ghee are the principal items in the export trade, most of which passes through the entrepot of Aden. Of secondary importance is the small port of *Zeilah*.

The island of *Sokotra*, lying at the end of a chain of small islands and reefs 150 miles east of Cape Guardafui, is a British protectorate

administered from Aden. It is semi-arid and has a population of about 12,000. The people are mainly pastoralists, rearing cattle, sheep and goats, and producing ghee. Permanent settlements are uncommon except near the coast, where fishing is the main occupation. There are few harbours and little trade.

ITALIAN SOMALILAND

The Italian colony of Somaliland occupies a broad strip of the plateau and coastal plain of the Eastern Horn, from the Gulf of Aden to Jubaland. The plateau, averaging 2,000 to 3,000 feet, slopes gradually eastwards and presents a series of steep scarp-faces towards the coastal plain and the Indian Ocean. Much of the territory, especially in the north, is almost absolute desert, but the slightly higher rainfall of the interior plateau results in the existence of fair seasonal animal pastures and dry woodlands of gum-yielding trees. Cattle, sheep, goats and camels are reared. Agriculture and permanent settlement is only possible in the south, where the waters of the Webi Shebeli and Juba support narrow belts of cultivation in which sesamum, millet and cotton are grown. There are only 1,800 Italians in Somaliland out of a total population of over 900,000. Most of them are on the 70,000 acres of Italian plantations or in the poits.

Mogadiscio, with 20,000 inhabitants, is the capital and chief port. It has no harbour, but it carries a good deal of momentum from the days when it was one of the important mainland ports of the Sultan of Zanzibar. It is the starting-point of a small railway which runs inland to the cultivated belt of the Webi Shebeli. *Kismayu*, at the mouth of the Juba (ceded with 33,000 square miles of Jubaland from Kenya Colony in 1926), is the second seaport. A service of steamboats plies on the River Juba from Kismayu to Bardera, a distance of nearly 200 miles, serving the cultivated tracts.

The exports of the colony reflect the dual nature of the occupations. Gums, hides and ghee come from the pastoral people, cotton and sesamum oil from the agriculturalists.

SECTION VIII

NORTH-EASTERN AFRICA

1. THE SUDAN

The name " Sudan " is applied to that great belt of savana land which stretches across northern Africa from Senegal to Abyssinia, separating the Sahara and Libyan Deserts from the regions of tropical forest (*cf.* pp. 15-16). Being thus a climatic and vegetational division, it could hardly be expected to correspond to any political boundaries. No one country or province is entirely within the region, unless it be Senegal, which we have already considered as part of West Africa. Several of the British and French territories of West Africa have large areas within the equatorial forest zone, whilst the French areas of Niger and Chad, and the Anglo-Egyptian Sudan, extend well into the deserts.

These last three areas will be considered in in the section. Politically and economically, Niger Colony is linked with French West Africa, looking towards the ports of the Ivory Coast or Senegal; Chad with French Equatorial Africa, looking towards the Congo or the ports of Cameroons ; whilst Anglo-Egyptian Sudan focusses upon the basin of the Nile and its outlets to the Red Sea and the Mediterranean. The striking difference in economic development between the Anglo-Egyptian Sudan and the French territories is dependent upon two of the most elementary geographical factors, position and water-supply. The French areas, only small portions of which have any permanent flowing water or any seaward drainage, lie in the heart of northern Africa, separated by 500 to 1,000 miles of comparatively undeveloped country, devoid of good communications, from the Mediterranean and the Gulf of Guinea. The Anglo-Egyptian Sudan has the great perennial artery of the Nile and its tributaries, with their vital annual flood to sustain agriculture and human life; and easy outlets by rail to the Red Sea and down the natural highway of the Nile Valley to its mouth.

Both British and French areas owe the late commencement of their development to the comparatively recent date of their pacification. It is but thirty years or so since an end was put in the Anglo-Egyptian Sudan to the despotic rule of the Mahdis and the Arab slave-trading; only in 1920 were the Niger and Chad territories demilitarised and turned over to civil administration.

Niger Colony.—Fully two-thirds of the 500,000 square miles occupied by this French colony are waterless desert and semi-desert, almost useless to man and beast, and with few natural resources except occasional salt-pans (Fig. 102, p. 212). In the south, however, bordering on Nigeria and stretching across the River Niger, is a wide zone of acacia-scrub merging into savana, and inhabited mainly by the Hausa people who bulk so largely in the population of northern Nigeria. Here are millions of livestock and much native cultivation. Some three million sheep and goats, one million cattle and thousands of horses, asses and camels graze the savana grasses, and good crops can be grown during the summer rainy season, for the total fall is between 10 and 25 inches. *Millet* is the chief food crop, but ground-nuts, manioc, wheat, maize and rice are grown, and native cotton is cultivated and locally used. The principal native market town is *Zinder*. The centre of administration has now been moved from here to *Niamey*, on the River Niger. The total population of the colony in 1936 was 1,764,000, including only 4,500 Europeans.

Chad Colony.—This territory, 400,000 square miles in extent, stretches from Lake Chad eastwards and north-eastwards to the borders of the Darfur uplands and the highland mass of Tibesti, and includes the great Bodele depression. It extends farther south than Niger Colony so that only about a half of it is useless desert or semi-desert. Moreover, there are numerous oases on the edge of the slightly better watered Tibesti highlands, whilst wells of artesian type are fairly well scattered over the Bodele depression. The southern savana zone drains to Lake Chad, but the Shari is the only perennial stream. Most of the watercourses are dry for the greater part of the year, but inundate wide areas for a few weeks during and after the rains. Lake Chad itself seems to be shrinking, leaving behind it vast areas of reedy swamp.

The products of the savana zone are animals and food crops. There are more than 800,000 cattle and many sheep, goats, donkeys, horses and camels, and some export of cattle to Nigeria and Anglo-Egyptian Sudan takes place. *Millet*, maize and beans are the chief food crops, and native cotton is grown to provide for local needs and a small export to Nigeria. Such traffic as there is is a continuance of native trading activities from the past. Production of commodities for trade with the outside world is non-existent. Good Egyptian cotton and rice could probably be grown with irrigation in the Shari Delta, but transport difficulties will prevent any great developments of any kind for many years.

The capital of the colony is *Fort Lamy*, at the junction of the Shari and the Logone. Other native trading centres are *Mao*, in Kanem, and *Abeshir*, in Wadai. The total population of the colony is just over a million.

2. ANGLO-EGYPTIAN SUDAN AND EGYPT : THE BASIN OF THE RIVER NILEⁱ

The Nile Basin—Physical.—The River Nile, one of the greatest rivers in the world, is in some respects also one of the world's best-known rivers, for although its sources remained for so long a mystery, its lower part was the cradle of one of the earliest and greatest civilisations the world has known, and the all-important part which its annual flood plays in the life of Egypt has stimulated scientific observation and research.

The basin of the Nile (Fig. 93) falls naturally into five major divisions :

1. *The Lake Plateau.*—The farthest headstream of the Nile, the Kagera, rises in the highlands of Urundi, over 4,000 miles from the Mediterranean, and flows into Lake Victoria. The course of the Victoria Nile through the Lake Kioga swamps and draining Lake Albert has already been described.

2. The vast basin of the *Bahr el Jebel*, or Upper Nile (Fig. 96, p. 200). This is a huge, almost flat expanse of land between 1,200 and 1,500 feet above sea-level, through the centre of which flows the main stream of the Nile—the White Nile or Bahr el Jebel—which is the only considerable permanent watercourse in the whole area. The extreme flatness results in vast areas becoming inundated during and after the rainy season, with the result that the Bahr el Jebel only collects a small fraction of the water which actually falls within its basin, for most of it is evaporated or consumed in the extensive swamps. This plain rises gradually to the more dissected Nile-Congo watershed on the south-west. The drainage of this slope and of the highlands of Darfur is collected into the *Bahr el Ghazal*, which joins the Bahr el Jebel at Lake No. East of the Bahr el Jebel the land rises very gradually to the foothills of the Abyssinian Mountains. This slope is drained by the *Sobat*, formed of two major headstreams, the Baro from the mountains and the Pibor from the plains.

3. *The White Nile Basin* from Malakal to Khartoum. The White Nile pursues a solitary course through the dry region of the Central Sudan, receiving little or no water from either side except the two great tributaries from the Abyssinian Mountains, the Blue Nile and the Atbara. The *Blue Nile* descends rapidly from the mountains through a series of gorges and debouches on to the plain near Roseires. It joins the White Nile at Khartoum, and the long "doab" which lies between the two rivers is known as the Gezira. The *Atbara*, a less constant stream, also descends in gorges from

ⁱ The authors are indebted to the Controller of the Sudan Government's London Of Office for comments on pp. 191-204.

the mountains and pursues a lonely course over the plain, joining the Nile at the town of Atbara.

The whole of regions (2) and (3) form part of the great crystalline plateau of Africa; but "solid" rocks are seldom found at the surface except on the highlands of Darfur, Kordofan and the Nile-Congo watershed, for the whole of the plain is covered with a thick



FIG. 93.—The Nile Basin.

Each dot represents 50,000 acres of cultivated land. Notice the small area when compared with the size of Ceylon. Notice carefully the position of Sennar.

accumulation of detrital material brought down by the seasonal floods of the rivers, and much silt is still being deposited. The summit of the Darfur highlands is volcanic, like the Abyssinian Mountains.

4. *The Lower Nile Valley* from Khartoum to Cairo. North of Khartoum the Nile enters the great sandstone region of Nubia. Here, in contrast with the vast open flats through which it has passed, it flows in a narrow valley, under a mile wide, incised not very deeply into the surface of the plains. Westwards there stretch hundreds of miles of uninterrupted desert, relieved only by low flat-topped hills produced in the sandstones by differential erosion. Eastward the land rises to the heights which overlook the faulted trough of the Red Sea. These heights are part of the great crystalline plateau and the old, hard rocks protrude westwards across the Nile Valley, causing those interruptions in the slope of the river bed which are well known as the six cataracts (Fig. 94). The Nile enters Egypt at Haifa, below the second cataract. Between Haifa and Aswan the valley closes in until it becomes the long gorge which forms the reservoir of the Aswan dam, at the first cataract. Thereafter it broadens to ten miles or so, giving a wide stretch of alluvial plain (Fig. 99, p. 206). Beyond the valley rims is the plain of Egypt, built up on young limestones and sandstones which, dipping northwards, present southward-facing escarpments.

5. Below Cairo lies the great *delta* of the Nile with its two main channels, the Rosetta and Damietta mouths, and innumerable distributaries.

Climate.—The Nile Basin can be divided into four climatic regions :

1. *The Lake Plateau* (cf. p. 159), with equatorial temperatures slightly modified by altitude, and an abundant rainfall, with no dry season and two maxima in April and December.

2. *The Southern Sudan.*—Here the two maxima of the equatorial regime have merged into one, occurring about July to August. The length of the rainy season and the total fall both decrease northwards. Thus Mongalla (lat, 5°) has 39 inches, mainly falling

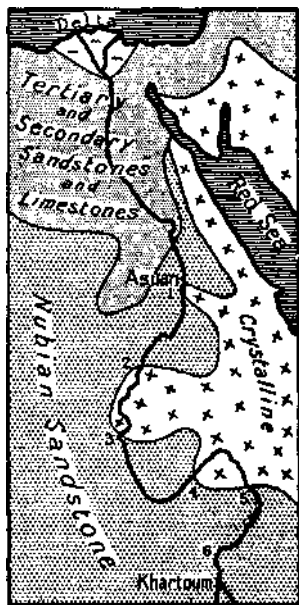


FIG. 94.—Simplified Geological map of the Lower Nile region.

The numbers 1 to 6 are the six cataracts, situated where the Nile crosses the outcrop of the crystalline rocks.

between April and October ; at Lake No (lat. 10°) the total is 30 inches, falling between May and October ; at Khartoum (lat. 16°) only 5 inches fall, nearly all in July and August. This northward decrease in rainfall is accompanied by an increase in the temperature range, and especially in the extremes of heat experienced. Thus at Mongalla the range is 76° to 83° ; at Lake No, 79° to 88° ; and at Khartoum 70° to 91°. As is usual in countries with a tropical climate, the maximum temperature occurs just before the rains begin, and there is a slight rise after they have ended, the drop during the rainy season being due, of course, to the increase of cloud.

3. *Northern Sudan and Egypt.*—Here desert conditions prevail. Rainfall is almost non-existent except occasionally on the Red Sea Hills, and the range of temperature, particularly between day and night, is considerable. (Wadi Haifa, 58° to 88°, no appreciable rain.)

4. The *delta* has an extremely dry type of "Mediterranean" climate. At Cairo the average rainfall is one inch, at Alexandria 8 inches, with a maximum in December and January and eight or nine months' drought.

The Regime of the River Nile.—If the River Nile were dependent upon the water derived from the lake plateau and southern Sudan, the ancient and modern civilisations of Egypt would never have existed, for the river would have no flooding capacity and its volume in lower Egypt would be small indeed, for it receives no permanent tributary below Atbara. Fortunately, however, its two greatest tributaries—the Blue Nile and the Atbara—take their rise in the Abyssinian highlands, where the melting snows and the monsoon rains combine to swell their volume enormously, thus creating that great annual flood which is the life-blood of Egyptian agriculture.

The outflow from Lake Victoria does not fluctuate widely in volume, and the wide expanse of Lake Kioga tends further to even up the flow and retard the periods of maximum and minimum. On the Victoria Nile the maximum flow occurs between August and November. In southern Sudan an enormous quantity of water is lost to the river in the vast expanse of swamp which forms during the rainy season; and the greater the rain the greater also the loss, because the inundations extend farther and expose a greater surface of water to evaporation. Of the quantity of water which flows past Mongalla, where the swamps begin, only about a half reaches the junction of the Sobat, which is the end of the swamp region. Most of the summer rain which falls in southern Sudan never reaches the Nile at all but is evaporated from the swamps in which it accumulates.

The Sobat brings down a variable amount of flood-water from

June until January, the maximum flow, in September and October, being delayed by the expanses of swamp through which it flows.

It is the Blue Nile which is really responsible for the bulk of the Nile flood. This river maintains an all-the-year-round flow, for it rises in Lake Tana, but its volume during its maximum period is nearly ten times as great as during the low-water period. Its rise in July and August is so rapid and so great (over 20 feet) that the water of the White Nile at Khartoum is actually ponded back. The flood begins early in June, reaches a maximum in September, and subsides in November and December.

The Atbara is a seasonal stream only. It floods between July and November, reaching its maximum in September, but during the remainder of the year shrinks to a series of pools and fails to reach the Nile.

Below Atbara little water is added to the river; in fact, the Nile loses volume continually below this point. Its regime is now the combined result of all the tributaries. The flood season commences in July, being slightly delayed by the passage of flood-water down the river, reaches its maximum in September (at Cairo delayed until October), and then falls until January. During the flood season the Blue Nile is responsible for nearly 70 per cent, of the water, the Atbara for 17 per cent, and the White Nile for 14 per cent. During the low-water period, however, the White Nile provides over 80 per cent, of the water. The White Nile is thus the constant source of supply and the mainstay of the dry season flow; the Abyssinian streams are the source of the annual flood.

Natural Vegetation.—(a) *Desert*. The natural vegetation of the Nile Basin increases in luxuriance southwards from the great Libyan and Nubian Deserts (Fig. 95). These deserts are for the most part sandy plains, almost completely devoid, save in occasional oases, of any living plant except after the very infrequent rains. Numerous oases occur at the foot of the rocky, granite hills of Nubia, and several large depressions, such as those of Faiyum, Kharga and Farafra are found west of the Nile in Egypt. In these oases dates and cereals provide the bulk of the food. The narrow Nile Valley is of course like one long continuous oasis. The desert ends at about latitude 17° to 18°, roughly along a zone extending from Abeshr in the Chad Colony, to Atbara.

(b) *Semi-desert scrubland* occurs over a belt 100 to 200 miles wide south of the desert, where a small amount of summer rain can be relied upon every year. Gum-bearing acacias are the principal elements in the vegetation, and grasses spring up rapidly after the rains, quickly drying up in the dry season.

(v) *Savana*, in various forms, occupies the bulk of the area southwards from Khartoum. In the north a variety known as "orchard scrub," on account of the small nature **and** regular

distribution of the trees, passes into thorn forest along the water-courses. The ground is dry and almost bare except during the rainy season, when a cover of grass appears. This part somewhat-resembles the "nyika" of East Africa. In the east, on the Abyssinian foothills, a more open forest with baobabs, dom palms and other trees occurs. South of the latitude of Lake No and east

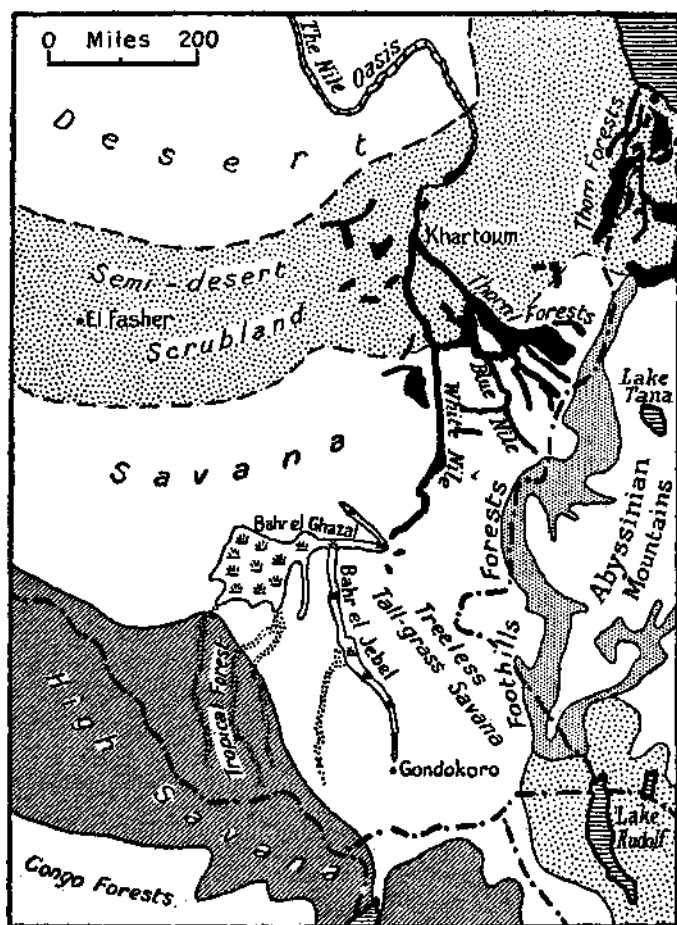


FIG. 95.—Vegetation of the Sudan (after H. L. Shantz).

of the Bahr el Jebel are vast expanses of almost treeless tall-grass savana. Trees are only found along the watercourses, annual firing of the grass (either natural or by human agency) preventing tree growth elsewhere.

(d) *High Savana*, or savana forest, consisting of a park-like formation of medium-sized trees with tall grass and perennial

herbs and a less parched aspect, occurs over the better watered areas of the Nile-Congo divide and northern Uganda, but there is actually little within the territory of the Anglo-Egyptian Sudan. The upper parts of some of the Bahr el Ghazal's southern tributaries are actually clothed in tropical forest, with rubber vines.

(e) *Swamp Vegetation*.—For 500 miles from Gondokoro to Lake No and beyond, the Bahr el Jebel flows through swamps, and similar vegetation characterises a large area of the Lower Bahr el Ghazal and its tributaries. The vegetation consists of papyrus, bulrushes, bamboo-like grasses and floating cabbage-like plants. Frequently, during the flood season, great masses of floating weed become detached, blocking up the river channels and resulting in altered channels, inconvenience to navigation and further inundations. This floating vegetation is called "sudd" or "sadd." Much of the marsh is seasonal only, drying up during the dry season. The Bahr el Jebel stream is kept free from sudd for navigation purposes, but some of the less-used streams, such as the **Pibor**, still suffer from blockages.

Agriculture and Irrigation.—The Sudan falls into two agricultural regions, the first being the south, where ordinary agricultural methods may be practised by making use of the summer rains, and the second being the desert region of the north continuing through Egypt, in which agriculture is only possible along the Valley or where water from the Nile has been made available by large irrigation works.

