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THE MIDDLE EAST

First published in 1950

CATALOGUE NO. 4252/U (METHUEN)

PRINTED IN GREAT BRITAIN

PREFACE

IN a foreword to his *History of the Hapsburg Empire*, Mr. A. J. P. Taylor quotes the saying that in order to be able to write a history of Austria, one must speak seventeen languages, and live ten times as long as mortal man. This phrase has frequently come to mind in the writing of the present volume on the geography of the Middle East : an area larger in extent than Austro-Hungary, more varied in its peoples, and with the longest continuous history of any region in the world.

My attempt, however indifferent, to present a reasoned account of human life in the Middle East and its environmental background owes something to the accident of war. During 1942-45 I had the opportunity of gaining first-hand knowledge of conditions in south-west Asia, and in southern Europe ; and was able to profit in some small degree from the large number of investigations and research projects that were carried out as a contributing element in the military campaigns of the period. In particular, new aspects of climate and weather in the Middle East were investigated, and upon some of these studies I have based my interpretation of the climatic mechanism in the eastern Mediterranean basin. I am conscious that the approach is in many respects unusual, if not unorthodox ; but, remembering the words of Professor Wooldridge that new views would receive sympathetic consideration, I am encouraged to put my own forward as a contribution to the closer understanding of prevailing conditions.

No better model could be found for an exposition of Middle Eastern geography than the remarkable studies of the late Professor Weulersse, in whose writings there is propounded the thesis that only by a close integration of geography and history can full understanding of human society be achieved. Because of the length of human occupation in the Middle East, the extent of interaction between man and his environment has proceeded further than in most other places on the globe, and an unusual stage of development has been reached : 'le fellah est tout le contraire d'un primitif; ce serait plutôt un hypercivilisé . . . écrasé sous le poids des siècles \ For this reason, I have endeavoured to give some weight to historical considerations, sometimes possibly at the cost of discursiveness, and a certain scrappiness and repetition ; but I am strongly of the opinion that the method

followed in this book is justified by the character of the material studied. As in many parts of the Middle East the Archaean basement rocks occasionally obtrude at the surface to form important elements in the modern landscape, so also we find a parallel in that contemporary social life is markedly coloured by past events, with an unaltered persistence of some practices throughout many thousands of years.

The technique of intermingling history and geography has been extensively developed by French writers, but is still rather unusual in Britain where it is too often the custom to regard the subjects as separate, even opposed, disciplines. Such an attitude is unfortunately particularly prominent in the northern half of our island, where in school curricula a choice must normally be made between the two subjects. However, after surveying the achievements of French geography, one may be tempted to believe that 'they order these things better in France \

With limitation of space, it has been inevitable that certain aspects of the geography of the Middle East have had to be treated summarily, or omitted. The problem of Palestine is an outstanding instance ; but the literature of Arab and Zionist viewpoints is so voluminous that it would be impossible to do justice to the claims of either side even in an entire volume. Another difficulty arises from the inadequacy of information for some regions. Despite this, it has been my aim to present a general exposition, with some mention of all areas. It is often tempting under such circumstances to devote exclusive attention to 'sample' districts; but although I have given relatively greater emphasis to the Levant than its size or population would warrant, I hope to avoid the criticism that my pages are merely arbitrary selections from the geography of the area, and do not fully live up to their title.

A word may be necessary to explain the usage of certain terms. I have taken the expression 'Levant' as indicating the coastal areas of the eastern Mediterranean lying between the Sinai and the Amanus range of Turkey—i.e. Palestine, the Lebanon, and western Syria and Transjordan, together with the island of Cyprus. Throughout the book I have followed the official practice of the governments concerned in using 'Iran' rather than 'Persia', and the modern Turkish spelling of place-names, e.g. Izmir and Eregli, instead of the older Smyrna and Heraclea.