(a) *Southern Sudan*.—This region is inhabited by rather primitive peoples who have not as yet been greatly influenced by the coming of the white man. Agriculture is practised only as a means of supplying *millet* or maize for food, and *cattle* provide most of the necessities of life. A little cotton, however, is cultivated, and in the south there is a small native coffee-growing industry. Floods and plagues of locusts are the chief hindrances to agriculture.

(b) *Egypt*.—There are three ways of watering the land employed in this region :

(1) The primitive "shaduf" (a bucket on the end of a long lever) survives in some parts, as also do water-wheels—but these can only be of very limited use.

(2) The "basin" system of irrigation is also very ancient, but more scientific, since it makes use of the Nile flood. It depends upon the fact that thousands of annual floods have deposited silt brought down from Abyssinia to such an extent that the Nile banks in Egypt, below Aswan, are now slightly above the level of the floor of the valley. Cuts are made in the raised bank, and as the river level rises the water flows through on to the fields which are arranged in a series of basins separated by embankments. The water remains on the land, depositing its

valuable load of silt, for six to eight weeks, and is then allowed to run back to the river (the level of which has meanwhile fallen). The seed is then sown in the mud left behind, and the crop is reaped before all the moisture has disappeared. This method, which of course allows of only one crop a year, still serves over a million acres of land in Egypt—more than one quarter of all the cultivated land in the country. A considerable acreage remains also in northern Sudan, but in both Sudan and Egypt perennial irrigation is now of far more economic importance, for it guards against the risk of a poor flood and permits of more than one crop being obtained in the year.

(3) Perennial irrigation, making use of dams across the river, dates only from the early part of last century. Mohammed Ali Pasha caused a barrage to be thrown across the Nile at the head of the delta, thereby damming up the flood-water which could then be run off in canals to irrigate the land for a much longer period than would have been allowed under the old basin system. Other barrages followed at Assiut (serving the Ibrahimia canal which waters middle Egypt and the oasis of Faiyum), at *Esna* (used only to give additional water for basin irrigation), at *Zifta*, on the Damietta distributary of the delta, and most recently (completed in 1930) at *Nag Hamadi* (Fig. 99). The Delta and Assiut barrages are the largest and most important. In the delta no water is allowed to escape to the sea between February or March and the beginning of the flood season in July or August. The Delta dam is closed, and large earthen banks, called "sudds" are built across the mouths to retain the water for irrigation.

The perennial irrigation of Middle Egypt is accomplished by means of the great dam at *Aswan*, which has been enlarged twice since its original construction. The Nile Valley for 200 miles south of Aswan becomes a huge reservoir, the filling of which is accomplished between November and January. The water is drawn off into irrigation canals between March and July.

Over four million acres of land in Egypt are now perennially irrigated.

In the Anglo-Egyptian Sudan the gigantic *Sennar* dam, on the Blue Nile, supplies water to the otherwise semi-arid area of the Gezira, lying between the Blue and White Niles south of Khartoum. The dam was completed in 1925 and a quarter of a million acres at once put under irrigation; the continuance of canal construction work has now increased this area to over three-quarters of a million acres, which are supplied with water from August to April. In 1937 another new dam was completed at *Jebel Aulia*, 25 miles south of Khartoum on the White Nile; this is about half the size of the Aswan dam, which it resembles in function.

Two results of far-reaching importance have accrued from these perennial irrigation schemes. The first is that no longer are Egypt

and northern Sudan dependent upon one crop grown with the aid of the annual flood. Two, and sometimes three, crops can now be obtained every year. The second is that now the annual flood is no longer allowed to spread its rich Abyssinian silt all over the fields, the soil is being rapidly exhausted, and large quantities of chemical manures have to be imported. During the flood season, far more water is available than can be used for irrigation, and this, combined with the fact that the flood water takes some time to pass down from the Sudan to the delta, and that if the flood water is allowed to cease flowing for long its load of silt will be deposited in the reservoirs, means that very careful co-ordination is necessary between the various dams so that the best and most efficient use shall be made of the water.

The principal crops of the irrigated lands of Egypt and the Sudan are cereals and cotton. For the food supply of the population, wheat, barley, maize, rice, millet and sugar-cane are grown, whilst cotton is the chief export crop. Cattle occupy an important place in the agricultural system. They are fed largely on a white clover called "bersim," a nitrogen-fixing plant which enriches the soil.

THE ANGLO-EGYPTIAN SUDAN

The Anglo-Egyptian Sudan came into being in 1899 after the overthrow of the Mahdists, who for sixteen years had held tyrannical sway over the territory, which had formerly been under Egyptian control. It is administered by a Governor-General, appointed by Egypt with the assent of Britain; public buildings fly both British and Egyptian flags. It covers just over a million square miles, extending from Uganda and the Nile-Congo watershed in the south to the boundary with Egypt in latitude 22° N.; and from the highlands of Darfur in the west to the Abyssinian foothills in the east, including as its north-eastern boundary a 300-miles stretch of the Red Sea coast.

Population.—The total population of the territory, owing to the numerous nomadic and semi-nomadic tribes, is difficult to gauge exactly, but it is generally estimated to be about six millions. The natives are of several different races. On the northern reaches of the river are the Nubians, largely settled agriculturalists with pottery and basket-making industries; and to the east of them, between the Nile and the Red Sea, are nomad pastoral Beja tribes. The central belt of the country and its north-western region are occupied by Arabs—nomad breeders of camels and sheep in the north and of cattle and horses in the south, with villages of sedentary cultivators between them. Farther south, forming the bulk of population of the Bahr el Ghazal and White Nile Basins, are the Negro-Hamitic peoples known collectively as Nilotes. Such are the Shilluk, the Dinka and the Nuer, mainly primitive people

who wear little or no clothing, and who live by keeping cattle, fishing, hunting the hippopotamus, and growing a few crops during the summer rains. A third group comprises the black people, more allied to the Bantu, who dwell in the hill regions. Such are the Nuba and other tribes of the Darfur highlands and Kordofan.

The population is very unevenly distributed, its distribution being controlled by water supply. Large areas of the north-west are virtually uninhabited.

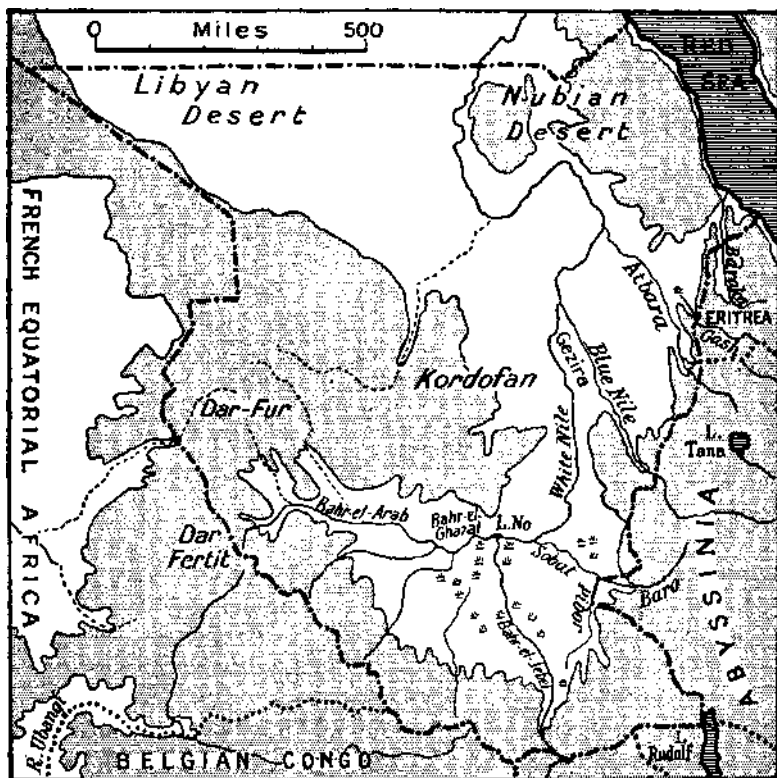


FIG. 96.—Anglo-Egyptian Sudan.

Land over 1,500 feet shaded.

Production.—The products of the Anglo-Egyptian Sudan are mainly vegetable, either collected or cultivated. The only mineral wealth comprises the *salt* which is obtained on the Red Sea coast near Port Sudan, and a little *gold* in the hinterland of the same port at Gabeit.

Of the collected products, *gum-arabic* is easily the most important. The Sudan is the world's chief source of this substance, of which there are two kinds. The better is obtained from the

Acacia vereck and the inferior from the *Acacia arabica*, in the central part of the country, principally in the Province of Kordofan. Rubber vines occur in the forests which follow the Bahr el Ghazal head-streams ; wild coffee occurs in the highlands of the Nile-Congo watershed; and inexhaustible quantities of papyrus could be collected from the sudd region; but little actual exploitation occurs.

By far the most important cultivated crop is *cotton*. The growing of American cotton as a rain-crop is a recent development of increasing importance, principally in the Nuba Mountains region of Kordofan Province which, in the season 1935-6, had over 100,000 acres under cotton, but also in Mongalla and the Upper Nile Province. Other small patches of American cotton are to be found around the eight Government pumping stations on the Nile, in the Northern Province. Most of the 350,000 acres of cotton cultivation, however, are planted with the Egyptian variety, called " sakel." There are three major areas of production. The oldest of these three are the inland " deltas " of the Gash and Baraka streams which descend from the mountains of northern Abyssinia and disappear in fan-shaped swamps. Kassala is the centre of the Gash region, where in 1934-35 there were 28,000 acres under cotton, Tokar that of the Baraka area, which had 31,700 acres. The greatest and most recent area is the Gezira, where the Sennar dam and its canal systems irrigate about 180,000 acres of cotton plantations. The importance of the crop may be gauged from the fact that it represents nearly two-thirds of the total value of the export trade. Most of the Gezira cotton is ginned at Wad Medani, that of the two deltas at Port Sudan ; there are 24 ginneries.

Other agricultural products include *sesamum* and *ground-nuts*, both of which are exported in small quantities. The principal food crop is *dura* (millet), widely grown with and without irrigation. The yield varies widely from year to year according to the rains and the intensity of the locust plague, but in good years an exportable surplus exists in the Blue Nile and White Nile regions. *Dura* is exported, principally to Egypt, for cattle and poultry food. *Dates* are a valuable crop in the northern desert region of Dongola and Haifa Provinces.

Livestock are important everywhere. In the irrigated areas cattle are fed on the forage crop which is grown as part of the regular crop rotation. In the southern part of the country over a million cattle represent the chief wealth of the semi-nomadic people. Much seasonal migration still occurs on the Abyssinian frontier, for the tribes are not to be deterred from their centuries-old customs by the setting up of a political boundary. In the savana and semi-desert regions, too, are several millions of sheep and goats, whilst in the centre and north camels are reared. These supply the

nomad tribes which breed them with milk and with hair for their tents. Many are exported to Egypt for meat; others are sold to sedentary tribes, who use them, as do the nomads seasonally, as beasts of burden.

Communications and Towns.—Communication in the Anglo-Egyptian Sudan is by railway, river steamer and camel caravan. The caravan routes across the Libyan and Nubian Deserts have lost much of their former importance with the arrival of the railway. Former market centres of importance were El Fasher in Darfur, Berber on the Nile, and Suakin on the Red Sea coast.

Nearly 2,000 miles of railway line have been built (Fig. 97). The main line runs southwards from Wadi Haifa, cutting off the great Dongola bend of the Nile, and then following the river closely *via* Berber to Khartoum. From Khartoum it ascends the Blue Nile Valley to Sennar and then strikes westwards to the Kordofan market town of El Obeid. Two important branches connect the main line with the only port of the territory, Port Sudan; one crosses the desert from Atbara, the other runs from Sennar *via* Kassala.

Over 2,400 miles of river-steamer routes are operated (Fig. 97). These provide the only link between the northern and southern parts of the territory. Stern-wheel steamers of shallow draught are principally employed. The navigable reaches of the Nile are separated by the cataracts, so that there are three distinct stretches of river transport. The most important is the connection with Egypt from Wadi Haifa to Shellal, just above the Aswan dam. This route has declined somewhat in the last decade owing to the increase in traffic *via* Port Sudan. The second and third cataracts separate this reach from the Dongola section, from Kerma to Kareima, from which town a branch of the railway connects with the main line. The third navigable section, separated from the Dongola reach by the fourth, fifth and sixth cataracts, is easily the largest, consisting of the White Nile and Bahr el Jebel from Khartoum to Rejaf, with flood season extensions up the Bahr el Ghazal and Sobat, and up the Blue Nile from Khartoum to Makwar (the Sennar dam), and from Makwar, in the flood season, to Boseires.

All-weather motor roads connect Juba, the Nile port of the southern Sudan, with Uganda and with the Belgian Congo; and the southern provinces of Mongalla and Bahr el Ghazal have a good system of all-season roads. In the dry northern provinces, cleared tracks suffice for motor traffic. There are no through roads from the north of the Sudan to the south, owing to the swampy nature of the intervening country. Aviation is increasing. Haifa, Khartoum and Juba are regular landing-grounds on the weekly Cape to Cairo service, and Port Sudan is now served.

The administrative centre of the territory is *Khartoum*, a city of

recent growth lying in the angle between the White and Blue Niles at their junction. With its twin town on the north side of the Blue Nile it has about 50,000 inhabitants. It owes much of its importance to its focal position as regards railway and steamer routes, whilst from the development of agriculture in the Gezira it has derived

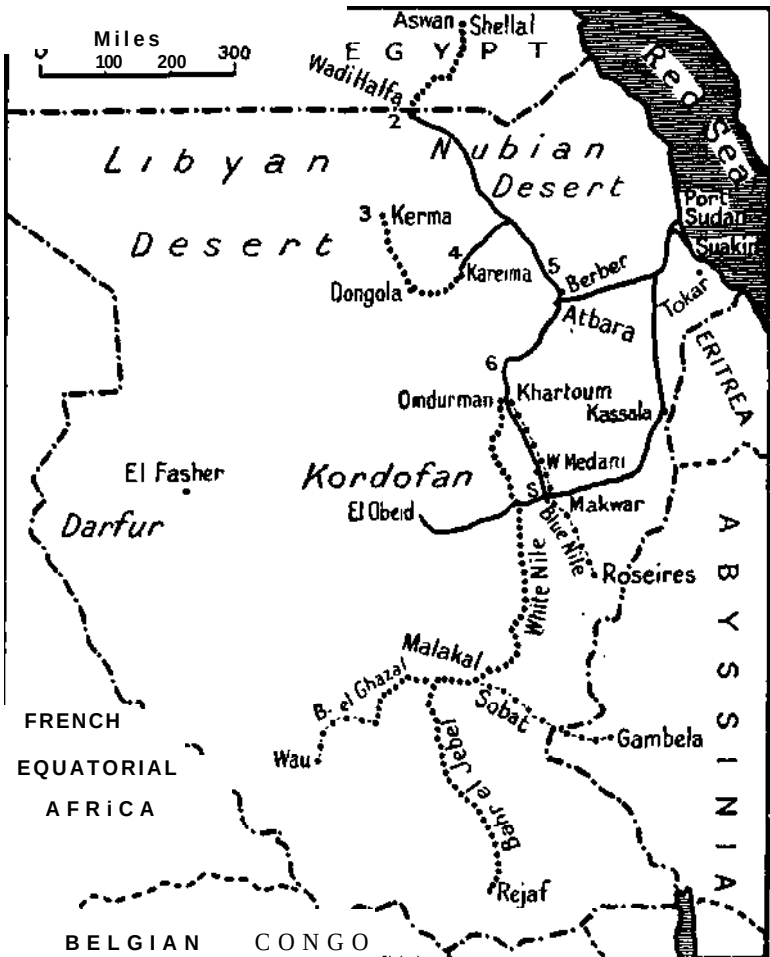


FIG. 97.—Anglo-Egyptian Sudan : Transport Routes (excluding airways).

- = Railways.
- = Steamer routes (all year).
- . - . = Steamer routes (summer only).

great benefit. On the opposite side of the White Nile is the sprawling native town of *Omdurman*, largely a collection of mud huts. *Omdurman* has some 80,000 people, and is a market centre of considerable antiquity which, like many other similar towns, has

lost some of its importance with the decline of the caravan traffic. Other towns of note, mainly market centres and junctions of rail and river traffic are Wadi Haifa, Dongola, Berber and El Obeid. The principal port of the country is *Port Sudan*, constructed in 1906, when the railway reached the Red Sea from Atbara, to replace the old Arab port of *Suakin*, the approach to which was difficult for large vessels. Port Sudan has developed rapidly since the Great War, and now handles over three million tons of shipping annually, and deals with over 80 per cent, of the trade.

Trade.—The trade of the Anglo-Egyptian Sudan is summarised in the following diagram (Fig. 98). The most noteworthy points

COTTON GOODS	IRON AND STEEL, MACHINERY	VEHICLES	SUGAR	COFFEE	TEA	OIL	TOBACCO	MISCELLANEOUS
C O T T O N								GUM ARABIC
								OIL SEEDS SESAMUM HIDES, SKINS
								OTHERS

FIG. 98.—Trade of Anglo-Egyptian Sudan. (Average 1933-35.)

Average value of Imports, £4.3 millions (*cf.* 1931-32, £3.4).

Average value of Exports, £3.6 millions (*cf.* 1931-32, £2.8).

are the essential dependence of the export trade upon two products, cotton and gum-arabic, and the large proportion of the total trade, especially of the export trade, conducted with Great Britain.

EGYPT

Area and Population.—Formerly a province of the Ottoman Empire, Egypt came under the influence of Britain in 1882, when, at the request of the Khedive, an expeditionary force was sent out to suppress a rebellion of the Egyptian army. A British protectorate was established during the Great War, but in 1922 Egypt became an independent sovereign state. Its territory includes a large section of the Libyan Desert, the Lower Nile Valley and the adjoining Red Sea Hills and the Sinai Peninsula. The total area is 383,000 square miles, but the greater part of this is uninhabited. Actually only 13,600 square miles of the Nile Valley, delta and oases are settled and cultivated, and the density of population in these areas reaches the extremely high figure, for a purely agricultural community, of over one thousand to the square mile (1,500 in the delta). The

¹ The authors are indebted to Mr. J. M. Furness, Director of the Egyptian Education Office, for comments on this section.

total population at the census of 1937 was 15,900,000, and the nomadic population of the desert regions being probably only 40,000. No further evidence is needed to confirm the well-known statement, first made 2,300 years ago by the Greek geographer Herodotus, that Egypt is the "gift of the Nile."

The productive area of Egypt is commonly divided into two parts. *Upper Egypt* is the ten-miles-wide flood plain of the River Nile, together with the basin of the Faiyum and the isolated oases of Kharga, Dakhla and Parafrā. *Lower Egypt* is the Nile Delta (Fig. 99).

The native population, the peasant section of which is known as "Fellahin," is descended mainly from the ancient Egyptians and belongs to the Eastern Hamitic stock. Many centuries of Arab influence have superimposed Mohammedan culture upon the people, and Moslems now outnumber the Coptic Christians by ten to one. The nomads of the desert are Bedouin Araos. The decline of the caravan traffic has left them without a means of livelihood and their numbers have decreased. Many have settled on the edges of the cultivated regions.

Products. 1. *Minerals*.—Like the Sudan, Egypt is essentially an agricultural country, and mineral wealth has a very subordinate position. *Phosphate* rock, important in a country where artificial manuring is becoming more and more necessary, is quarried on the Red Sea coast at Kosseir and elsewhere; *manganese*, of vital importance to Britain and other countries for steel manufactures, is mined in the Sinai Peninsula; fine *building stones* exist, such as the Mukattam limestone (which is also used for cement near Cairo), the Nubian sandstone and the granites of Aswan and the Red Sea Hills; and *oil* has been found near the Red Sea coast at Hurghada and other places. The oil is refined at Suez, where it helps to supply the shipping which passes through the Canal.

2. *Crops*.—Before the introduction of perennial irrigation, Egypt's agricultural year was divided into three parts: (1) the season of inundation, June to October; (2) the growing or cultivation season, October to February; (3) the harvest season, February to June. The new system of water supply enables two crops to be obtained every year, the winter crops occupying the ground between October and April, and the summer crops between April and October. Sometimes an extra "season" may be added, a quick crop of maize or millet being obtained between September and November. Rotation of crops is practised and large quantities of fertilisers are used, but on the whole the agricultural methods can be described as still rather primitive when compared with the highly mechanical and scientific agriculture of Western Europe and North America. The holdings are extremely small, 68 per cent. of the land being in tiny compartments less than one acre in extent.