The writing of this book could not have been accomplished, even

in the present inadequate way, without the help generously given from many quarters. In the first place, I should like to pay tribute to Emeritus-Professor H. J. Fleure, F.R.S., under whose guidance I began work as a student. Though there are few textual references to Professor Fleure's publications, it is upon his teaching and example that much of this book is based, and, were it possible, I should be proud to think that the following pages could convey even the slightest echo of the lofty thought, brilliance in interpretation, and warm humanism that are characteristic of Professor Fleure's approach to geography. To the inspiration of the late Professor Demangeon, of the University of Paris, one of the greatest of a unique group of geographers, I owe an abiding interest in human geography, and recall with gratitude and a sense of privilege the time spent working under his direction. I am also considerably indebted to Mr. A. C. O'Dell, Head of the Department of Geography, Aberdeen University, for encouragement, valuable criticism, and timely suggestions that have improved the text, and greatly eased the task of writing.

For several years, it was my good fortune to be associated with a profound and indefatigable investigator whose knowledge of parts of the Middle East is unrivalled : Dr. L. Dubertret, Head of the Geological Survey of Syria, who made available many of his own researches, and through whose good offices I was able to undertake certain field investigations in the Levant. My sincerest thanks are also due to Dr. G. M. Lees, F.R.S., of the Anglo-Iranian Oil Company, for helpful comment, and material on the structure and oil resources of the Middle East; to Dr. W. T. H. Williamson, Head of the Soil Science Department, Aberdeen University, who has revised the chapter on soils; to Professor E. E. Evans-Pritchard, of All Souls College, Oxford, who has kindly allowed me to use the results of surveys carried out by him in Cyrenaica ; to Dr. E. C. Willatts, of the Ministry of Town and Country Planning, whose work on Palestine has been extensively quoted ; to Dr. Bayard Dodge, formerly President of the American University of Beirut, for facilities and advice afforded to me during 1942-46 ; and to Professor H. A. R. Gibb, of St. John's College, Oxford, to whom I am indebted for an interpretation of present-day cultural trends in the Middle East.

In conclusion, I wish to record my grateful obligations to Miss K. M. Holmes, B.A., of University College, London, who has read much of the manuscript; to Mr. J. Morland Craig, of the Department of Geography, Aberdeen who has prepared a number of the

illustrations, and to Mr. R. MacNay, B.Sc, Mr. U. A. Warinop, and Mr. A. M. North, of Aberdeen Grammar School, who have also given valuable assistance in preparing maps and diagrams ; and finally to the American Geographical Society of New York, for kind permission to reproduce material from two articles of mine that have appeared in the *Geographical Review* ; and to the Royal Geographical Society, London, which has been good enough to allow me to reproduce one illustration from the *Geographical Journal*

W. B. F.

DARWEN, LANCASHIRE,
December, 1948.

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CHAPTER I

INTRODUCTORY

THE first task in an account of the geography of the region under consideration must be one of definition. The term 'Middle East' cannot unfortunately be said to command universal acceptance in a single strict sense, and it is therefore essential to delimit the region to which the name is held to refer, and to indicate how 'Middle East' gained acceptance in its present meaning.

Up to 1939, there prevailed a somewhat vague and loose division of southern Asia into Near, Middle, and Far East. The Far East was generally taken as connoting China, Japan, and, less frequently, Indo-China and Indonesia. The Middle East included Iran and Arabia, usually also the lower basin of the Euphrates-Tigris, and occasionally Afghanistan and India ; while the Near East began in the Balkans and included most of the countries adjacent to the basin of the eastern Mediterranean. No precise definition could, however, be said to be in general use, and for an indication of the inadequacy of the terms employed, and the looseness with which they were applied, we need only refer to current geographical literature of the past few years. Sir Percy Loraine, speaking before the Royal Geographical Society of Britain, defined the Near East as the Balkan states, Egypt, and the coastal areas on the eastern shores of the Mediterranean and of the Black Sea. An American geographer, Col. L. Martin, would qualify this definition to read 'and sometimes Egypt'. On the other hand, Sir P. Loraine described the Middle East' roughly as being Iran, Iraq, Afghanistan, and the Arabian peninsula ' ; but E. Jurkat, another American writer on S.W. Asia, shows the Near East as extending from Afghanistan to Crete, both inclusive, but exclusive of Egypt. The inadequacy of 'Near East' is also apparent from the titles *The Nearer East* of Hogarth, and *Nationalism and Imperialism in the Hither East* of Kohn.