The outstanding commercial crop of Egypt is *cotton*. Cotton-growing was introduced just over a hundred years ago by the

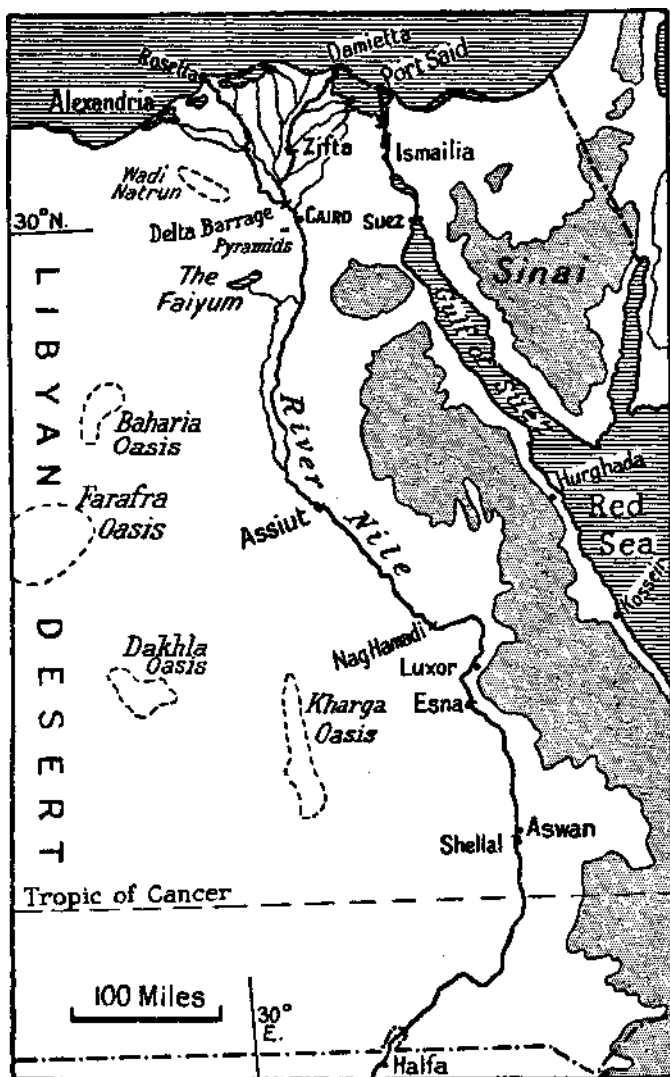


FIG. 99.—Egypt.

Land over 1,600 feet, shaded. Railways, which so closely follow the Nile, have been omitted to avoid confusion. The bars across the river are dams.

originator of perennial irrigation and cultivation has extended steadily ever since. Two broad types of cotton are grown, long staple and medium staple. For a long time the finest variety was

" Sakel " (short for Sakellarides), with a long staple (1½ inches) and a silky lustre, and a quality considered second only to the famous " sea-island " cotton of the United States and West Indies. Since 1935, however, a new and heavier yielding variety, perfected during the last ten years, and known as " Giza 7 " (from Giza, opposite Cairo, where there is a large experimental station), has passed sakel in acreage and yield. Other new varieties are being produced at Giza which may even oust these two. These long-stapled cottons are grown mainly in the delta. The second type is a shorter* stapled cotton called " Ashmouni." It is not of such superlative quality as Sakel, but still is very good. It grows principally in Upper Egypt. The yield of cotton in Egypt is phenomenal when compared with that obtained in other countries. It varies from year to year, of course, but an average of about 400 lbs. per acre is usual, the Ashmouni yielding much more than this and the Sakel rather less. This compares very favourably indeed with the average American figure of 180 lbs., and with the Indian figure of 80 lbs. Over 1½ million acres are now planted with cotton every year. There are several spinning and weaving mills in Lower Egypt, notably in the delta at Mehala el Kobra.

The other crops are mainly cereals. Wheat occupies about 1,500,000 acres, maize 1,600,000 acres, barley 300,000 acres, millet 250,000 acres and rice 450,000 acres. Onions occupy only 35,000 acres, but are second in value to cotton, and an important export crop. Pulses and sugar-cane also figure in the list of crops. In the oases these food crops are grown, but dates are the most important commercial crop.

3. *Livestock*.—Animals are reared as part of the regular farming system. There are about 1½ million cattle (oxen and buffaloes), over a million sheep and thousands of goats, donkeys and camels ; artificial fodder in the form of bersim (clover) is provided in the normal crop rotation. Poultry, fed on millet, are assuming more importance, and eggs are now exported in quantity.

Communications and Towns.—The communications of Egypt follow the River Nile so closely that little explanation of them is needed. There are about 15,000 sailing vessels on the Nile, and shallow-draught steamers ply on the river as far as Aswan, where connection is made with the Sudan Government services southward. The Egyptian State Railways operate about 2,000 miles of standard-gauge line, comprising the trunk lines from Alexandria, Port Said, Ismailia and Suez to Cairo, and from Cairo to Shellal, the terminus of the Sudan steamers, together with a network of branch lines in the delta ; and a narrow-gauge line to the Kharga oasis. In addition, the Egyptian Delta Light Railways work some 600 miles of narrow-gauge (2 feet 6 inches) lines, serving the agricultural districts of the delta ; and two other light railway

systems in Lower Egypt add a further 200 miles. Thus with nearly 3,000 miles of railway for 13,000 square miles of settled land, Egypt is very well supplied.

Cairo is the most obvious trading and administrative centre. Situated on the right bank of the Nile at the head of the delta, at the meeting point of the narrow valley of Upper Egypt and the broad flats of the delta, it has been a natural converging point for caravan routes from west to east for many centuries, and although this function has declined, the importance of the city has been increased by its command of rail, river and air routes. It is an air-port of major importance, the diverging point of the British air routes to India and South Africa, with which it is connected by bi-weekly services. Airways are also in operation to Alexandria, Port Said, Palestine and Baghdad, and to Aswan ; and a Dutch air line offers connections with Holland and the Dutch East

United Kingdom		Japan	Germ	Italy	FR	Belg	U.S.A	Others				
TEXTILES		FOOD, DRINK AND TOBACCO		MINERAL PRODUCTS		METAL GOODS		MACHINERY	CHEMICALS	MISCELLANEOUS		
												
C O T T O N										ONIONS	RICE	OTHERS
United Kingdom		France		J	Germ.	Italy	Japan	India	Spain	U.S.A	Others	

Indies. Cairo has a million inhabitants, and remains one of the most important cities in the whole of Africa.

Alexandria, named after Alexander the Great, who established a base here, has acquired a certain amount of the commercial activity which Cairo, concentrating on its administrative function, has lost. Situated on the western side of the delta because the currents sweep the silt eastwards, and on a long, low strip of land which was formerly an island, it possesses an artificial harbour. It is connected by rail and canal with Cairo, and has grown to be the principal port of Egypt, and one of the largest in the whole Mediterranean. It controls nearly 80 per cent, of the import trade and over 90 per cent, of the export trade, most of the remainder of the trade passing either through Port Said or Suez, or overland to or from the Sudan.

No other towns in Egypt approach these two in size or importance. *Port Said*, at the entrance to the Suez Canal, is a coaling

station and entrepot. *Ismailia* and *Suez* are small ports on the canal connected by railway with the delta and Cairo. *Aswan*, in Upper Egypt, is important as one of the major irrigation controlling centres. *Luxor* is chiefly a tourist centre, whence winter visitors can reach some of the most famous of the ancient ruins.

Trade.—The trade of Egypt is summarised in Fig. 100.

The Suez Canal lies in Egyptian territory. It cuts through a flat strip of desert, the isthmus between Egypt and Sinai (Fig. 101).

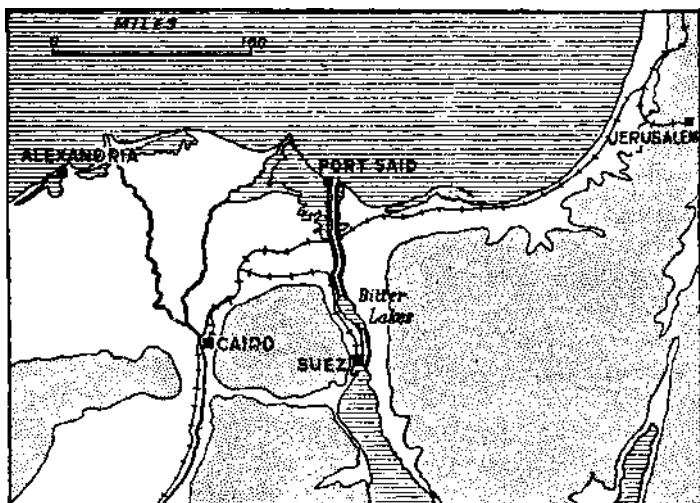


FIG. 101.—The Suez Canal.

Notice that there is no high land near and so there are no locks on the canal. The highest land passed through is only 50 feet above sea-level. Land over 500 feet shaded.

The canal is roughly 100 miles long, but part of that distance is through the Bitter Lakes. At the northern end is Port Said, on the Mediterranean; at the southern end is Suez, on the Gulf of Suez. The canal was built by the French engineer De Lesseps, and finished in 1869. It has since been enlarged but still limits the size of vessels trading between Europe and the East. There are no locks, and the canal is open to the sea at both ends. The Suez Canal is owned by the Suez Canal Company, in which the British Government has some shares, other shares being held by the French. Nearly 5,000 steamers, with a net tonnage of nearly 30 millions, pass through the canal in a year; more than half of them are British.

SECTION IX

THE SAHARA

The great desert of Sahara, although considerably larger than many of the regions to which sections have been devoted in this book, is the least important part of the continent, presenting very few opportunities for human settlement, and still fewer for economic exploitation. It is a vast "negative" region, forming a great barrier between two entirely different types of environment—the Mediterranean Atlas lands, with their winter rainfall, characteristic vegetation and agriculture and mainly Hamitic and Arab peoples, and the tropical West African coast and hinterland, with its summer rainfall, tropical and equatorial crops, and Negro peoples.

Although exhibiting a considerable degree of uniformity as regards aridity and vegetative cover (or lack of it) the environment of the Sahara is characterised by considerable diversity of relief and surface, and the nature of the surface and the availability of water are the controls of settlement (permanent or seasonal) and routes.

Physical Features.—The northern limb of the crystalline plateau of Africa extends north-westwards from the highlands of Darfur, through the Tibesti Mountains to the broad highland massif known, from north to south, as the Tasili, the Ahaggar and the Air Plateaus. The summits of these highlands reach 7,000 feet, but their general level is much less. The average elevation of the Saharan region as a whole is less than 1,500 feet, and the highlands separate several areas of comparative depression. Thus the basins of Tuat and Bodele on the south, and that of the shotts of eastern Algeria and central Tunis on the north, are less than 600 feet above sea-level, the Shott el Melghir actually lying below sea-level. There are wide stretches of lowland in the west, in Mauritania, and in the north-east in Cyrenaica.

In detail the topography is the result of a combination of three forces : (a) torrential water erosion, produced by the rapid run-off after occasional heavy storms (probably more active in the past than now); (b) the breaking-up of the rocks by the sharp alternations of heat and cold characteristic of hot desert regions; (c) the re-deposition of the eroded material by wind action. Three types of scenery and surface result: (1) the "erg" desert, consisting of shifting sand-dunes, found over a wide zone extending from

Mauritania via Tuat to southern Tunis, and then southwards, east of the Ahaggar highland, and in parts of the Libyan Desert; (2) the "reg" desert, largely an accumulation of stones and boulders, typically developed over the area of the Tanesruft; (3) the "hamada" or rocky desert of bare sandstone, which occupies much of the central highland zone. Although there is little or no permanent drainage in the Sahara, there are many evidences of former water erosion, and after occasional storms innumerable wadis rush in torrents down the sides of the highlands and are swallowed up in the thirsty desert. The Tibesti Mountains are seamed on their southern flanks with gorges, and the water which disappears underground is found near the surface in the Bodele depression. The flanks of the Ahaggar and Tasili Plateaus are likewise deeply furrowed and watercourses run southwards into the Tuareg country, westwards into the Tuat oasis, and northwards towards the shotts. West of longitude 0°, where there is little relief, there is little rainfall or drainage. Similar conditions prevail in the Libyan Desert on the east. Many strong wadis flow southwards into the desert from the Saharan Atlas Mountains.

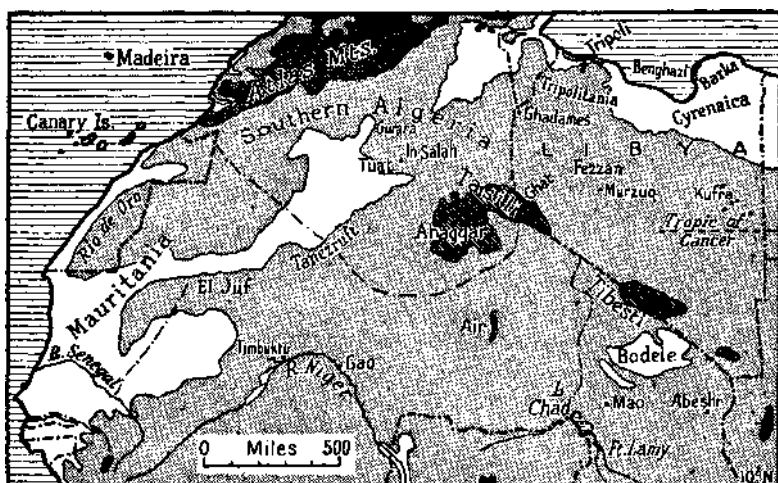
Climate.—Aridity prevails. Such rain as does fall comes in irregular storms, often of considerable violence, and usually in the summer, though on the highlands occasional falls may occur at any time, and snow covers the highest parts of Ahaggar for a short period. The prevailing wind is the "Harmattan" or north-east Trade, a very dry and often dust-laden wind (dust-storms are known as "simoons"). Clouds are rare, and the daily range of temperature is thus high—between 30° and 40°. Scorching days and cool nights are characteristic.

Vegetation.—The vegetation, such as it is, depends on the nature of the land-surface and upon the presence of surface or subsoil water. Parts of the erg deserts of the north and of the Libyan Desert are naturally almost devoid of vegetation, and large areas of the stony reg have but a few half-dead plants, as in the Tanesruft and El Juf areas. Over most of the Sahara the bulbous plants and spiny bushes, sparsely scattered, remain dormant for long periods between the infrequent rain-storms. On the southern and northern edges the shrubs become larger and less parched, and grass grows after rain. The southern limit of desert conditions is about latitude 18° N. South of this the summer rainfall becomes appreciable, and the vegetative cover increases. On the highlands the rainfall supports sufficient pasture to carry herds of camels, sheep and goats. The oases have a tree vegetation of date-palms, olives and other Mediterranean fruit trees, and can be cultivated to yield temperate and sub-tropical cereals.

Population.—Ethnically, the Sahara is of south-west Asia and Mediterranean Europe rather than of Africa. Its peoples belong

either to the northern Hamitic group or to the Semitic Arab stock. The Arabs can be divided into three occupational types : (1) the camel-nomads of the desert regions, *e.g.* the Kababish ; (2) the semi-nomadic cattle raisers of the Northern Sudan, *e.g.* the Bequqara of Kordofan and Darfur ; (3) the settled cultivators of the oases. Of the Hamitic groups, the most noteworthy are the Tuareg, a confederation of tribes forming the bulk of the Saharan population between Tuat and Fezzan on the north and Timbuktu and the Fulani country of Niger Colony on the south. They are essentially nomadic camel-men.

Development.—Most of the Sahara is incapable of any development other than that which has characterised it for many centuries



0-600 Feet.

600-3000 Feet.

Over 3000 Feet

FIG. 102.—The Sahara.

past. Agriculture is obviously impossible except in the vicinity of oases, mineral wealth, apart from salt, is negligible, and communications are slow, unreliable and very restricted as to routes by water supplies and the availability of grazing. Many of the peoples have only within recent years been brought under the subjection of France and Italy, and the effective control of semi-nomadic tribes in such a vast area is a matter of no little difficulty. The suppression of the slave trade and the development of railways in the Mediterranean and West African regions have undermined the trans-Saharan caravan traffic, and no local traffic can ever develop which would warrant railway construction. The ambitious French plan for a trans-Saharan railway from Colomb Bechar to the Niger has been abandoned. It is desirable, however, that the valuable

French territories of the Mediterranean and West Africa should be linked by some reliable form of transport, and interest centres at the moment on the motor-car and the aeroplane. French and Belgian air routes exist (see Frontispiece), and a fortnightly motor transport runs for six months of the year (October to March—*i.e.* not during the summer, when sudden storms may obliterate the route) between Colomb Bechar, Gao, on the Niger, and Niamey, across 650 miles of absolute desert. A new motor route is being prepared from eastern Algeria to Kano.

Political Divisions. Mauritania.—This territory is administered as part of French West Africa ; it has ranked as a colony since 1921. A sparsely-peopled region, with about 400,000 natives and a few hundred French, and a density of under one person per square mile, it consists of desert in the north and east, with an area of dry savana in the south near the River Senegal. A narrow belt, the Chemana, along the Senegal, can be cultivated after the summer flooding of the river, and millet and maize are grown. Camels, dates and gum are the characteristic products of the interior, and there is a large sheep and cattle population. Along the coastal lagoons salt is collected, and used in the preparation of fish for export. Quite a large fishing industry is centred on *Port Etienne*.

Southern Algeria falls into three natural divisions, the sandy deserts and oases of the north (Tuat, Gurara, etc.), the rocky deserts and wadis of the Ahaggar massif, and the stony desert of the Tanezruft in the south-west. It has an area of 767,000 square miles, and a population of only 643,000, about 8,900 of whom are Europeans. *In Salah*, in the Tuat oasis, and *Adrar*, in Gurara, are the most important centres. Away from the oases, the population is densest in the Ahaggar massif, where the Tuareg peoples have animal pastures.

Rio de Oro.—The title of this territory is a misnomer. Far from possessing any rivers of gold, it is mostly desert, and is very scantily peopled. It has an area of just over 100,000 square miles and is administered by Spain from the Canary Islands.

Libia Italiana.—Italian Libya, largely within the Sahara Desert, but having a coastal strip where a rather arid variety of Mediterranean climate is found, provides a link between the great deserts and north-west Africa. The Turkish province of Tripoli was annexed by Italy in 1911-12 ; the war interrupted development, and it is only since 1928 that a great drive has been made by Italy to pacify and colonise the territory and make its cultivable parts productive. Libya is now divided into four provinces and a southern military zone, but the two former provinces of Tripolitania and Cyrenaica may best be retained for descriptive purposes. The whole territory has an area of about 530,000 square miles and a population

(1931), of 704,000, of whom 44,000 are Italians, and the remainder Arabs, Berbers, mixtures of these two races, and Jews.

Tripolitania may be divided into three zones. (1) The greater part of the area is *desert*, relieved only by occasional oases. The principal oases are those of the Fezzan district, in the south (e.g. Murzuq), and of Ghat and Ghadamas, on the western border. (2) A *semi-desert* zone lies north of the desert and along much of the coast. Alfa grass is the principal product. (3) The area of "*Mediterranean*" vegetation and products is very limited in area, occupying only about 17,000 square miles. Tripoli has a rainfall of only 16 inches, and the amount decreases very rapidly inland. The coastal oases yield dates, olives and oranges. The irrigable "steppe" areas, now being colonised by Italian farmers, grow wheat, barley and tobacco, whilst the "jebel" or upland areas have a cover of dry Mediterranean brush, with the olive, fig and vine as characteristic plants. The coastal dunes are being afforested with wattle, cypress, pine and other trees.

The principal products of the territory, apart from cereal food crops, are tobacco, salt, olives, and the output of the coastal sponge and tunny fisheries. Native industries include the making of matting, carpets and leather articles. There are nearly a million sheep and half a million goats.