The war of 1939 at one stroke removed the question of territorial definition in western Asia from the academic groves to which it had hitherto been mainly confined. There came *the fait accompli* by which a military province stretching from Iran to Tripolitania was created and named 'Middle East'. Establishment in this region of large military supply bases brought the necessity to reorganise both the

political and economic life of the countries concerned, in order to meet the changed conditions of war. A resident Minister of State was appointed to deal with political matters, and an economic organisation, the Middle East Supply Centre, originally British, but later Anglo-American, was set up to handle economic questions. It was inevitable that the territorial designation already adopted by the military authorities should continue in the new sphere ; hence ' Middle East ' took on full official sanction, and became the standard term of reference, exclusively used in the numerous governmental publications summarising political events, territorial surveys, and schemes of economic development.

Following the practice of their respective governments, a number of learned societies in both countries have adopted the new term. Equally significantly, the name has been adopted in the countries to which it is held to refer. The former Jewish Agency in Jerusalem employed it in their publications,¹ and the Arab Offices in London and Washington showed no reluctance to follow the same usage.

There were those, however, who did not look altogether favourably on the new and extended use of ' Middle East ' ; and in 1946 a deputation from the Royal Geographical Society placed this view before the Prime Minister of Great Britain. No change in policy took place, so that it is still the official practice of the British Government to refer to Egypt, Palestine, and Syria as forming part of the ' Middle East*.

Under these circumstances, it would seem difficult to challenge the validity of ' Middle East ' particularly as the general public in Britain and America has become accustomed to the usage—in some cases as the result of first-hand acquaintance with the region during military service. Though it can be urged that there is little logic in applying ' Middle East ' to countries of the eastern Mediterranean littoral, there is one compensation that outweighs this disadvantage : in its wider meaning, the term ' Middle East ' denotes a single geographical region with certain elements of marked physical and social unity. This consideration has led to its use in the present volume.

TERRITORIAL LIMITS

The next step is to arrive at a precise definition of the territories which it is proposed to group under the description ' Middle East.'

¹ E.g. in *Statistical Handbook of Middle Eastern Countries*, published 1943.

In its official publications, the British Government has included up to twenty-one countries—Malta, Tripolitania, Cyrenaica, Egypt, Cyprus, the Lebanon, Syria, Palestine, Transjordan, Iraq, Iran, the sheikhdoms of the Persian Gulf, Saudi Arabia, the Yemen, Aden and the protectorate, Eritrea, Ethiopia, British, French, and Italian Somaliland, and the Anglo-Egyptian Sudan. The inclusion of some of these countries was, however, the result of fortuitous administrative grouping by military authorities. It would seem greatly preferable to omit from this list the Sudan, Eritrea, Ethiopia, and the three Somalilands, which are all more properly considered as parts of intertropical Africa, and to replace them by Turkey, which, intimately linked to its southern and eastern neighbours by ties of geography, was not included in the governmental publications because of a purely temporary and political separation from the rest of the Middle East.

The position of Malta is open to doubt; as in the case of the Sudan, there are grounds for attaching it to other areas; and in the present author's view a division could well be made between Tripolitania and Cyrenaica, with the latter treated as a part of Egypt, and hence forming the western boundary of the Middle East region. The western desert of Egypt continues without real break into the plateau of Cyrenaica, whilst between eastern and western Libya, in the region of Agedabia, there is a marked topographical division.¹ Complementing and perhaps influenced by the structural affinities between Egypt and Cyrenaica are the racial, social, and economic ties that bind Cyrenaica to its eastern rather than to its western neighbour: Cyrenaica has only a few of the Hamitic or Berberine racial elements that are prominent in Tripolitania; and the culture of the region has been described as 'more Arab than that of any other region except peninsular Arabia'. We may also note that Cyrenaican cattle are driven eastwards to markets in Egypt—rarely westwards to Tripolitania; and it may also be relevant to recall that, with the exception of the Italian conquest of 1911, almost all major attacks on Cyrenaica have been mounted from the east.