. There is still some caravan traffic between Tripoli and the central Sudan. Several short railway lines, totalling 144 miles, have been built outwards from *Tripoli*, the principal port (92,000 inhabitants); along the coast westwards to Zuara and eastwards to Tagiura, and inland to Azizia and El Abiat. There is an excellent road system, and aeroplane services have been established from Tripoli to Rome and Benghazi.

Cyrenaica.—This territory consists of Cyrenaica proper, or the peninsula of Barka, and the southern zone of Kufra. The Barka Peninsula has an upland limestone core, with a moderate rainfall which gives rise to abundant pasture and waters the numerous oases at the foot of the hills, especially on the western coast. Benghazi has about 10 inches of rain a year. The Italian population is mostly concentrated in the agricultural zones of these oases, notably at Guarscia, El Abiar, Barce and Soluk. Barley is the chief food crop, and many fruits are grown. There are numerous salt-pans along the coast, and as before the sponge and tunny-fishing industry is important. The principal town and port is *Benghazi*, with 34,000 inhabitants. It has short railway lines to Barce and Soluk, along the coastal oasis zone, and airways to Rome and East Africa.

The trade of these Italian territories is as yet very one-sided, imports, chiefly of cotton goods, sugar, flour and other food products and metal goods, greatly outweighing exports in value. The principal export items are sponges and fish, tobacco, hides and skins, and wool.

SECTION X

NORTH-WEST AFRICA—THE ATLAS LANDS

The Atlas lands of north-western Africa are structurally distinct from the rest of the continent. They belong to a different epoch of the earth's history. Most of Africa consists of Archean, crystalline rocks and relatively undisturbed early Palaeozoic sediments. The Atlas Mountains form part of the great European Alpine uplift, of Tertiary date, and they are built, like the Alps themselves, of folded sedimentary rocks of Mesozoic and Tertiary ages, sometimes cored with crystalline rocks thrust up in the folding.

Latitude and altitude result in a moderate rainfall, and the Atlas lands thus form an area favourable to agriculture and human settlement, set like a large island—called by the Arabs "Jesirat-el-Maghreb," the Island in the West—on the edge of a great sea of desert. This favourable area is characterised, however, by considerable diversity of topography and agricultural possibilities, due largely to the parallelism of the main mountain ranges with the coast-line, and a number of strongly marked natural regions may be distinguished. The unity which the area possesses to-day is due to the unity of political control over all but a small portion of the territory—though the attainment of this unity by the French is of quite recent date. It must be remembered that a very large area is involved; Morocco is as large as France itself, and Algeria and Tunis together are as large as the British Isles.

Country	Area in sq. miles	Population		
		Natives	Europeans	
French Morocco	200,000	6,036,000	206,500	(1936)
Algeria	80,000	5,614,000	978,300	(1936)
Tunisia	48,264	2,215,000	194,000	(1931)
Spanish Morocco	4,400	751,000	44,000	(1934)
Tangier Zone .	225	43,500	16,500	(1934)

Physical Features.—The Atlas ranges in Morocco present quite a different aspect from those of Algeria and Tunis (Fig. 103). In Morocco the central and highest range is the Great or High Atlas, with a crystalline core, reaching, in the Jebel Likumt, over 14,000

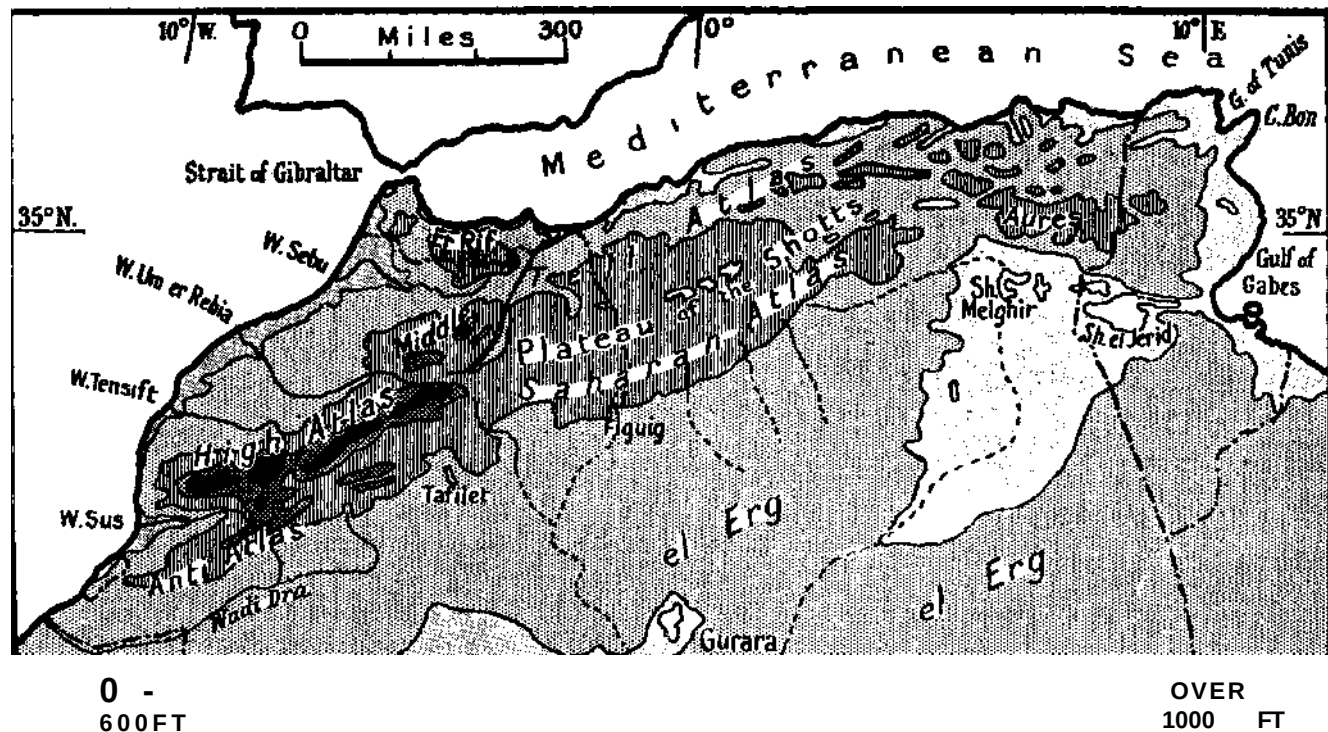


FIG. 103.—The Atlas lands: Relief.

feet. South of the High Atlas, and separated therefrom by the triangular depression of Sous, is the Anti-Atlas range, lower and of less extent. On the north side the Middle Atlas branch off from the High Atlas, and the Moulouya depression corresponds in relative position to that of Sous. The Great and Middle Atlas ranges are separated from the coast by a broad expanse of level plateau, roughly 1,000 feet in elevation. Across this plateau run a number of fairly large streams—the only long permanent watercourses in the whole of the Atlas lands. Fed by the mountain snows, these rivers (all called "wadis") occupy broad basins of considerable agricultural value. From north to south they are the Sebu, the Bou Eegreg, the Um er Rebia, and the Tensift.

The arc of the Rif Mountains forms the link with Europe. This range must obviously once have been continuous with the Sierra Nevada of Spain, before the formation of the Straits of Gibraltar.

In Algeria there is no high central range. The High Atlas fades out, and a double mountain formation, enclosing a high plateau, ensues. On the north side the Tell Atlas continues the line of the Rif, and on the south the Saharan Atlas may be considered as a continuation of the Anti Atlas ranges. The Plateau of the Shotts, so called from the large number of semi-permanent lakes or "shotts" which stud its surface, lies in between the two ranges. The Tell Atlas ranges drop fairly steeply northwards to the coast. This northward slope is known as the Tell. Often, however, a distinct coast range is developed, as near Oran, and along the central Algerian coast between the Wadi Chelif and the sea and in the hills of Kabylia. The Saharan Atlas present a steep, gorge-seamed face southwards to the desert, in Tunisia the two ranges approach at their seaward end, terminating in Cape Blanc (Tell Atlas) and Cape Bon (Saharan Atlas), separated only by the 60-miles width of the Gulf of Tunis.

The shore of the Gulf of Gabes, and southern Tunis, form a continuation of the Libyan coastal plain and plateau.

Whilst the comparatively simple arrangement of the physical features is responsible for the major natural divisions usually distinguished, the large area involved allows of considerable detailed variation, due mainly to elevation and aspect.

Mineral Wealth.—Even if the Atlas lands were not rich agriculturally, their content of minerals would have been sufficient reason for their great development during the last few decades. Metalliferous ores and phosphates are here in abundance in the sedimentary rocks—mainly limestones—which make up the bulk of the land surface. On the whole the degree of development decreases westwards and southwards—westwards into Morocco, which is a much "younger" territory, politically, than either Tunis

or Algeria, and southwards as distance from the coast increases. The exploitation of the reserves is yet in its infancy. Increased transport facilities will open up new stores of wealth.

It is very unfortunate that, with so much mineral wealth, coal should be almost completely lacking. Small quantities exist in Algeria, near TUMS and in the Eif, and a little lignite is found in north-eastern Tunis, but none of these deposits is likely to be of material advantage in developing metallurgical or chemical industries.

Phosphatic chalk, containing 50 to 80 per cent, of phosphate, used for the manufacture of chemical manures, occurs in great quantities in southern Tunis and in western Morocco. It is almost all exported for manufacture abroad.

Of the metals, *iron* easily occupies first place. Rich carbonate and haematite ores, with 50 to 60 per cent. iron content, are found associated with Mesozoic limestones in a long band roughly parallel to the northern coast, extending from Morocco, through the Rif and Algeria to Tunis.

Lead and *zinc*, usually in close association, are found in eastern Algeria and Tunis. Small quantities of cobalt, antimony, manganese and copper have also been produced.

Climate.—The whole of the Atlas lands, lying between latitudes 30° and 37° may, in a general way, be said to experience a "Mediterranean" type of climate. Everywhere the seasonal alternation of cyclones and trade winds is felt, and over most of the area except the High Atlas about 80 per cent, of the precipitation falls during cyclonic storms in the winter half-year. Relief, aspect and distance from the Atlantic and the Mediterranean, however, combine to produce a great variety of types from wet and cool to hot and very dry. True "Mediterranean" figures of about 25 inches of rain with a temperature range of from 50° to 75° are found over only a limited area of northern Algeria (*e.g.* Algiers 53° to 77°, and 30 inches). The Moroccan coast is affected by the cool Canaries current, which causes a low summer temperature and much fog, but only a moderate rainfall (*e.g.* Mogador, 57° to 68°, and 13 inches). The Moroccan Plateau, between the coast and the High Atlas, is a marked dry belt (Marrakesh has only 9 inches), but the slopes of the mountains probably receive as much as 60 inches of precipitation in the form of rain and snow, occurring in summer as well as in winter (Fig. 104).

North-western Algeria lies in what may be called the "rain-shadow" of the Rif. Precipitation is definitely less here than farther east, where the coastal ranges and the more northerly position combine to attract more rain from the depressions which pass along the Mediterranean. Perhaps 60 inches of rain and snow fall on the Djurjura and Kroumirie highlands.

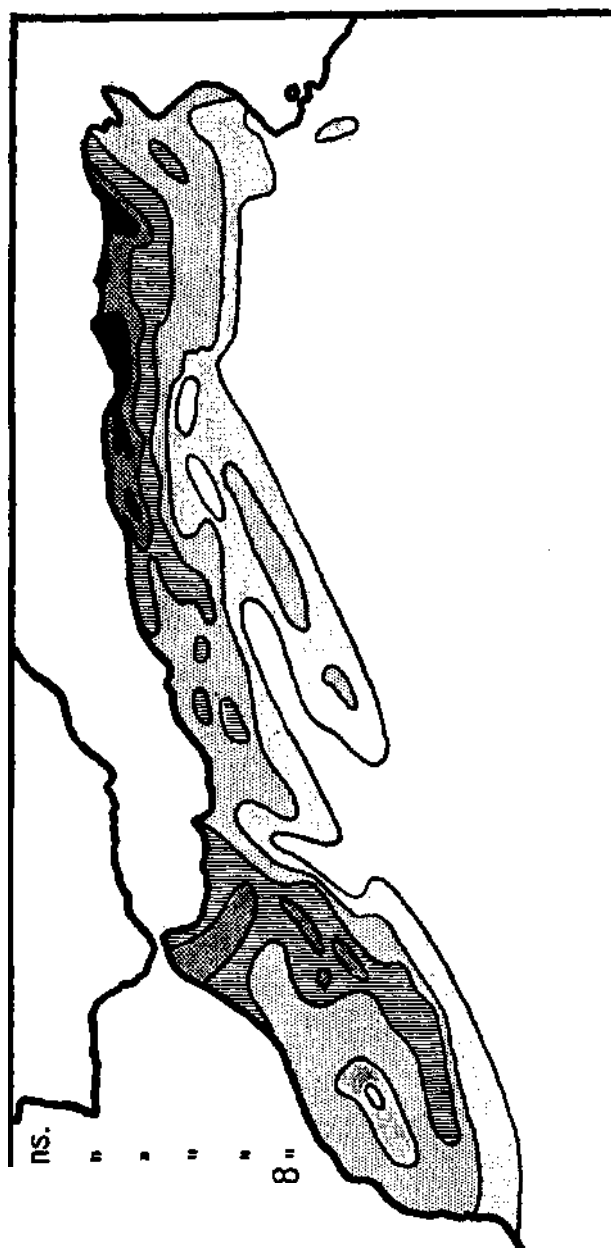


FIG. 104.—The Atlas lands: Rainfall.

South of the High Atlas and the Tell Atlas precipitation **decreases rapidly**.

The **plateau** of the Shotts has only 10 to 15 inches of rain, and its altitude of 2,000 to 3,000 feet makes for great extremes of temperature and severe aridity during the hot summer months.

The Saharan Atlas makes the final climatic divide; slightly more rain falls on its northern flanks than on the plateau, but south of the crest-line the rain is cut off abruptly, and desert at once ensues.

Natural Vegetation and Agriculture.—As in the case of the climate, a considerable variation of natural vegetation and agricultural possibilities is found, depending upon relief and rainfall. Whilst "Mediterranean" characteristics of resistance to drought are almost universally present, the luxuriance of the vegetative cover varies from oak and conifer forests to semi-desert scrubland. Five major types of natural vegetation may be recognised :

1. Most characteristically "Mediterranean" is the bush or "maquis," found in the Tell and on the lower slopes farther inland. This consists of evergreen bushes (stunted myrtle and oak) and abundant small heath-plants such as *Erica* or "Mediterranean heath," together with bulbous and other flowering plants. Occasionally quite dense thickets occur.

2. With wetter conditions, as on the slopes of the High and Middle Atlas, the Rif and on some of the higher areas behind the eastern Algerian coast (in Kabylia and Constantine), a fairly dense forest of oaks (cork and holm oak) and conifers (pine, cedar and jiiiper) is found, together with stretches of good grassland at higher altitudes. Much of the former forest cover has been destroyed, and soil erosion has prevented its recovery. Only 5 per cent, of Algeria, 3 per cent, of Morocco, and 9 per cent. of Tunis are forest-covered, but the French are carrying out afforestation work.

3. With drier conditions, as on the plateau of western Morocco, in the dry zone of western Algeria, and on the drier slopes of the Tell Atlas, a dry and impoverished maquis, consisting mainly of grasses and small palms, occurs.

4. A further decrease in rainfall results in the existence of steppe or scrubland, with alfa and other tufty grasses and dry stunted bushes. Such scrub occurs in the heart of the Moroccan **dry belt**, on the plateau of the Shotts, and in south-eastern Tunis.

5. South of the Anti Atlas and Saharan Atlas, semi-desert merges into absolute desert, with numerous oases at the foot of the mountain ranges and large areas of completely barren "erg" farther out (as between Figuig and Gurara and south of Touggourt). The more important of the mountain-foot oases are Tafilet, Figuig, Laghouat and Biskra; farther out in the desert are Igli, Mزاب, Touggourt and Souf.

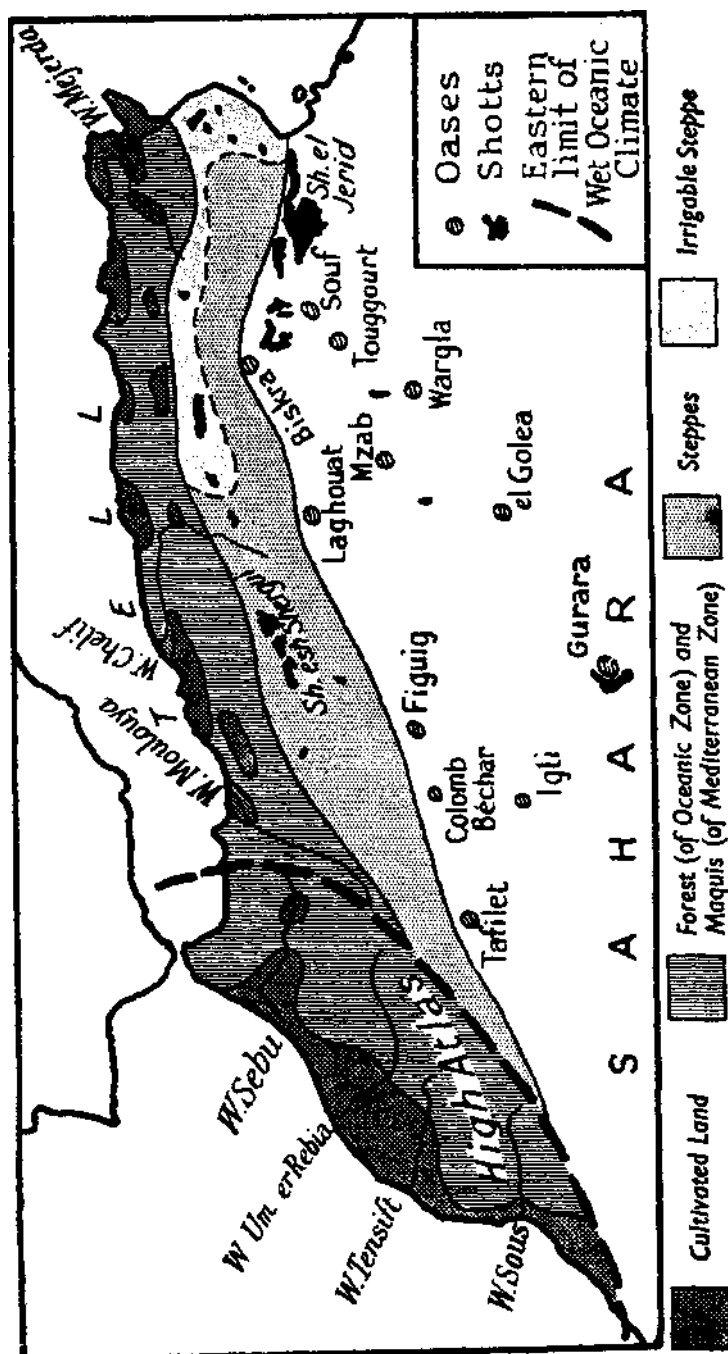


FIG. 105.—The Atlas lands: Land-use regions (after Gallouédec and Maurette).

The areas favourable to agricultural activity are naturally confined to the western and northern margins of the region. Even here, especially on the north coast, agriculture is not continuous; the arable areas along the actual coast are separated by patches of highland, whilst a few isolated patches occur behind the coastal ranges in sheltered and well-watered valleys (Fig. 105). The products are typical of Mediterranean countries : barley and wheat are the principal cereal crops, whilst amongst the great variety of fruits the olive and vine are now most important, thanks mainly to French cultivation. From the oases come dates.

Sheep and goats, more easily adaptable to semi-arid pastures than cattle, are the most numerous amongst the animal population.

Irrigation is, of course, frequently necessary in an area with such a markedly seasonal rainfall and a summer drought. The Romans were probably the first to construct irrigation works in North Africa, and the French have greatly extended the cultivable areas by their enterprise in the control of water supplies.

Population and Development.—The true native population of the Atlas lands belongs to that section of the northern Hamitic group known as the Berbers, and this region of Africa is still sometimes referred to as "the Barbary states." The Berbers are completely unlike the rest of the African peoples in being almost European in their whiteness. They resemble Italians and southern Spaniards rather than any African race. It is clear that they must be derived from one or more of the major European races. In habit they are both agricultural and pastoral, and a seasonal migration or "transhumance" sometimes amounting to semi-nomadism, is often found. Over the greater part of the region the original Berber stock has suffered much admixture from the various invasions to which the territory has been subjected, but several pure groups remain in the highland recesses of Morocco (High Atlas and Rif), in Kabylia and in the Aures massif. Arab penetration has been a feature of the region since the Middle Ages. A large proportion of the population is a mixture of Arab and Berber stocks (usually known as "Moors"), and the Arab population has come to occupy the greater part of the more arid section of the territory, notably in Algeria, leaving the wetter highlands to the Berbers. In addition to these two races there are the wandering Bedouins of the desert.

"Maghreb" has been perpetually held by a foreign power. One empire after another has conquered it and left its mark—Carthage, Rome, the Vandals, the Byzantines, the Arabs, the Turks—and now the French have made themselves supreme in this gigantic oasis on the edge of the desert. The domination of the Atlas lands has never been an easy matter, however, and only within quite recent years have the wilder tribes of Morocco and the

Rif been pacified. French influence began to be felt in 1830. The territory now known as Algeria was proclaimed a French colony in 1834, but 17 years of warfare was necessary before it could be really considered as under effective French control, and several decades elapsed before any economic progress was recorded. The year 1860, however, saw the commencement of the trunk line of railway from Algiers to Oran, and from that date, despite early difficulties, the exploitation of agricultural and mineral wealth has never ceased to expand. The extension of French influence over the borders was natural. In 1881 the Sultan of Tunis transferred his allegiance from Turkey to France ; in 1912, after a long period of warfare, the Sultan of Morocco accepted French protection.

Unlike their predecessors in north-west Africa, the French, although firm in subduing insurrections of the wilder tribes, have not warred down the native peoples into complete subjection and trampled violently upon their institutions and customs. They have thus smoothed the way for economic development, encouraging native enterprise as well as French colonisation.

The three territories of Morocco, Algeria and Tunis, although all under French control, possess a considerable degree of individuality, and differ considerably in their development and fundamental problems. Algeria, the "oldest" of the three, is a French colony—"France in Africa," it is sometimes called—and has been developed largely with a view to increasing France's material wealth and food supply. Tunis, with a longer history of native development, still has a population problem in the large numbers of Italian colonists. The development of Morocco is largely post-war, and is in many respects phenomenal, only rivalled for rapidity by that of the Katanga. Its ultimate destiny in world commerce has yet to be worked out.

MOROCCO

Morocco, the most recently developed part of the Atlas lands, is divided politically into three very unequal areas, which were delimited at the end of the Franco-Moroccan wars in 1912. The French zone, roughly 200,000 square miles in extent, is a protectorate under the nominal rule of a Sultan ; the Spanish zone, sometimes known as the Rif, has an area of about 8,000 square miles ; and a small zone, roughly 225 square miles in area, around the port of Tangier, has been internationalised. The French zone has progressed by leaps and bounds whilst the Spanish zone, only pacified a few years ago, remains almost undeveloped, and the Tangier zone has tended rather to stagnate owing to the growth of the French Moroccan ports.

The **Tangier Zone**.—This small area has a population of about 60,000, mainly native Mohammedans, with some Jews and

Europeans. The area is obviously too small to support any considerable trade of its own, but the port of Tangier has a large entrepot trade, which, however, seems to be suffering somewhat from the competition of Casablanca. The productive district of Fez now has railways to both ports, and Casablanca is nearer and cheaper. Tangier's trade consists of the export of locally-caught fish, together with leather goods, hides and skins and eggs from the French and Spanish zones—these items go mainly to the United Kingdom, France, Spain and Italy; and a much greater import trade, in flour and other foodstuffs, tobacco, oil and manufactured goods, nearly half of which come from France and are destined for the French zone. The value of the trade in 1935 was: Imports £600,000, Exports £180,000. About 2,000 steamers call at the port every year, and one source of income which may help to counter-act the declining trade is the tourist traffic. Mediterranean cruises are carrying greater numbers of people every year to Tangier. It may be noted that daily aeroplane services connect Tangier with Gibraltar and France.

The Spanish Zone.—The population of this area is about three-quarters of a million, of which some 50,000 are Europeans and Jews. The final pacification of the wild Rif tribesmen is very recent history (1927) and the area, naturally rather poor in resources, has undergone little economic development. Many of the tribes are still living in primitive conditions, practising crude agricultural methods, and except for a little mineral extraction near Melilla, industries are practically non-existent. There are very few Spanish colonists, and people are even leaving the area for the neighbouring French regions of Morocco and Algeria, where prospects are brighter.

Much of the area is mountainous (Er Rif and Djebala). There is a western coastal zone, the hinterland of *Larache*, where millet and other cereals are grown, and small patches of cereal and fruit (including vine) cultivation on the north coast; but cereals, vegetables and fruit are imported from France and Spain. The highland zones are mainly pastoral, yielding wool, hides and skins, mainly from sheep and goats; some valuable cork-oak forests exist, but are little exploited.

The only exploited mineral wealth at present is iron ore, but the industry is not flourishing. Several mines exist behind Melilla; one of them works lead as well. Other metals exist, but are at present inaccessible owing to lack of transport facilities.

The principal ports of the territory are *Ceuta*, recently much improved to accommodate large liners, and *Melilla*, the mineral port. Both these towns are actually administered as part of Spain. *Larache* and *Rio Martin* (the port for *Tetuan*, the administrative centre and principal inland town) are small unimproved ports of little consequence.

Short railways run inland from Ceuta and Kio Martin to Tetuan; from Larache to join the Tangier-Fez line, and from Melilla to the iron mines. The construction of good motor roads in the Ceuta-Tetuan area has resulted in greatly decreased railway traffic.

Almost all the exports except ores (which only represent a small percentage of the total value) go to Spain. Hides and skins, wool, cork, fish and other animal products are the principal items. Imports, mainly from Spain and France, are textiles and food-stuffs for the most part.

FRENCH MOROCCO

The French protectorate of Morocco covers an area of 200,000 square miles. Its long land boundary from Rio de Oro to Algeria is indefinite. Of this area about 90,000 square miles may be considered as "occupied" by the French. The population numbers over 6 millions, mostly native Berbers, Moors and Arabs, but including 160,000 native Jews and about 240,000 foreigners from France, Algeria and other countries. The Europeans are mostly in the towns—35 per cent, of them in Casablanca alone—showing that comparatively little agricultural colonisation has yet been attempted.

Physical Features.—The major elements of the relief have already been outlined. A number of parallel zones, oriented from S.W. to N.E. may be distinguished.

1. *The Coastal Plain.*—The coast is rather inhospitable, owing to the huge Atlantic swell and the absence of river havens; the seasonal flow of the rivers causes much silt to be deposited at their mouths, and there is only one port of any size at the mouth of a river along the whole coast. The coastal plain averages perhaps 20 to 30 miles in width, and is widest in the north, in the Gharb region of the lower Sebu river. It rises inland to the 1,000-foot plateau which occupies so much of western Morocco.

2. *The Plateau,* 60 to 80 miles broad, is crossed by a number of deeply incised streams, the spring flooding consequent upon the melting of the Atlas snows, combined with the relative aridity, being responsible for the existence of the gorges. As regards water supply, the plateau divides itself naturally into three parallel zones—the western edge, comparatively well watered; the centre, semi-arid; and the well-watered and fertile eastern mountain-foot zone, the last-named best developed in the south, behind Marrakesh,

3. *The Atlas Ranges.*—The High Atlas consists of several parallel sierras, highest and widest south of Marrakesh, and forming a great barrier, physical, climatic and human, with very few crossing places despite the innumerable deep valleys which seam the steep sides. The head of the Moulouya trough divides the High Atlas from the lower Middle Atlas ranges. The Anti Atlas on the

IL—8

south forms a high desert plateau, with several volcanic peaks, **and** sides deeply scored by wadis.

4. *The Intramontane Troughs.*—Between the High and Anti Atlas lies the Sous depression, an arid zone where all life depends on the river. At the north-eastern end of the mountain zone is the Moulouya trough, which is but the more fertile western end of the Algerian Plateau of the Shotts.

5. *The Saharan Zone.*—The southern slopes of the mountains, steep at first and then very gradual, pass insensibly into the Sahara Desert. The Wadi Ziz feeds the Tafilet oasis, the Wadi Gir that of Igli, whilst the Wadi Dra runs parallel to the mountains towards the coast, which it seldom reaches.

Climate.—There are two main influences on the climates of Morocco—the sea and the mountains, and the dry belt falls between them. The coastal climate is equable and moist, though the sun may be very hot in the summer. The mountains are alternately frozen and scorched, and large daily and seasonal ranges of temperature are experienced. Daily averages rise to 100° under the blazing summer sun, even at altitudes of several thousand feet, and descend to 15° or 20° in winter, when much snow falls. The dry belt has all the extremes, but none of the moisture, of the mountain zone.

Rivers flow abundantly, especially during winter and spring, on the north-western side of the mountains; on the Saharan side, almost complete aridity prevails except for occasional summer thunderstorms, and the wadis are intermittent.

Vegetation and Agriculture. *Forests.*—Morocco has not a great deal of accessible forest, but what remains is being carefully conserved by the French. The most valuable timber supplies are on the edges of the Atlas Mountains, but extensive dry woodland areas with cork-oak exist on the coastal plain behind Rabat (the Mamora forest) and Mogador.

Crops.—Although irrigation by barrages is progressing, agriculture is still to a large extent dependent upon the winter rainfall and the annual spring flooding of the rivers, and yields, especially of cereals, thus fluctuate widely; locust plagues may also affect the crops. There are about 39,000 square miles of agricultural land in the area actually occupied by the French; of this area some 2,700 square miles are distributed in 2,800 farms amongst French colonists. Most of these farms are in the best parts of the coastal plain—in the Grharb, and in the Rabat and Chaouia districts. It is obvious that the bulk of agricultural output is of native production.

The colonists have hitherto been mainly cereal farmers; barley and wheat have been produced in such large quantities, however, that, the area under cultivation has had to be restricted, for the bulk of the output goes to France. More attention is now being

paid to vegetable and fruit cultivation, for Morocco can place early vegetables on the French market two or three weeks in advance of Algerian produce. Maize, oats and pulses are also cultivated. Much attention is being paid also to tree fruits of "Mediterranean" varieties, and vine and olive cultivation is extending, notably around Casablanca and Rabat. Cotton cultivation has met with little success, but mulberry plantations and silk-worm rearing are being encouraged.

Apart from the coastal plain and the lower courses of the streams already referred to, the most productive agricultural zones are to be found on the western edge of the plateau in the region of Meknes, in the nearby middle basin of the Sebu around Fez, and in the region of Marrakesh and the piedmont zone lying behind it. An outlying zone is the valley of the Moulouya, in the north-east. Here are rich and fertile cereal and fruit-growing areas, where irrigation is practised. Several large barrages have recently been completed, as on the Tensift near Marrakesh, and on a tributary of the Sebu near Meknes; others are contemplated on the Um er Rebja in its piedmont course, and on the Moulouya.

South of the mountains are the oases, where dates are the principal product.

Livestock.—Morocco has a very high density of sheep and goat population (*cf.* Fig. 16, on p. 30). There are nearly 8 million sheep, 3 million goats, and 2 million cattle; whilst mules, donkeys, horses and camels are also reared in large numbers. Pastoral occupations predominate in the dry belt, on the Shotts Plateau in the north-east, and, interspersed with patches of irrigated agriculture, in the plain of the Sous. Transhumance is a common practice amongst the native pastoral peoples.

Fisheries.—The coastal fishing industry is expanding, for the natives are adopting European methods. Sardines, anchovy and tunny are caught, and the canning of sardines is now a flourishing industry at a number of ports including Casablanca, Fedhala, Saffi and Mazagan. Eight million boxes of sardines were packed in 1930.

Minerals.—Metallic minerals are not abundant in Morocco. Cobalt, nickel, manganese and lead are produced in small quantities, mainly from the eastern end of the country (Djerada district). Manganese is being developed in the Sous area and at Bou Arfa. A little coal is mined near Oujda in the extreme north-east, and large resources are believed to exist.

The *phosphate* deposits are, however, of immense actual and potential value, and their exploitation has been responsible for considerable railway development. Phosphatic chalk is widespread, but the richest deposits are in the middle west, where Wed Zem, Kourigha, Ber Rechid and Ben Guerir are the most important centres. An electric railway connects the Kourigha deposits with

the port of Casablanca, where there is a factory for the manufacture of superphosphates. Although in recent years the world agricultural depression has caused a decline in the demand for artificial manures, Morocco undoubtedly has a great future as one of the principal suppliers of such material. Phosphates make up about one-third of the total value of the exports, the chief recipients being Italy, Spain, Denmark, Holland and France.

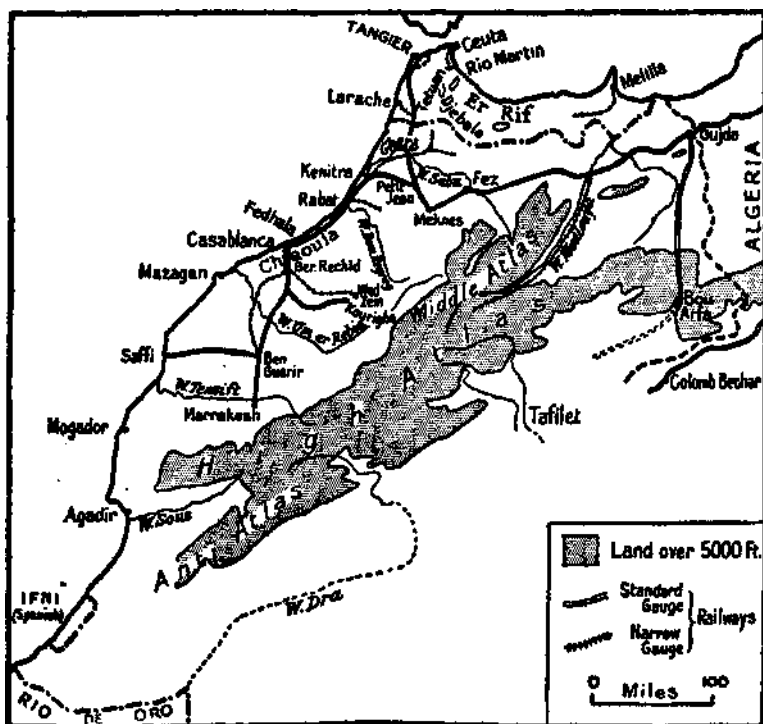


FIG. 106.—Morocco.

The only narrow-gauge line remaining in 1937 was the one in the Gharb region.

Communications and Towns.—The Moroccan railway system had its origin in the series of narrow-gauge lines which the French constructed for military purposes between 1911 and 1915, and subsequently extended with a view to economic development. Almost all these lines have now been replaced by standard-gauge lines or by motor roads, and nearly 1,000 miles of standard-gauge track now exists. Three main objects can be discerned in the development:

1. To provide an outlet for the phosphates. One line connects Wed Zem and Kourigha with Ber Recnid and Casablanca, and the new mines at Ben Guerir have been linked to Saffi. An extension

from Ben Guerir now serves the Marrakesh agricultural district. The Casablanca-Marrakesh Une has been electrified.

2. To link the productive Fez-Meknes area with the coastal plain and ports. A line connects Casablanca, Rabat and Kenitra (electrified over this section) and runs inland to Meknes and Fez. Another more recently completed line (1927), built in accordance with the treaties of 1912 under which Tangier was internationalised, runs from Tangier, through the Gharb to Petit Jean on the Meknes-Kenitra line.

3. To link Morocco and Algeria. The old narrow-gauge line from Fez to Oujda has been supplanted by a standard-gauge track, so that through communication is now possible from Marrakesh to Algiers and Tunis.

Two other railways of note are the new Une from Oujda to the mining district of Bou Arfa, and the still newer line (1936) from Oujda to the Algerian port of Nemours (an outlet for mineral traffic).

In addition to the railways, the French have made great strides in road construction, and there are now 2,700 miles of metalled roads in use, following roughly the same plan as the railways.

Regular daily air services connect Casablanca and Rabat with Tangier and France, and a weekly service flies from Casablanca to Dakar, the administrative centre of French West Africa.

Of the inland towns, chief is *Marrakesh*, which, with 190,000 inhabitants (only 7,000 Europeans) is the largest in the country. An ancient walled city, situated in the midst of a rich agricultural district, it still holds an important fair, and is the centre of many native industries such as carpet-making, oil-pressing, leather, silk and metal work. *Fez*, another walled city, has 144,000 people, and is a centre for native metal working and pottery industries ; its old function as a route centre and market has been emphasised by the railways. *Meknes*, not far distant from Fez, has 75,000 people.

Casablanca is the principal port. It has had a phenomenal growth in twenty years. In 1914 the tonnage entered at the port was 200,000 ; in 1935 it was over three millions and the amount of merchandise handled represented 80 per cent, of the total trade of Morocco. It has a population of 258,000, including 73,000 Europeans. Not naturally favoured by a good harbour, it has been furnished with several long artificial quays, and its function as phosphate port, fishing port, air port, and railway centre will ensure its continued progress. It is also the chief industrial centre in the country. It has a large electric power station which supplies several towns and the electrified railways ; a factory for the manufacture of superphosphates, and numerous grain silos and mills for the production of flour, semolina and macaroni; cement works, oil and soap factories and a sugar factory which may shortly be supplied with

locally-grown beet, as well as numerous other miscellaneous industries.

Rabat, with 84,000 people, is the French administrative centre and the seat of the Sultan. It has not attained great importance as a port, for it is situated at the mouth of the Bou Regreg ; and it is overshadowed by Casablanca and Kenitra.

Kenitra (Port Lyautey) is the second port of French Morocco, but it only handles 7 per cent, of the total trade. It has supplanted the silted harbour of Mehediya as the chief outlet for the Gharb district, but the large quantities of mud brought down by the Sebu necessitate constant dredging in order to maintain deep approaches, and vessels drawing more than 16 feet of water cannot enter.

Saffi, *Mazagan* and *Mogador* are small ports in the south-west; with the exception of *Saffi*, which is benefiting from the new

France and Algeria		Japan Belg.		U.S.A.	China	U.K.	Others
TEXTILES	SUGAR	OIL	VEHICLES	TEA	IRON AND STEEL	MISCELLANEOUS	

parts of the valleys of the Sig, Chelif and Isser. These coastal uplands are for the most part remnants of a great earth block (called Tyrrhenis) up against which the younger rocks were folded during the Alpine movements.

2. The *Tell Atlas* is a series of elongated "massifs" separated by comparative depressions through which routes can be carried to the plateau.

3. The *Plateau of the Shotts*, highest in the west, where the series of lakes known as the Shott esh Shergui occupy a 100-miles-long depression about 3,000 feet above sea-level, and lowest in the centre, where a great break in the Saharan Atlas leaves only a low watershed (1,500 feet) between the Shott el Hodna and the southward drainage to the Shott Melghir.

4. The *Saharan Aths*, higher on the whole than the Tell Atlas, and less broken, except for the one great gap just mentioned. The highest summit in the Aures massif is not far short of 8,000 feet above sea-level.

5. The *Piedmont Oasis Zone*, only a few small portions of which actually fall within the three provinces of Algeria proper. Biskra, on the southern side of the break in the Saharan Atlas, is the most important oasis included.

Climate.—It would be difficult to find another area of comparable size with such marked climatic zoning, consequent upon relief and distance from the coast. Whilst the whole area experiences summer drought, the chief distinguishing features are amount of rainfall and range of temperature. On the coast the annual fall is 20 to 30 inches, but more than twice this amount, including some snow, may fall on the highest parts of the coastal range such as the Djurdjura. Biskra, in the piedmont oasis zone, gets only 7 inches, and curiously enough the summer drought is here not quite so absolute, owing to thunderstorms. On the coast the range of temperature is about 20°, but beyond the coastal range, maritime influence ceases to be felt, and on the high plateau great extremes occur. Much of Algeria can be described as "a cold country where the sun is hot," elevation, absence of thick vegetation and of cloud conducing to this effect.

There are no permanent streams in Algeria.

Vegetation and Agriculture. *Forests.*—Many small areas of coniferous forest exist on the seaward slopes of the coastal ranges and Tell Atlas, but they are of little value except locally, and constructional timber has to be imported. Much cork-oak woodland is also found, notably in the north-west of Constantine Province, and some cork is exported, but it represents only a minute fraction of the total trade (less than 0·1 per cent.).