The position of Iran, as easternmost member of the Middle East region is less open to doubt. Despite the barrier of encircling mountain ranges, and the abrupt separation from the Tigris lowlands, connexion with the west is the outstanding feature. The bulk of the Iranian population lies close to the western frontier, and Iranian

¹ It may be significant that in 1941 the advance of the British Army from Egypt came to a halt at Agedabia.

interests are closely bound up with those of Iraq, Turkey, and Russia, rather than with India.¹ Between Iran and its eastern neighbours lies a desolate belt of mountain ranges, salt steppe, and irregular *playa*, all of which are for the most part uninhabited or very sparsely peopled. This belt acts as an effective zone of separation, and can hence be taken as the eastern boundary of our Middle East region.

With these changes, it would appear possible to postulate on geographical grounds the existence of a natural region to which the name Middle East can be applied. It is true that the division proposed is open to certain criticism ; but the course of history, including war-time experiences during 1939-45, has shown that within this region are common elements of natural environment and social organisation. Herein, as it is hoped that this study will make reasonably clear, lies the justification for treating the Middle East as a single unit.

GENERAL CONSIDERATIONS

In a previous volume of this series, Professor Griffith Taylor contrasted the simplicity of geographical features in Australia with the complexity of conditions in Europe. A similar relationship—in ascending order—might be worked out between Europe and the Middle East, for within a physical environment that is at least as varied as that of Europe, one finds a pattern of human response that is infinitely more involved. Europe has its representatives of three races, but in the Middle East there are four, if not five, major racial elements ; Europe is at least predominantly Christian, but the Middle East is the home of three contrasting religious systems, and with a gradation from almost unrelieved paganism to the most advanced forms of Judaism, Christianity, and Islam. Ways of life, too, show a greater variation than those of Europe : communities of hunters are still to be found in parts of Arabia, and nomadism is predominant in many areas, whilst on the other hand, in certain favoured spots, standards of life approximate to the highest of Europe and America. Moreover, no visitor to the Middle East can fail to be conscious of the wide gap in living conditions and mental outlook which separates the townsfolk from the peasants, or the leaders of society from the common

¹ Cf. (a) The religious link—Iraq and Iran are the only states in which the Shi'a form of Islam predominates, (b) commercial relations—almost all of which are with the north and west, and (c) the movement of nomadic tribes, many of which pass part of the year in Iran, and part in Iraq and Turkey.

man. Within one single geographical region can be found traders and merchants in touch with international markets—in oil, textiles, fruit, and grain—and political or religious leaders fully conscious of their part as members of world-wide organisations; and yet alongside such highly developed groups occur large communities of farmers and herdsmen living at the extreme level of subsistence, whose total annual income is less than £10 or £25, and whose experience is limited to the immediate district in which they live.

The complexity of geographical conditions within the Middle East has for long been a considerable barrier to study. The country itself, largely mountain or desert, offers considerable physical obstacles to movement; and its relatively large size, and the poverty and emptiness of many regions have been further restrictive factors. Besides the so-called Empty Quarter* of Arabia, which has been traversed by Europeans only within the last two decades, parts of central and southern Anatolia are unsurveyed—it cannot yet be stated with finality how many component ranges make up the Anti-Taurus system—and wide stretches of marshland in southern Iraq, and of salt desert in central Iran, are quite unknown.

To these natural obstacles must be added the reluctance of native communities in some areas to admit outsiders, and the mutual jealousies of outside powers, each anxious to preserve for itself the exploitation of spheres of influence. For example, because of rivalry over the control of oil resources, even topographical and geological surveys have taken on a strong political implication. Moreover, to many Middle Easterners, any form of census or economic survey can arouse misgiving and sometimes active opposition. Under such conditions, it may be difficult to obtain a picture of reality, and any study of the Middle East must still rely to some extent on estimates, outline surveys, and the reports of travellers.