Crops.—Algeria is essentially an agricultural country, even though the actual area cultivated may be but a small proportion

of the whole. French occupation has widely extended the cultivable areas. The native population, employing primitive methods, was chiefly gathered in the upland areas of the Tell and Tell Atlas, where the rainfall permitted agriculture. The coastal plains, often salt-encrusted and swampy, and the sub-littoral depression, too dry for cultivation, were almost unoccupied. By draining and improving the coast plain, and by irrigating the valleys of the wadis, vast new areas have been rendered productive, and the distribution altered in a marked way. The soil is often rendered exceptionally fertile, as for example in the Sig valley, by the high phosphate content, for although the phosphate belt of Morocco and Tunis is not richly developed in Algeria, it is not entirely absent. The principal cultivated areas are indicated on Fig. 105. On the map the several broadenings of the coastal plain may be distinguished, around Oran, Algiers, Bougie and Bone, together with the Tlemcen region, the Sig and Chelif valleys, and the high plain of Setif in western Constantino.

Algeria is essentially a cereal-growing country, and as such has suffered rather severely during the last few years whilst the world's grain markets have been over-stocked. Between 7 and 8 million acres are annually sown with the temperate cereals, almost equally divided between wheat and barley with a small area under oats, and the resultant harvest, which fluctuates widely from year to year," may be from 1½ to 2.1 million tons of grain.

Five-cultivation is without doubt the most profitable agricultural occupation in Algeria, and the value of the wine export is anything from 5 to 10 times that of the next commodity, wheat. Most of the vines are French varieties grown by French methods. There are nearly a million acres of vineyards, and for economic reasons further planting has been prohibited. The quality and character of the wines are improving, and much of the produce is exported to France; so great did this trade become that growers in the south of France became agitated, demanding protection, which was given in the form of a restriction on the Algerian export. The Algerian production is now about one-third of that of France. Most of the vineyards are in the provinces of Algiers and Oran. The Tell in Constantine Province is wetter, and so less suitable (*cf.* Fig. 104).

Tobacco is increasing in importance, largely through the activities of marketing organisations. Unlike vine-growing, tobacco cultivation occupies a large area in Constantine, and is least, almost negligible, in Oran, where only snuff tobacco is grown. A flourishing manufacturing industry now exists, and cigars, cigarettes and pipe tobacco are produced for home use and for export.

Of the remaining agricultural resources there may be mentioned the produce of the one million olive trees, the increasing quantities of "market-grown" produce—early vegetables and fruit-grown

tot the French market, and the tree-fruits of the usual "Mediterranean" varieties. Cotton has not been very successful, and has almost been abandoned.

From the oases come dates'; and some alfa or esparto grass is cut on the high plateau, especially at the western end, in Oran.

Livestock.—Pastoral occupations are dominant over most of the country outside the Tell, especially on the plateau of the Shotts. Although large in numbers, however—there are some 6 million sheep, 3 million goats, and nearly a million oxen, as well as horses, mules and asses—the animals are mainly in native hands, and are of poor quality owing to the impoverished pastures and lack of adequate water, and little actual industrial activity results. Live sheep are exported, but live animals and meat are also imported. Only an increase in the irrigated areas and in the amount of fodder grown can improve the livestock industry in Algeria.

Minerals.—Although, judged by weight, the mineral produce of Algeria bulks very largely in the total exports, considered by value it occupies a very low position. Yet the mineral wealth is great, and much of it has now been rendered accessible by railway construction. Rich non-phosphoric ores of *iron*, suitable for high-class steel manufacture, are mined at intervals along the Tell, principally where rail transport to a large port is available. Thus Oran, Algiers, Bougie, Philippeville and Bone all export iron ore, most of which goes to Britain and Germany. An annual production of over 2 million tons has been attained, but there have been wide fluctuations in recent years. *Phosphates* to the extent of about 800,000 tons per annum are produced, chiefly in Constantine, at the western end of the Tunisian phosphate belt. Small quantities of iron pyrites, zinc ore, gypsum, salt and coal are also produced.

Communications and Towns.—Algeria possesses 3,000 miles of railway lines on various gauges. The Algerian State system comprises a large network in the east between the Tunisian frontier and Algiers, and another in the west centring on Oran and extending southwards into the desert. The P.L.M. Railway of France owns a system extending from Algiers to the frontier of Morocco. More than half the total mileage is of standard-gauge track.

The essence of the system is a main east-west line, mainly following the sub-littoral depression, and connecting the principal towns, from the Moroccan frontier at Oujda to the frontier of Tunis. Except for Algiers, the ports are all on branches of this main line. Then there are several southward tracks into the desert. The first, which was to have formed the beginning of the trans-Saharan line, runs from Oran *via* the oasis of Ain Sefra to Colomb Bechar, with a short extension to the small coal-mine at Eenadsa. The second runs due south from Algiers and may eventually reach the

oasis of Laghouat; the third runs southwards from Constantino via Batna (zinc mines) to the oases of Biskra and Touggourt.

Road transport has also received much attention during recent years. There are over 4,000 miles of national roads, maintained by the Government. Motor transport is now well organised, notably

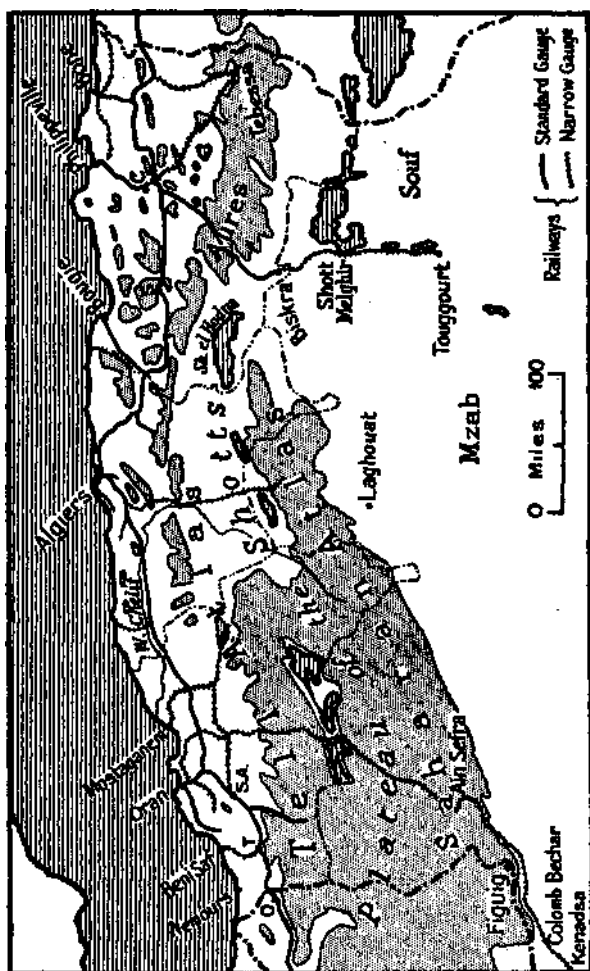


FIG. 108.—Algeria.

O — Oujda; T — Tlemcen; S.A. — Sidl-bel-Abbes; S — Sétif; C — Constantine. Land over 3,300 feet shaded.

by the P.L.M. Railway, and frequent services are available between and around the principal towns. There are airways to France and Central Africa.

Of the inland towns the largest is *Constantine*, with 105,000 inhabitants (half Europeans). It is a natural fortress and the outlet for the rich grain-growing area of the high plain of Setif. *Tlemcen*

(46,000) and *Sidi-bel-Abbes* (46,000) are old Moorish centres in the west of Oran.

Algiers, with 257,000 inhabitants, including 117,000 Europeans, is the largest town in the Atlas lands, and the principal Algerian port. Its poor natural harbour has been supplemented by extensive docks and quays, and it deals with over one-third of the total trade. It is the principal commercial centre of the country, and has flour niills and tobacco factories; the tourist industry is expanding.

Oran (164,000 inhabitants, including 130,000 Europeans) has almost as great a trade as Algiers. Its fertile and iron-producing hinterland, and its connections- with Morocco and the Saharan oases, have been largely responsible for its growth. It has quite a good harbour, but numerous improvements are being made in order to accommodate more vessels.

F r a n c e						Others	
TEXTILES	FOODS	IRON AND STEEL	MACHINERY	CHEMICALS	SILK	8	208
W I N E						CEREALS	SHEEP . FRUIT
F r a n c e						Others	

FIG. 109.—Trade of Algeria. (Average 1933-35.)

Value of Imports 3,657 million francs (c. £30 millions). (Cf. 1031, 5,573 million francs.)

Value of Exports, 3,445 million francs (c. £28 millions). (Cf. 1031, 3,705 million francs.)

Bone (69,000 inhabitants) is the third port, deriving most of its importance from phosphates and iron ore. Other ports of note, but very much smaller, are Mostaganem (outlet for the Chelif Valley), Philippeville, Bougie (a growing iron-ore port) and Beni Saf (also an ore port). A shorter outlet for eastern Morocco has recently been provided by the construction of a new line from near Oujda to the small Algerian port of Nemours, from which coal and ores will be exported.

Trade.—The trade of Algeria is summarised in Fig. 109.

TUNISIA

This French protectorate, under the nominal rule of a Bey, has a population of 2,410,000, of which 90 per cent, are native Moslems. Included in the total are 91,000 French and the same number of Italians, 56,000 native Jews and 13,000 other Europeans (Maltese, Spaniards and Greeks). Probably nearly 90 per cent of the population derives its livelihood from agriculture and mining, and thus the world economic depression has been severely felt.

There has been less demand for metals and for phosphates, prices for cereals have been low, and a series of bad harvests due to lack of sufficient rainfall have further hindered progress.

Physical Features.—Although the smallest of the three French territories, Tunisia contains quite as much variety of topography and vegetation as the other two. The following divisions may be recognised: (1) an extension of the Algerian Tell, with the well-watered Kroumirie highlands representing the Tell Atlas range, which terminates at Cape Blanc; (2) the Mejerda Valley, physically the equivalent of the Shotts Plateau, though actually more like the sub-littoral depression; (3) the western plateau, being the end of the Saharan Atlas highlands, which run out to sea at Cape Bon; (4) the eastern plain, known as the "Sahel"; (5) the depression of the Shott el Jerid and the coastal plain of the Gulf of Gabes; (6) the southern desert uplands.

Climate.—The rainfall decreases rapidly southwards, from more than 30 inches on the north-west coast, to 18 inches at Tunis, 7 or 8 inches on the shores of the Gulf of Gabes, and practically nothing in the far south. The long coast-line makes for maritime influence, but nevertheless the climate tends towards extremes, with very hot, dry and cloudless summers, and winters which may be uncomfortably cool owing to the dampness. Even Tunis, on the coast, has a range of 30° (50° to 80°). The Sahel is rendered even, drier than its rainfall of 10 to 15 inches would suggest by the porosity of its limestone soils.

Vegetation and Agriculture. *Forests.*—On the wetter northern uplands there are over 2½ million acres of forests; the Aleppo pine, evergreen oak and juniper are the principal trees, but the most valuable areas are the cork-oak woodlands of the Kroumirie highlands. A little cork is exported.

Esparto Grass is a valuable export item, since it is taxed. The grass is used in the manufacture of high-grade papers. Boughly 80,000 tons of it are collected every year from the western plateau, and almost the entire cut is shipped from Sousse and Sfax to Britain. Economic factors, such as the substitution of other vegetable pulps, Britain's abandonment of the gold standard, the high export duty, and the fact that the natives collect less when food supplies are more abundant, have affected the trade in recent years.

Crops.—Tunis is essentially an agricultural country, like Algeria, although mineral wealth is also important in adding bulk to the export trade. About 7½ million acres of land are under cultivation, nearly one-half of it being sown with *cereals*, principally wheat and barley. Much better harvests are obtained in the north than farther south, though the general average yield is very low (wheat only 6 bushels to the acre). This is mainly because over

four-fifths of the cereals are cultivated by the natives, but is partly due to deficiency of rainfall.

The area occupied by *vineyards* is much less than in Algeria, only 130,000 acres. Most of the wine and grapes are exported to France. *Olives* are grown all over the north and centre of Tunisia, but chiefly in the Sahel behind Sfax and Sousse. There are 16 million trees, and the annual production is about 8 million gallons of oil, about half of which is exported to Italy for refining, much of the remainder going either to France or being refined and used in the country. "Mediterranean" fruits, principally almonds, oranges and lemons, are grown in the north; dates are produced in the oasis region of the south, around the Shott el Jerid and near Gabes.

Livestock.—T here are 3 million sheep and 2 million goats, as well as oxen, mules, horses, asses and camels. The chief animal products figuring in the export list are mohair, wool, and sheep and goat skins. There are native

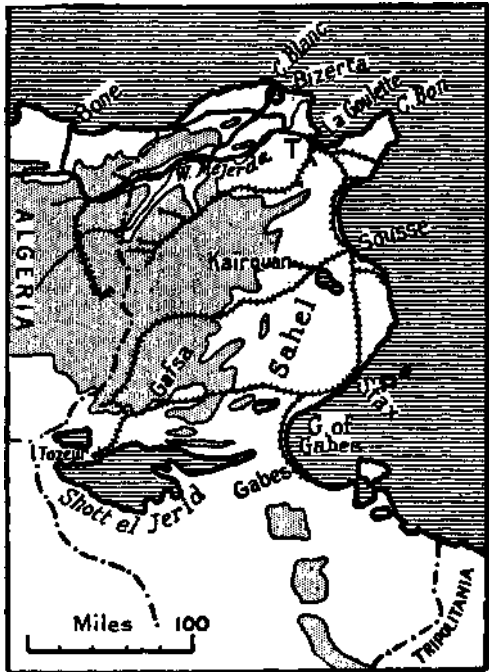


FIG. 110.—Tunisia.
Land over 1,600 feet, shaded. T=Tunis.

woollen manufacturing industries, notably of blankets and carpets, the latter trade being centred at Kairouan.

Fisheries.—Deep-sea fisheries yield mullet and whiting, whilst inshore fishing yields tunny and sponges. Sfax is the chief fishing port.

Minerals. *Phosphates* were discovered in 1885 in the Gafsa region, and a 200-miles railway line was built across the steppe to reach them. In recent years the annual production from this region has been roughly 2 million tons; about 1½ million tons have been exported through the port of Sfax, mainly to France, Italy and Britain. There are other smaller deposits farther north. Metalliferous ores, chiefly *iron*, *lead* and *zinc*, are found in several localities, but in greatest abundance on the north-western

edge of the Sahel around Kairouan. Before the recent depression, nearly a million tons of iron ore were mined annually ; much of it was exported from Bizerta and Tunis, about half the total to Britain. Refined lead is exported to France and Algeria, and zinc concentrates to France and Belgium. There is some production of *salt* from marine and inland salt pans.

Communications and Towns.—There are 1,300 miles of railway in Tunisia, divided between two systems. The Tunisian State Railways' monopolise the northern part of the country. One-third of their track is of standard gauge. The main line (standard gauge) continues the Algerian State line down the fertile and well-irrigated Mejerda Valley, one of the chief agricultural regions in the country, to Tunis. Branches run to the port of Bizerta and along the Tell. The other lines are of metre gauge. One runs south-westwards from Tunis on to the plateau, another southwards from Tunis to the ports of Sousse and Sfax, and a third from Sousse to the ore-bearing and phosphate regions. The Gafsa Railway, also with metre gauge, was built from Sfax to Gafsa to carry phosphates ; nearly three-quarters of its traffic still consists of phosphates and ores. Short extensions have been carried to the date-palm groves of Tozeur, on the shores of the Shott el Jerid, and along the coast to Gabes. An electric railway, 24 miles long, serves to connect Tunis with Goulette, its outport, and La Mersa ; it is encouraging suburban development around the capital.

Road transport is hardly so well developed as in Algeria, but is progressing. Two air lines are in operation. A French company has daily services between Tunis and Marseilles, and the aeroplanes of an Italian company ply between Tunis and Rome. It seems likely, from the central position of Tunis in the Mediterranean region, that its importance as an air port will increase, especially should French enterprise succeed in establishing aerial communication with Equatorial Africa *via* Chad.

There are no inland towns of note in Tunisia with the exception of *Kairouan* (21,000 inhabitants), once a famous Moslem capital and now an important mineral centre. Of the ports, Tunis and Sfax deal with the greatest tonnage. *Tunis*, connected to its outport of *La Goulette* by a 6-miles channel across a lagoon, stands at the head of the Gulf of Tunis. The favourable situation, in a sheltered gulf and within easy reach of the produce of several different regions—the Tell, the Mejerda Valley, and the plateau—was long ago responsible for the growth of Carthage, the ruins of which lie just above La Goulette. In modern times Tunis has become a railway centre and the principal port of the country. It has 202,000 inhabitants, including 87,000 Europeans. *Sfax* (40,000 people) on the northern side of the Gulf of Gabes, is an artificial port, the importance of which is derived mainly from its

phosphate export, though a good trade in olive oil and fish is also carried on. *Sousse* (25,000 people) is a small mineral port on the east coast, and *Bizerta* (23,000) is a naval base and an alternative outlet to Tunis for the ores and agricultural produce of the Tell and Mejerda regions.

F r a n c e					Alger. U.K. Others	
MISCELLANEOUS MANUFACTURES	TEXTILES	METAL GOODS	MINERALS	COLONIAL PRODUCE	TIMBER	OTHERS
CEREALS AND FLOUR		VEGETABLE OILS	MINERALS (ORES)	WINES	J ESPARTO	OTHERS
F r a n c e			Italy	Alger. UK. Others		

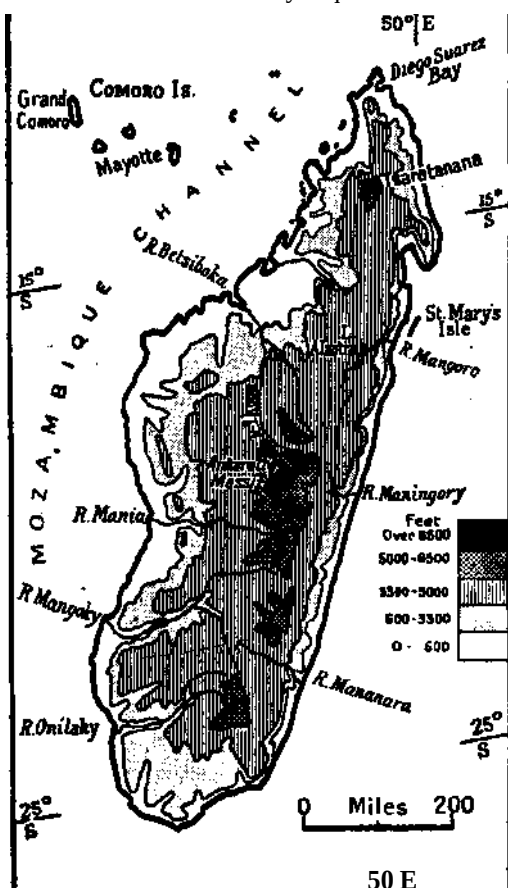
SECTION XI

THE AFRICAN ISLANDS

1. ISLANDS IN THE INDIAN OCEAN

MADAGASCAR

Madagascar is the largest island, which is not also a continent, in the whole world. Nearly a quarter of a million square miles in area,



it is almost as large as France, Belgium and Holland combined. It is 980 miles long, extending over 13° of latitude (12° to 25° S.), and has a maximum width of 360 miles. Its geological structure and its position athwart the main rain-bearing wind system combine to produce a number of different climatic and vegetational types, and so of natural regions.

The island was discovered by the Portuguese in 1500, but was not settled by them. The French took possession of it for a short period in the middle of the seventeenth century, but there was no effective occupation until the early part of the nineteenth century, when English and French merchants and

missionaries began to extend their sphere of influence. It finally passed into French hands in 1885.