Importance in World Affairs.—Conditions are, however, in process of altering considerably because of the changed position of the Middle East in world affairs. Until the middle of the nineteenth century, S.W. Asia was a backwater, isolated from the main currents of political and economic activity, and neglected even by its nominal rulers, the Ottoman Sultans. This situation, as an outlying and unvalued portion of the domains of the * Sick Man of Europe \ began to alter after the Suez Canal was cut, following which the eastern Mediterranean and Red Seas became a principal artery of communication between Europe and Asia.

Developments in air transport have enormously increased the importance of the Middle East. The prevalence of steppe and desert, not normally a favourable factor, has shown itself to have some advantages—in the matter of weather conditions, which are usually very favourable for flying, and in providing abundant stretches of open, level country where air-fields can easily be constructed. It is no accident that Egypt has become a nodal centre of air routes ; and the effects are seen in the enhanced political and economic status of the country. The same tendency is apparent in other countries of the Middle East; hence the region that less than a century ago occupied a remotely marginal position has now become a cross-roads—the point of junction between an awakening Asia, a still influential Europe, and a triumphant America.

This enhanced importance is indicated by the intense interest of outside powers in Middle East affairs, and their attempts to obtain strategic and economic advantages by the possession of bases or concessions. As a further indication of the changed role of the Middle East, it may be useful to recall that during the war of 1914-18 the campaigns of Allenby were regarded as a ' side-show ' ; whilst in 1942 the victory of Alamein was a turning-point in the war.

There is another contributing factor in the rise of the Middle East to a position of world importance. This is the presence of oil deposits, reserves of which, at the time of writing, are thought to exceed those of the entire United States. Though in other respects the Middle East remains a region of extreme poverty, development of oil resources will inevitably produce far-reaching changes ; and one matter of significance is that the largest single oil refining plant in the world is located in Iran, and not, as might be expected, in North America.

Another topic might be opened up at this juncture, were it not too great in scope for an introductory chapter. This relates to the political situation in the Middle East, which has now come to exert an influence far beyond the borders of the countries directly concerned. Forty years ago, for example, it could hardly have been foreseen that Palestine would become a major issue in the domestic politics of the U.S.A., that the Arab policies pursued by Britain and France should be a minor, but persistent source of discord between the two nations, or that the mantle of Disraeli, as champion of the Turks against Russia, should descend upon an American President of left-wing views.

Poverty in Resources.—Throughout the pages of this volume, one

theme will recur. This is the poverty and depressed level of existence that prevail over the whole of the Middle East. Despite enhanced strategic and nodal importance, and despite the richness of oil deposits—the benefits from the exploitation of which, however, do not always reach the indigenous population—natural resources are in general very small as compared with those of other regions, and the sparse natural wealth that does exist is only too often inefficiently or incompletely utilised.

A mere 5 per cent of the total area is regarded as cultivable, while mineral resources, with the single exception of oil, are scanty. Thus the economic potentialities of the Middle East are not large, and it is regrettable that within the last few years there should have appeared a number of inflated estimates of possible future development in the Middle East. Such views must be set in relation to the factual information available, from which a much more modest and sober picture has to be drawn. With a rapidly rising population in many parts, existing standards of living, low though these may be, are in danger of further decline, so that for some communities it is a case of running hard, like Lewis Carroll's Red Queen, in order to keep in the same place. This is the view of a former Director of Food in the Middle East Supply Centre,¹ and one that is difficult to challenge.

Present Society in the Middle East.—In conclusion, a word may be said concerning the rapid break-up and alteration of existing ways of life. Forms of society that have endured since the Middle Ages or earlier are now in rapid decay, bringing the urgent problem of creating a new social order. Religious feeling, once the mainspring of most forms of cultural and political activity, is now in eclipse ; instead, a spirit of materialist nationalism is taking its place, not always with advantage. In the economic sphere, ancient methods of agriculture, stock-raising, and commerce are proving inadequate to modern conditions—hence, quoting from Drs. Keen and Worthington, although ' husbandry may be kept going by the resources of modern science, they are only palliatives. . . . Clearly there is some fundamental difficulty.' As a result, ' the whole area with a few local exceptions must be classed with the worst nourished parts of the world '\²

Faced with disintegration within, and foreign pressure from without, Middle Eastern peoples are being driven to adopt new ideas and new

¹ K. A. H. Murray, *Some Regional Economic Problems of the Middle East*.

² B. A. Keen, *Agricultural Development of the Middle East*; E. B. Worthington, *Middle East Science*.

techniques, but this process, neither easy nor harmonious, is responsible for much of the unrest which is characteristic of contemporary affairs. At the present time we are witnessing a rapid and fundamental reorganisation of society with two possible alternatives, the one a narrow regionalism leading ultimately to disruption, and the other a more fruitful development on a broader scale, involving the application of modern scientific principles to utilisation of resources, and the organisation of large parts of the Middle East as a single unit.

PART I

PHYSICAL GEOGRAPHY

CHAPTER H

LAND FORMS AND STRUCTURE

Geological Exploration.—In discussing the structure of the Middle East, reference must first be made to the lack of detailed geological information in many areas. Interest in the potentialities of mineral deposits has led to detailed investigation of a few favoured regions, but elsewhere knowledge is in a much less advanced state, and may in certain instances consist merely of incidental surveys carried out by travellers. The complex structure of the Middle East is itself an important obstacle to investigation. Recent phases of vulcanicity, particularly in Turkey, Armenia, and Iran, have covered a few districts under masses of lava ; and metamorphism has been a further hindrance to identification of rock structures both in the lava areas and in the folded zones. The floors of a large number of inland basins are covered by thick deposits of salt, or of saline, semi-liquid mud ; and elsewhere whole river valleys are filled with detritus, alluvium, or marsh. Thus entire geological structures may be masked by later deposits which offer little aid to the interpretation of underlying series. On the other hand, it should also be stated that arid country can often show excellent outcrops of rock strata, and thus the geology of some districts may be much better known than that of many regions covered by forest or alluvial plains.

Some of the earliest geological work took place in Iran, where towards the middle and end of the nineteenth century exaggerated reports of the mineral wealth of that country led to investigation by British, French, German, and Russian geologists. Interest centred mainly on the folded zone of the south-west, and to-day it is this area which is by far the best known. The geology of the central and eastern plateaus, which consist in part of a barren series of salt basins, was until very recently practically unknown ; and at the present time, exploration is merely in a preliminary stage. Our knowledge of the north of Iran is insufficient to pronounce with finality on the age and

detailed structure of the Elburz range and its continuations east and west.

Geological exploration in Turkey, and its former dependencies Syria and Palestine, owed much in the early stages to the work of Germans. Apart from a certain political influence in pre-1914 days which tended to make Turkey increasingly a German preserve, investigation was directed towards the exploitation of Turkey's scattered mineral resources. The difficulties of terrain alluded to above, particularly as regards eastern Turkey, tended for long to restrict investigation to local and regional problems ; and it was not until 1946 that the first complete geological map of Turkey was published by the Ministry of the Interior.

In Syria and Palestine preliminary work by Germans was carried a stage further by French and British geologists. In these regions structure and stratigraphy offer much less difficulty to the investigator, and maps of the whole area have been available for some years. A similar state of affairs exists in Iraq, where considerable interest has centred on the oil-bearing series of the Zagros foreland.

Wide areas of the Arabian plateau remain to be mapped. Although the fundamental feature of Arabian geology—the presence of an underlying platform of Archaean rocks—has been established, the disposition of later series, and the alignment of structural features are still to be determined. Recent attention to oil possibilities on the western shores of the Persian Gulf, particularly by American interests, will eventually increase our knowledge of Arabia.

Studies by British, French, and German geologists have advanced our knowledge of Egypt, and a detailed geological map was published in Cairo as early as 1910. As in modern Turkey, the constitution of a governmental Survey Department has greatly aided progress, and oil prospecting in the Tertiary series of the north has been a further favourable factor.