Physical Features and Geology.—The "backbone" of the island lies much nearer to the eastern coast than to the west (Fig. 112). Consequently the descent to the east coast is considerably steeper than that to the west. The central mountainous region is composed of ancient crystalline rocks like those of the African Plateau, and there seems no doubt but that the Deccan of India, Madagascar and Africa are all parts of the former great continent of "Gondwanaland." It forms an extensive plateau with mean elevation of about 4,000 feet, but diversified by the occasional presence of longitudinal and transverse ridges, rising perhaps several thousand feet above the average level, which break it up into a series of tablelands. The surface is thus generally fairly rugged, but rolling high-level plateaus, as in the Imerina Province, are by no means uncommon. The surface is usually thickly covered with an accumulation of laterite, resulting from the decomposition of the crystalline rocks. The highest parts of the mountain "backbone"

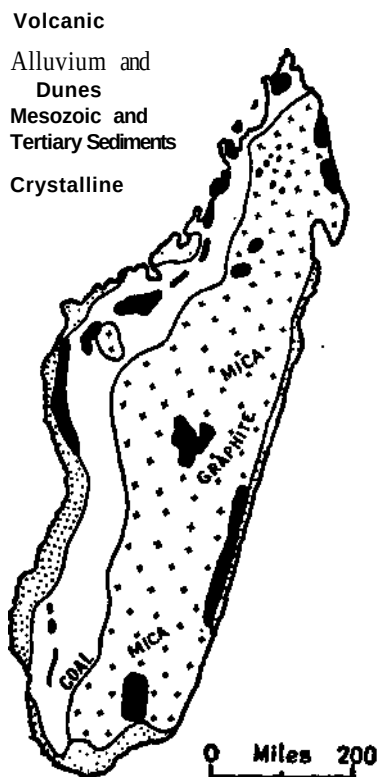


FIG. 113.—Madagascar. Simplified geological map, showing minerals.

are the centrally placed Ankaratra massif and the Tsaratanana Mountains in the north, the summits of which reach 8,000 to 9,000 feet. The Ankaratra massif is composed of newer volcanic rocks. It contains several extinct volcanoes, and there are over 200 old cones in the Lake Itasy depression which lies immediately to the north-west of the massif.

The eastern side of the "backbone" falls like a gigantic broad stairway to the coast. The slope is deeply cut into ravines by

numerous streams which, fed by the constant and heavy rains, follow torrential courses to the sea. The eastern coast is remarkably straight and free from indentations. It is fringed with coral reefs, and safe anchorages are few and far between, owing to the great swell produced by the prevailing south-easterly winds.

The western slope of the backbone is broader, though frequently diversified by ridges and deep valleys. The crystalline plateau usually ends in a series of west-facing scarps overlooking the territory formed by Mesozoic sedimentary rocks (Fig. 113). These sedimentary rocks dip westwards beneath the Mozambique channel, and consequently the harder beds in the series present eastward-facing scarps which break up the general westward slope of the land. Unlike the east coast, the west coast is backed by a fairly broad plain, made up of recent sediments deposited by the rivers. Coral reefs are frequent, and a fringe of sand dunes is commonly found. The north-west coast is rendered even more rugged and indented by the existence of several masses of volcanic rocks in amongst the Mesozoic sediments. A number of very large, semi-enclosed bays occur, such as that of Diego Suarez, any one of which could accommodate a whole navy.

The drainage of the island is dependent upon three factors: (1) the asymmetric placing of the watershed, giving a short eastern and a long western slope; (2) the constant rain of the eastern slope, resulting in perennial streams; (3) the seasonal character of the rain on the western slope, resulting in most of the smaller streams being almost dry during the dry season. The largest of the eastward flowing streams are the *Mangoro* and the *Maningory*. Both of these have their upper courses in an old north-south lake basin, 200 miles long, the last remnant of which remains in Lake Alaotra. In the south the *Mananara* has a fairly large drainage basin.

Several large and well-developed river systems drain the western slope. They all have rapid courses where they leave the crystalline plateau for the western sedimentary region, and they nearly all have deltas built up of the detritus brought down during the flood season. The largest river in the island is the *Betsiboha* which, with its tributary the *Ikopa*, drains the Ankaratra massif and the Imerina Plateau to the north-west coast. The *Mania* drains the central massif westwards, and the *Mangoky* and the *Onilahy* collect the drainage of most of the south-western sector of the island.

Minerals.—The crystalline rocks are fairly well mineralised. As in most parts of Africa, native metal working, notably in iron, has been common for centuries, but modern exploitation has been confined to the panning of alluvial gold in the north, and the working of graphite and mica. *Oraphite* is at present the most important mineral. It is of widespread occurrence and is easily worked near

the surface. Production has fluctuated considerably, sometimes rivalling that of Ceylon, which is the world's chief producer. *Mica* is also worked, and a little exported; several metal ores exist, and bauxite is common as usual in areas of lateritised crystalline rocks. A small carboniferous coal basin exists in the upper Onilahy valley and several deposits of lignite occur in the north. There is as yet little or no working of these deposits.

Climate.—Altitude, of course, reduces the average temperature considerably, so that whereas the coastal districts have an average of between 70° and 80° all the year (*e.g.* Tamatave, 68° to 80°), the highlands are much cooler, and their temperatures would seem to suggest the possibility of white settlement (*e.g.* Antananarivo, 4,600 feet above sea-level, 55° to 67°).

The latitudinal position of the island brings it for the greater part of the year within the Trade wind belt, and south-easterly winds predominate, bringing some orographical rain to the eastern side, but very little—since they are descending—to the west. During the summer season, however, the southward migration of the major pressure systems brings the doldrum low-pressure belt across the centre of the island in January, and this is the period of maximum rainfall. The wind direction is variable, and on the coasts land and sea breezes are of daily occurrence, but the dominant direction is from some easterly point on the eastern side, southerly in the south-west, and north-westerly in the north-west, the last-named air-stream being a continuation, south of the equator, of the Indian Ocean north-east Trades (*cf.* Figs. 4 and 6). From January to April tropical cyclones are liable to occur on the eastern side; they may be of great violence, with severe lightning and thunder, winds of hurricane force, and heavy falls of rain. (*Cf.* Fig. 116 on P- 248).

Four climatic divisions are apparent:

1. *The Eastern Slopes and Coast.*—This region has wet south-easterly winds all the year, and a rainfall of over 100 inches even on the coast, with considerably more on the slopes. The rainiest period is from December to July, but there is no real dry season, and at least 4 or 5 inches may be expected even in the driest months.

2. *The Plateau.*—Here altitude reduces the temperature to warm temperate levels, and the daily range may be fairly large, freezing-point being frequently approached in the dry season. The rainfall is much less than in the east, only 40 to 60 inches. Thick mists, however, are very common. The rains last only from December until March, and the period May to December is really dry.

3. *The West and South-West.*—Here there is a kind of semi-permanent "chinook" effect, for the prevailing winds are descending from the plateau on the east and so are getting warmer and

less capable of dropping moisture. The result is that the region west of the plateau is distinctly dry. The rainfall diminishes southwards, and the south-west coasts are almost arid, with only about 15 inches of rain. The rivers here are dry for seven or eight months of the year.

4. *The North-West.*—This only differs from the east in experi-

encing north-westerly winds during the mid-summer period. The rainfall is heavy with a drier season lasting from May or June until November.

Natural Vegetation.

—The natural vegetation corresponds closely to these divisions (Fig. 114). There is comparatively little forest. Only about one-tenth of the island is forested, and little more than a third of this area can be classed as dense forest. The principal forest zones are the eastern region and the north-west coast, where dense evergreen jungles with rosewood and ebony, rubber trees, copal, and many species of pp,lm, occur over extensive areas where they have not been interfered with by fire or by native or European

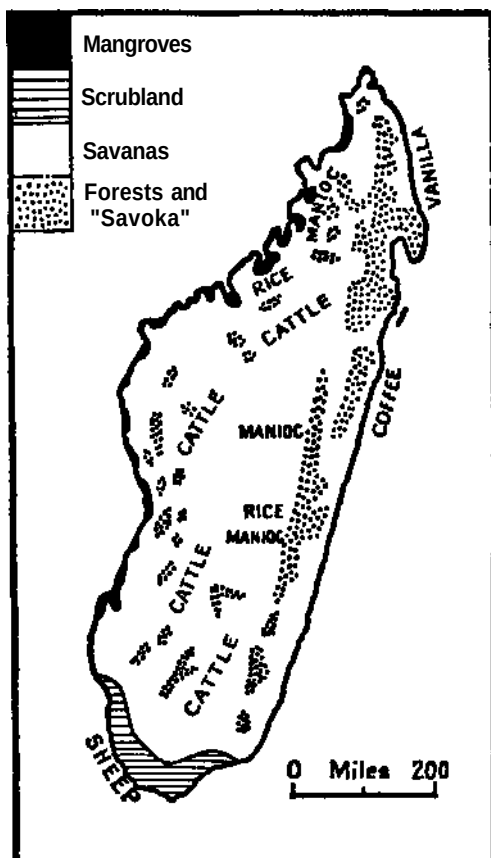


FIG. 114.—Madagascar. Vegetation and chief agricultural products.

exploitation. Bamboo forests are common at higher altitudes on the eastern slopes. Much damage has been done in this great forest belt by fire and by native clearance for agricultural purposes. The laterite soil is not very fertile and so clearings are soon abandoned and allowed to degenerate into bush called "savoka," which is easily burnt, whilst the bare soil that remains becomes crust-like and useless.

On the plateau the general poorness of the soil and the exposure

to strong winds militate against a forest cover, and much of the area is grassland of savana type. The western slopes have patches, in the moister parts, of deciduous forest, composed mainly of slow-growing hardwood trees. In the south the vegetation is scrubby and drought-resisting. The deltaic swamps of the west coast support mangroves, the bark of which is collected and exported for tanning purposes.

A forestry service has been established to repair as far as possible some of the damage done to the forests by destructive exploitation,, and a small amount of timber, notably ebony, is exported. Collected forest products include gum copal and raffia.

Agriculture. 1. *Crops*.—This tropical island is not as agriculturally rich as might have been expected, owing to the large semi-arid area and to the general poorness of the soils on the plateau. Moreover, plantation agriculture is as yet feebly developed, and most of the cultivation is of foodstuffs for native home consumption. *Rice* is the principal food and the most widely grown crop, being cultivated throughout the island except in the arid south-west. * Many varieties are grown, most of them of rather poor quality and low yield. Swamp rice, needing most labour, is grown in swampy valleys, around lakes or near the coastal estuaries and deltas. Some European plantations exist in the east, within access of the railway to Tamatave, and an exportable surplus is produced. Upland rice is grown in the eastern forest zone. It is sown in clearings, and such areas are seldom planted more than twice. *Manioc* is second to rice as a food crop. It is widely grown except in the wettest parts, notably in the savana regions, where it is planted after burning off the grass. Other food crops are maize, sorghums, yams, and beans. *Maize* can be grown even in the dry parts during the rainy season, and is thus important in the south-west; but with the others it is grown almost everywhere with varying success. *Sugar-cane* is grown in many parts where irrigation* is possible, and it is especially important in the east and north-west.

Of the industries which arise from this native food-producing agriculture the preparation of rice, tapioca and sugar may be noted.

Amongst the crops which are grown with a view to export the following deserve mention : *Coffee*, of the " arabica " type, is grown in the native villages, but. European plantations of Liberian and other more resistant types (" robusta ") have been established in the eastern region, and the export is increasing. *Vanilla* has been introduced from the island of Reunion into the wetter north western and eastern districts, and an export trade set up. C are grown on St. Mary's Isle, off the north-east coast, and on the neighbouring mainland. *Cacao* is not well favoured by climate and soil in Madagascar, but it is successful in the Tamatave d

The cultivation of coconuts is extending on the north-west coast, whilst inland cotton, sisal, and flax have been tried, notably in the fertile and irrigable Onilahy Valley of the south-west; a number of plants yielding perfumes are cultivated and exported for the Parisian scent industry.

Altogether there seems to be plenty of scope for the development of plantation agriculture of tropical and sub-tropical character; the chief difficulty is the unwillingness of the natives to depart from their primitive cultivation, and the scarcity and poor quality of the labour supply, the natives being frequently indolent and unwilling to do more than supply themselves with food.

2. *Livestock*.—The agricultural people of the east have few animals. On the plateau, however, and in the drier west and south, cattle-rearing is the mainstay of the native agricultural economy. There are 7 million *cattle* in the island, mostly of zebu type and poor quality. The cows are small and give only a meagre yield of milk. Severe losses often result from lack of food during the dry season. Nevertheless, the cattle provide an important source of wealth; hides and skins are marketed and exported and a meat-packing industry has been established at several of the larger towns, notably Antananarivo, Tamatave, Diego Suarez, Mayunga and Antsirabe. Fat-tailed *sheep*, adapted for withstanding a dry and hungry season, are reared in the arid south and on the central plateau. *Goats* also find plenty of food in the dry western and southern districts. Nearly every native farm has a few *pigs*.

Population.—The population of Madagascar is about 3½ millions. About 1½ million live on the plateau and some 400,000 in the eastern coastal zone. The people are a very mixed race, of Indo-Melanesian origin, but very much mixed with Arab, Indian and Malayan blood. They are almost all half-castes of one kind or another. Innumerable small clans formerly existed, but these have now become grouped into seventeen major peoples, known collectively as Malagasy. The principal "races" are the Hovas, with 900,000 members, the Batsileo, with 480,000, and the Betsimisaraka, with 400,000. There is some uniformity of language and customs throughout the island, though little actual connection between the various groups; there is little connection, either, between the natives and the Europeans. In addition to the Malagasy, there are about 18,000 French colonists and administrators, and about 11,000 others, mainly Arab, Hindu and Chinese traders.

Settlements and Communications.—The bulk of the native population lives in small villages, usually surrounded by a protective wall of some kind of vegetation. Most of the larger towns owe something of their development to European influence (Fig. 115).

Antananarivo, once a large native village, and the centre of the Hova people, but now for the most part a modern town, with

upwards of 100,000 people, is the capital. It is situated on the edge of the Imerina " plains," one of the more fertile areas of the plateau. It is connected by a railway line with *Tamatave*, the principal port (15,000 inhabitants). A branch from this line runs northwards through the old lake basin mentioned above—another fertile region—to the shores of Lake Alaotra. The main line continues southwards from the capital to *Antsirabe* (19,000 people) and it is intended to continue it farther to *Fianarantsoa*, the centre of the Batsileo people, whence another line, in course of construction, will descend to the port of *Manakara*.

Mayunga, with 20,000 inhabitants, is the second port. It has a fine site on the estuary of the Betsiboka river, which is navigable for 150 miles through an area of developing tropical agriculture to Maevatanana. *Tulear* is a small port of considerable promise at the mouth of the Onilahy river. Its expansion will depend on the development of irrigation agriculture and communications in the valley which forms its hinterland.

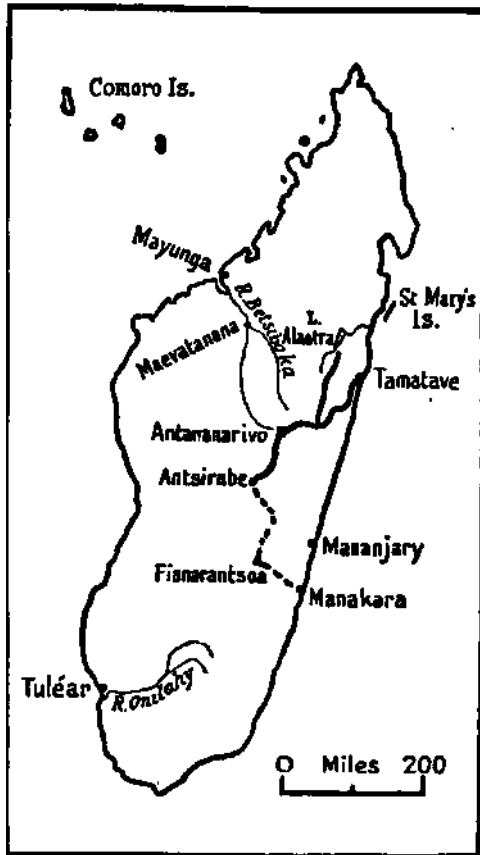


FIG. 115.—Madagascar. Communications and towns.

Trade.—The bulk of the trade is with France. Imports are mainly manufactured goods—cotton clothing, machinery and metal wares. Exports include tapioca, rice and vanilla; hides and skins; raffia and mangrove bark; and graphite.

THE COMORO ISLANDS

This group of islands is administered by France from Madagascar. Lying midway between the north-west coast of Madagascar

and the mainland of Africa, the group consists of four main islands, the most noteworthy of which are Grand Comoro, 720 square miles in extent, and Mayotte, 140 square miles (Fig. 116). The total population of the group is about 120,000.

The climate is tropical and wet, and most of the natural forests have been cleared for agriculture. *Sugar-cane* and *vanilla* are the principal crops, though the decline of the former, owing to the competition of beet-sugar, has been marked in recent years, as in the Mascarene Islands, and has led to a certain amount of emigration from the islands to the neighbouring coasts of Africa and Madagascar. Cacao is grown, likewise coconuts and sisal, and

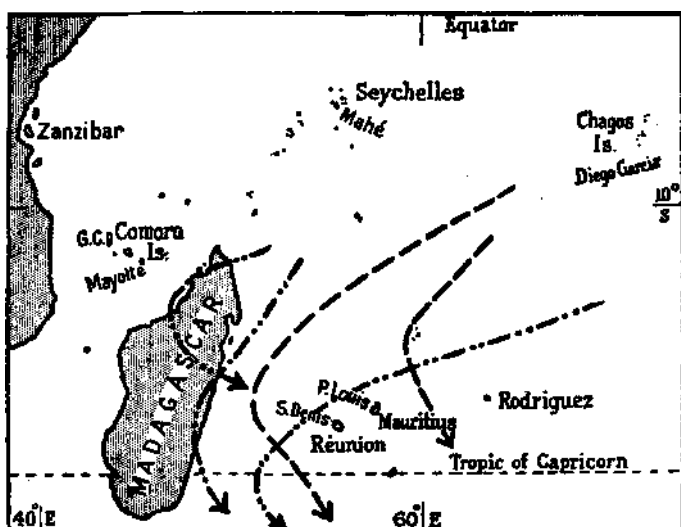


FIG. 11(5).—"African" islands in the Indian Ocean.

— Typical cyclone tracks in November.

— · · — Typical cyclone tracks in February.

(After Ken drew.)

also certain perfume-yielding plants. Some timber for railway purposes is obtained from the forests which remain.

The trade of the islands is not large. Cotton and metal goods are imported, and rice for food. Sugar, vanilla and copra are the chief exports.

THE MASCARENHAS

The Mascarenhas are a chain of three volcanic islands, named after their Portuguese discoverer. They consist, from south-west to north-east, of the French possession of Reunion and the British islands of Mauritius and Rodriguez; their maximum height decreases eastwards—Reunion 10,000 feet, Mauritius 2,700 feet, Rodriguez 1,300 feet.

They experience a Trade-wind climate, with a moderate to heavy

rainfall derived mainly from the south-easterly winds, but augmented during the summer months by frequent tropical cyclones, often of a very violent nature. Rainfall totals vary with aspect and altitude, from about 45 inches in Rodriguez to perhaps 150 inches on the slopes of Reunion and Mauritius. The rainy season lasts from November to April, and most of the rain is of the usual Trade-wind orographical type, very heavy where highlands interrupt the flow of the air-stream, but rather low on the lowlands. Only in the low-lying parts is there any real dry season ; and the lowlands facing northwards are the driest parts. The average temperature at sea-level ranges from about 68° to 79°.

Before their discovery by Europeans, the islands were densely forested and uninhabited. A long period of plantation agriculture has resulted in the destruction of most of the forests; and the population has been derived from France, Britain and India, with a few Negroes (the descendants of slaves), Malagasy (the natives of Madagascar) and Chinese. The chief economic crop is sugar-cane, and consequently the islands have suffered somewhat in recent years from the competition of beet-sugar.

Reunion.—This island was occupied by the French in the middle of the seventeenth century, and except for a short period during the Napoleonic wars, has been French ever since. Originally named Bourbon, its name was changed to Reunion when it was handed back to France by the British. It is a conical island, only 970 square miles in extent and yet rising to 10,000 feet, with a very narrow coastal plain and numerous deep valleys seaming the mountain slopes. One large crater in the south-east is still extant, and has erupted more than twenty times during the last century. There are many hot springs. The great range of altitude gives a wide variety of crops. The earliest plantations were of coffee, cloves, vanilla and sugar ; now tea, cinchona, and cacao have been added to the list of tropical products, whilst manioc, cassava and rice are grown for food, and at higher levels wheat, temperate fruits and vegetables. The principal economic resource is the sugar-cane ; not only are large quantities of sugar exported, but an important industry is the distilling of rum. The productivity of the island is not nearly so great as that of Mauritius, however, owing to the virtual absence of black labour.