Structural Units,—Though detailed information for some areas may be lacking, it is nevertheless possible to outline the broad features of structure in the Middle East. Most of the south and west of the region consists of a series of plateaus or tablelands formed by the deposition of later, less resistant sediments upon a basement of ancient crystalline rocks. This basement once formed an extensive continental block known as Gondwanaland, which included most of the African continent, and portions of Australia, the Deccan, and South America. The Gondwanaland block was sufficiently **hard** and rigid to resist

mountain building movements which in other parts of the world gave rise to folded ranges such as the Alps and the Himalaya; and hence anticlinal and synclinal structures are either wholly absent or poorly developed in most southern parts of the Middle East.

Though folding was not a feature, the Gondwana block did not prove entirely resistant to crustal movements, and where these disturbances were on a sufficiently large scale, fracturing and faulting occurred, so that the marginal portions of the Gondwana continent have become detached as separate fragments. This was the case in Arabia, which became separated from the main mass of Africa by the

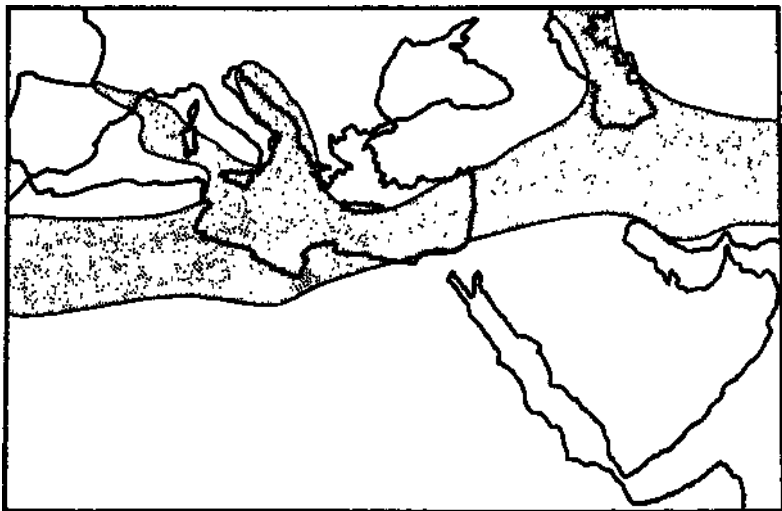


FIG. 1. Sketch of Gondwanaland and the Sea of the Tethys in early Permian times (after Schuchert). Sea stippled.

development of a series of parallel rifts in the area of the Red Sea. Smaller fragments of the Gondwana continent may also occur amongst the fold structures of Asia Minor and Iran, but here, because of the great disturbance and geological complexity of both regions, the presence of such blocks is less certain.

To the north of Gondwanaland lay a sea area, in which sedimentary material accumulated in considerable quantity. As this sea was rich in marine life, a large part of the sediments laid down on its floor was derived from the hard calcareous parts of the bodies of marine organisms, and thus limestone and chalk were gradually formed on an extensive scale, though non-calcareous rocks such as sandstones were also present. The sea area, which formed a portion of a larger

geosynclinal sea to which the name Tethys has been applied, had a basement of less resistant rock; hence when earth movements occurred, the relatively soft and plastic layers of sedimentary material underwent considerable compression and distortion, giving rise to the development of the extensive fold mountains, with an adjacent geosynclinal trough. Folded ranges of sediments laid down in the sea of the Tethys and uplifted in phases beginning in Cretaceous, and ending in late Pliocene times, are therefore characteristic of the northern and eastern parts of the Middle East; and from the point of structure the entire region can be regarded as composed of two sharply contrasted provinces : (a) the geologically ancient and stable platform of the south, and (b) the more recent and highly disturbed folded zone of the north.