The island has a population of 186,000, of whom 180,000 are French, the remainder being Malagasy, Chinese and Indians. The principal centres of settlement are along the coast—St. Denis, the capital, St. Paul and St. Pierre each have over 20,000 inhabitants. A railway line runs for 80 miles round the north-western coast of the island. There are few harbours; the only one accessible to large vessels is *le Port des Galets*, a partly artificial port on the north-west coast near St. Paul.

The trade of the island is simple. Sugar and spirits are exported and foodstuffs (rice and temperate cereals for the large French population) and cotton goods are the principal imports.

Mauritius.—The British Colony of Mauritius includes the island of that name and a number of small dependencies, such as Rodriguez and the Chagos Islands. The island of Mauritius was first settled by Dutch colonists, but was later abandoned by them and recolonised by the French. It was ceded to Britain in 1814. It covers 720 square miles, and has a population of nearly 400,000. Unlike Reunion, it has few Europeans, about two-thirds of the inhabitants being British Indians, and the remainder negroes, half-castes and a few thousand Chinese.

The island has a hilly interior with two highland masses, the Black River Mountains in the south-west (2,711 feet) and the Pieter Both (2,690 feet) in the north, separated by the Curepipe Pass by which the Midland Railway line crosses from east to west. The removal of so much forest from the highlands has increased the rapidity of the run-off and the amount of erosion, so that the coastal lowlands have become distinctly swampy and malarial. The shore is fringed with coral reefs.

Sugar is the outstanding crop, and a more obvious example of a "one-crop" economy would be difficult to find. Sugar represents over 95 per cent, of the total export value. Some 40 factories produce over 200,000 tons of sugar every year, almost all of which is exported to Britain. Coconuts and various tropical foodstuffs are also grown, and there is some export of copra. The imports are mainly cotton goods and iron and steel manufactures from Britain and rice from India.

Mauritius possesses quite a well-developed railway system, totalling 144 miles, with two main lines focussing upon Port Louis, and several branches. *Port Louis*, with 54,000 people, is the capital and chief port. It has a good natural harbour, and its situation on the north-western side of the island gives it shelter from the south-east winds. It is rather hot and unhealthy for Europeans, however, and a considerable "hill-station" settlement has grown up at *Curepipe*, 1,800 feet above sea-level and only a dozen miles from the port.

Rodriguez, lying 350 miles north-east of Mauritius, is much smaller, only 42 square miles in area, and with only 8,500 inhabitants. It is cooler than Mauritius, and sugar is not important. Fishing and the cultivation of fruit and food crops (maize and beans) are the chief occupations.

THE CHAGOS ARCHIPELAGO

or **Oil Islands**, are a group of coralline atolls lying in the middle of the Indian Ocean just south of the equator. They support about

2,000 people, mainly of African or Madagascar origin; nearly 500 are on the one island of *Diego Garcia* (80 square miles), which is a coaling station. The main exports of the island are coconut oil and copra. Guano, the deposit of sea-birds, is collected, and fish are caught and salted.

THE SEYCHELLES

The colony of Seychelles and its dependencies consists of about 100 islands with a total area of 156 square miles. Originally colonised about 1750 by the French (named after Sechelles), they became part of the British Empire in 1810. The group lies about 500 miles N.N.E. of Madagascar, and on the line of the axis of the island. Granite rocks and laterite soil complete the geological similarity, and it seems probable that the islands are but the unsubmerged peaks of a former vast mountain range. Lying only 5° south of the equator, they have an equable temperature regime (79° to 80° all the year round, with little daily range), and experience a seasonal wind reversal. The rainfall is heavy—upwards of 100 inches—with a maximum in January-March, and a minimum, though scarcely a dry season, in July and August.

The islands are well cultivated, coconuts and cinnamon providing the principal exported products. Cattle are raised, guano is collected, and there is much fishing.

The largest island is *Mahe*, 55 square miles in area and with 28,000 inhabitants. Its port, *Victoria*, has a good harbour, and is a miniature entrepôt for the group. The trade is conducted mainly with Britain and India, and consists of exports of copra, cinnamon oil and guano, and imports of rice and cotton goods.

2. ISLANDS IN THE ATLANTIC OCEAN

THE AZORES

Although administered as a part of Portugal, the Azores are usually considered as "belonging" to Africa (Fig. 117). Lying well out in the Atlantic, in latitudes 37° to 38° N., they receive a fair rainfall from the cyclones of the westerly wind belt during the winter months. During the summer they lie within the sub-tropical high-pressure belt, and so are drier, but the relief, which is considerable (Pico reaches 8,500 feet), prevents any serious drought. The three groups of islands are of volcanic origin, and have a total area of a little over 900 square miles, with a population approaching a quarter of a million. *Sao Miguel*, in the eastern group, is the largest island; on its shores is *Ponta Delgada*, the chief town and port. The principal products of the islands are foodstuffs for home consumption—cereals, fruits (including the vine), cattle products

and fish. The total trade is not large, and is conducted mostly with Portugal, but the scenery, climate and mineral springs attract many visitors.

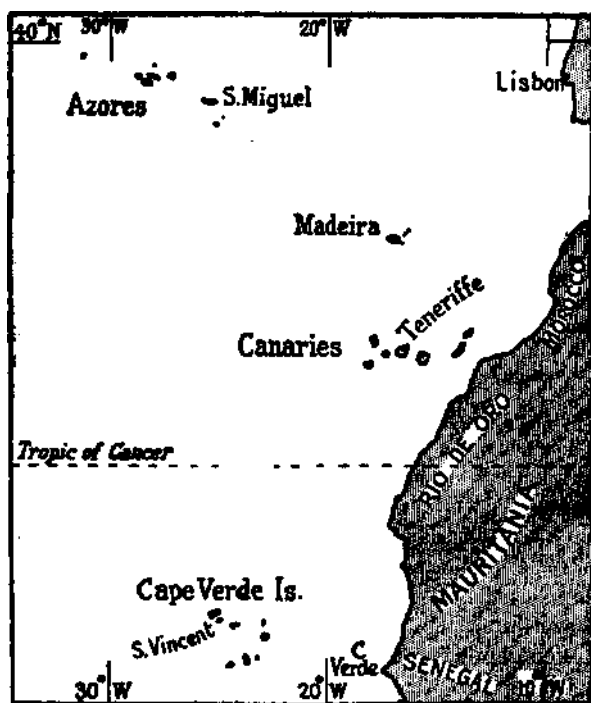


FIG. 117.—"African" islands in the North Atlantic Ocean.

THE MADEIRAS

This group, lying in latitude 33° N. about 400 miles from the Moroccan coast, also ranks as a province of Portugal. The more southerly latitude results in a longer dry season and a shorter period of winter cyclonic rainfall, and Funchal, on the southern side of the main island, has less than 30 inches a year. The group consists of one large island, Madeira itself, nearly 300 square miles in area, and four small ones. The total population is about 170,000. The islands are of volcanic origin, and rise steeply from the sea; the summit of Madeira is 6,500 feet. The formerly forested slopes are now carefully terraced to prevent soil-wash, and the cultivation yields rich harvests of cereals and fruit, notably the vine and such tropical fruits as pineapples and bananas. Wine and fruits are the principal exports, but the main industries of the island, including the native handicrafts (lace-making and the fashioning of articles in cane, straw and wood) may be said to centre around catering

for the large numbers of tourists who are attracted by the pleasant winter climate and the beautiful scenery. *Funchal*, the largest town, is, however, also an important port of call for vessels bound for West and South Africa.

THE CANARIES

The Canary Islands are administered as part of Spain. they comprise seven islands, of volcanic origin, with a total area of 2,800 square miles and a population of just over half a million. Again, slopes are steep and there is little lowland; the dormant snow-clad volcano of Teneriffe rises to more than 12,000 feet above sea-level. The latitude (28° to 29° N.) and the nearness to the western Sahara make for much greater aridity than in either Madeira or the Azores. At low altitudes on the eastern sides, where the Harmattan is most felt, the total rainfall is 10 inches or less, but the higher parts and the western sides may get more, very largely from westerly winds during the winter months. As a result, the vegetation of the lower parts is scrubby, whilst hardwoods of Mediterranean type (e.g. ilex) are found on the slopes. Tropical and sub-tropical fruits (e.g. bananas) may be grown in the lower parts if irrigation is available; higher up abundant crops of Mediterranean products (vine, olive, citrus fruits, tobacco), and the temperate cereals and vegetables, notably onions, are produced.

Apart from the production of fruit and vegetables for the European market, handicrafts, fishing and catering for tourists are the main industries of the islands. The two principal towns are *Las Palmas*, near the north-eastern coast of the island of Gran Canaria, with its port of *Puerto de le Luiz*, an important coaling station; and *Santa Cruz*, towards the north-eastern end of Teneriffe, also a coaling station and the centre of the tourist traffic. Both are important ports of call, like Funchal, for vessels on the South and West African services..

CAPE VERDE ISLANDS

This group of ten islands and a few small islets is administered by Portugal. The total area is 1,500 square miles and the population 150,000. Situated in latitudes 15° to 17° N., due west of Senegal, they naturally experience the hot and dry north-east Trades or "Harmattan" all the year round; they are, therefore, extremely dry. The total rainfall is between 5 and 10 inches a year on an average and most of it falls between August and October, when the temperature is highest. (Contrast the three previous island groups.) The average temperature is high, and the range small (72° to 80°); the maritime environment and low altitude results in temperatures higher than 90° or lower than 60° being

unknown. The islands are again of volcanic origin, and the 9,000-foot peak of Fogo is an extinct cone. The soil is fertile if it can be watered, and the variety of relief makes for a considerable variety of agricultural produce. Sisal, castor oil, coffee, oranges, and hides may be mentioned as amongst the most valuable; but comparatively little is exported. The capital of the islands is *Praia*, but the principal port and commercial centre is *Sao Vincente*, an important coaling station for vessels bound for South America.

ST. HELENA AND ASCENSION

The British Colony of St. Helena includes the island of that name lying 1,200 miles west of the African coast in latitude 16° S., and the island of Ascension, 700 miles to the north-west, in latitude 8° S.

Ascension is a small volcanic island, 34 square miles in area, and rising to nearly 3,000 feet above sea-level. It lies in the track of the south-east Trades all the year round, and as its small bulk provides little obstacle to the winds it is very arid, practically nothing falling at sea-level and only a few inches on the higher parts. There are less than 200 people on the island, and the only reason for their existence is the important cable station of Imperial and International Communications, Ltd. This company runs a farm with some arable land above 2,500 feet to provide fruit and vegetables, and a few cattle, sheep and pigs. The only other resources are the turtles which breed in large numbers on the shores, and the guano left by myriads of sea-birds, which is not commercially worked.

St. Helena is also volcanic and of marked relief, rising to nearly 3,000 feet. Its area is 47 square miles and its population, largely owing to its damper character, is about 4,300. It also is constantly in the track of the south-east Trades, and on the higher parts as much as 30 inches of rain fall in the year, though lower down the total is much less. The former forest cover has been largely removed, and soil-wash has ruined many arable areas. The principal crop is an introduction from New Zealand—phormium, a kind of flax. About 2,000 acres are planted with this crop, and nine mills have been established to deal with the produce. Fibre, tow, rope and twine together make up the bulk of the export trade. As a result of this use of arable land for flax, the island is not nearly self-supporting in foodstuffs; some cereals and potatoes are grown, but much flour, rice and other food products are imported. St. Helena is an Admiralty coaling station, but its former function of being a vital food and water station **on** the sailing-ship route round the Cape has ceased to exist.

TRISTAN DA CUNHA

Tristan da Cunha, the largest island of a small and remote group, belonging to Britain, in the South Atlantic, in latitude 37° S., is an extinct volcano rising to 8,000 feet above sea-level. The climate is cool and stormy, with the " Roaring Forties " of the cyclonic belt blowing hard from the west for the greater part of the year. Cultivation is thus limited, and the rugged relief of the island leaves only a small plateau in the north-west, about 12 square miles in extent, capable of settlement. The staple food is potatoes, and animal products obtained from the sheep, cattle and geese which are kept, and from fish. There are only about 130 people on the island, which is right out of the track of all commercial routes, and is therefore very seldom visited.

EXAMINATION QUESTIONS

(Selected from ten years' Intermediate and Degree Examinations of the University of London)

I. GENERAL

1. "The keynote of the development of Africa is transport." Discuss this statement.
2. Discuss briefly the climates of the areas in Africa crossed (a) by the Equator, (6) by the Tropic of Capricorn, and offer explanations of the conditions you describe.
3. To what extent is it true to say that the climatic zones of Africa are symmetrically arranged about the Equator?
4. Describe critically (1) the distribution of savana in Africa south of the Equator, and (2) its relation to political distributions.
5. How far are the great rivers of Africa navigable? Explain exactly what you understand by the word "navigable."
6. "In the tropical zone climates are differentiated by variations in rainfall." Discuss the application of this statement to Africa.
7. Discuss the value of transverse as compared with longitudinal lines of communication in Africa.
8. What conditions favour, and limit, the large-scale production of the following in Africa: palm-oil, cacao, cotton and rubber?
9. Name, with brief notes, the chief races and cultural groupings represented in Africa, and discuss their distribution in relation to the physical features of the continent.
10. Give an account of the present position of the Cape-to-Cairo railway scheme, and of the chief lateral connections.
11. State, and explain, the distribution of the main types of forest in Africa, and point out the main contrasts between the northern and southern sub-tropical types.
12. Discuss fully the monsoon phenomena of either Africa or Australia.
13. Write a geographical essay on the mineral wealth of Africa, south of the Zambesi.
14. Analyse and account for the distribution of population in Africa, south of the Zambesi.
15. Analyse the geographic conditions influencing the development of communications in Africa, south of the Zambesi.
16. It has been said that the French as a nation are not apt at colonisation. Discuss this statement in regard to the French Colonies in Africa, north of the Equator.
17. Discuss the relation of mineral exploitation to communications in Africa.
18. Describe and discuss the areas in Africa which you consider suitable for white settlement.
19. Write a general description of the distribution of vegetation in Africa, and account for the main features.
20. Describe the ethnic and economic distribution of population, north of the Sahara.
21. Divide Africa, south of the Tropic of Capricorn, into climatic regions and justify your divisions.
22. Attempt a division of Africa south of the Equator into major areas according to rainfall and examine the relationships of this division to one based upon the chief types of natural vegetation.
23. Contrast the course of discovery in the interior of South America with that in Africa, south of the Equator. How do you account for the difference?

II. WEST AFRICA

24. Discuss the geographical conditions favourable and unfavourable to the production of good cotton in Nigeria and Uganda.
26. Write a concise geographical account of Nigeria.

26. State and discuss the significance of frontier changes in the region of Kamerun since 1911.
27. Give a geographical description of the Niger Basin with special reference to its climates, communications, and possible economic development.
28. Analyse the successive belts of climate of the western coetlands of the African continent.
29. Relate climatic conditions to agricultural production in British West Africa.
30. Describe the geographical factors which were of most importance in Mungo Park's work in the Niger Basin.

III. EQUATORIAL AFRICA

31. Give a geographical account of the Congo Basin and refer in particular to the chief exports of the Belgian Congo.
32. Sketch the distribution of equatorial forests in either South America or Africa and examine the conditions which hinder their economic exploitation.
33. Outline the present economic development of the Belgian Congo.
34. Give a detailed account of the journeys of exploration which led to the discovery of the Upper Congo waters and solved the problem of this drainage system.
35. Write a geographical description of the Congo Basin.
36. Discuss the problems, in so far as they are geographical, of tropical colonial development as illustrated either (a) in the Belgian Congo or (b) in British West Africa.

IV. BRITISH SOUTH CENTRAL AFRICA

37. Describe shortly the form and nature of the basin of Lake Nyasa, and indicate the economic possibilities of the surrounding land.
38. Contrast the Niagara Falls and the Victoria Falls as power resources from the standpoint of (a) physical, (b) human conditions. Add an account of any third centre of water-power development which you consider usefully illustrates the question of favourable geographical conditions.
39. Write a brief description of the Katanga-Northern Rhodesia mineral belt, paying special attention to actual and potential developments and to means of communication with the coasts.
40. Outline geographical conditions underlying farming activities in Southern Rhodesia.

V. SOUTH AFRICA

41. State the broad facts as regards the relief and drainage system of South Africa and compare briefly with the conditions in Australia.
42. Relate the railway system in the Union of South Africa to the geographical conditions.
43. What geographical conditions are necessary for sheep farming? Illustrate your answer by special reference to South Africa and Canada.
44. Give a general account of the south-western quadrant of Africa.
45. Give a detailed geographical account of Natal, with special reference to agricultural production.
46. Discuss the problem of water-supply as it affects the Union of South Africa.
47. Discuss the geographical reasons for the existence of commercial rivalry between California and South Africa.
48. On a sketch-map indicate the position of the chief known mineral deposits of either the Union of South Africa or Australia, and note further the ways in which these deposits form, or may form, the basis for industrial development.
49. Compare the Union of South Africa with East Australia in respect of (1) ease, (2) difficulty of inland commercial transport.
50. Describe the general distribution of population in British South Africa.

VI. EAST AFRICA

51. Compare the natural hinterlands of Mombasa and Beira.
52. Discuss the suitability of the East African plateau for colonisation by white men.
53. In broad outline correlate the climates with the vegetation zones of Kenya.
54. Attempt a division into natural regions of British East Africa, and give reasons for your division.

55. Give a concise geographical description, from the standpoint of human geography, of the country between the line of lakes Edward, Albert, and Tanganyika, and the East coast of Africa.

56. Divide Kenya into natural regions, giving a short description of each

57. Write a concise geographical account of Kenya.

VII. EASTERN HORN

58. Discuss the sources of our knowledge of the interior of Abyssinia and its river systems.

59. Discuss briefly the economic geography of either Peru or Abyssinia.

VIII. SUDAN AND EGYPT

60. Describe the principal explorations which led to the discovery of the Nile sources.

61. Discuss the regime of the Nile and the sources of the water-supply of Egypt throughout the year.

62. Discuss the influence of the Nile on the political development of ancient

63. Discuss the geographical and economic conditions which favoured the early development of civilisation in Egypt.

64. Discuss the division of Nile water between Egypt and the Sudan.

65. Discuss the chief geographical problems connected with Egyptian agriculture.

66. Divide the Nile Basin into natural regions, describing carefully the climatic factors of each region.

67. What combination of causes makes irrigation physically and economically possible? Illustrate by notes an irrigation scheme in the Sudan and Australia.

68. Describe the course of the Nile and give an account of the part it plays in the economic life of Egypt and the Sudan.

69. Write a general account of the Sudan, both French and Anglo-Egyptian, with special reference to recent developments.

70. Show how the relief and rainfall of the Nile Basin combine to produce an annual and protracted flood period. Indicate by what artificial means the river is controlled.

IX. SAHARA

71. In what direction has our precise knowledge of the Sahara been extended in recent years?

72. How do you distinguish the main aspects of the Sahara? And how is each reflected in the natural flora and the economic fauna.

73. Discuss, in careful detail, the questions (a) how far the Sahara has hitherto acted as a real barrier to advance into Africa from the north, and (6) how far modern methods have solved the problem of communication over it.

74. Describe the present means and routes of communication across the Sahara.

X. ATLAS LANDS

75. Divide Morocco into natural units and justify your divisions.

76. Illustrate the inter-relations of physical and human geography in either (a) Morocco or (6) Algeria.

77. Write a broad account of the distribution of population in what are known as the Atlas lands, especially in its relation to topography and climate.

78. Describe in some detail the relief of Algeria and Tunisia, pointing out the relation between relief and the possibilities of development, both in the past and in the present.

79. Write a critical account of the physical and economic geography of Morocco.

80. Write a geographical account of Algeria and Tunisia.

81. Summarise the economic geography of Morocco.

XI. ISLANDS

82. In what geographical respects is Madagascar typically African?

83. Describe the fauna of Madagascar, compare it with that of Africa and account for the differences between them.

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