In the strict geological sense, no further division is possible, since the structural units of the Middle East derive either from the foreland of Gondwanaland, or from the geosyncline of the Tethys. From the standpoint of the geographer, however, it is useful to particularise an intermediate region, or *zone of attenuation*, which can be said to lie between the foreland and the mountain ranges. Here the monotony of structure derived from undisturbed or resistant rock series gives way to a certain diversity of topography, and to a variety of economic resources ; and the difficult and unrewarding abruptness of the northern folded highlands is replaced by gentler land forms which offer greater human opportunities. This intermediate zone shows on the one hand a certain stability due to the foreland, and, on the other, the beginnings of variation in rock type and structure that is characteristic of the geosynclinal area. Such a zone can have no exactly defined physical limits, but support for the reality of its existence can be found in certain aspects of the human geography of the region. At a later stage in the book the three-fold physical division which is here outlined will be shown to have some validity as a factor in the social grouping of the region.¹

(a) *The Foreland*.—This zone includes Arabia, and most of Cyrenaica and Egypt (Fig. 2). The fundamental feature is the basement of Archaean rocks which is everywhere present, and most often underlies later series that are as a general rule deposited in horizontal layers. Although resistant to compression, the basement has undergone numerous periods of uplift and depression, with transgression at

¹ For a fuller discussion of the geological history of the Middle East, the reader is referred to Appendix I at the end of this volume.

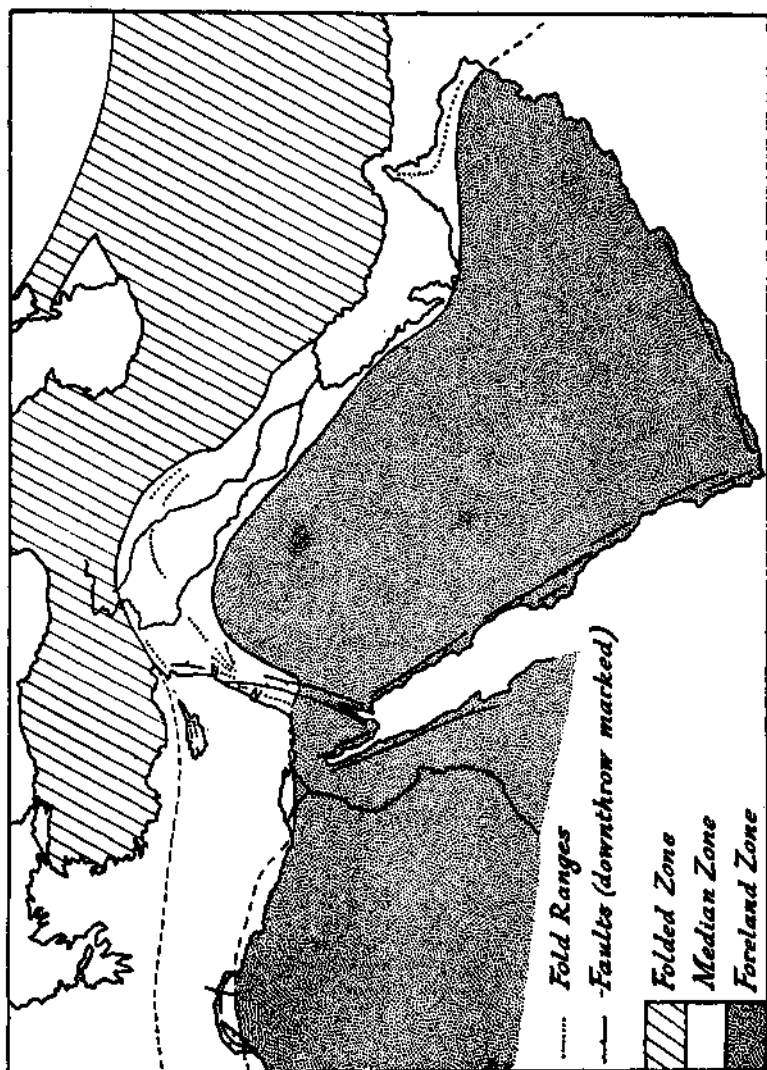


FIG. 2. Structural Units of the Middle East. Minor folds of Median Zone shown.

frequent intervals by the Tethys. Owing to the permanence of the structure, however, marine transgressions have mainly affected the outer margins, which therefore show a greater variety and thickness of later sedimentary deposits as compared with the interior.

The numerous strains and stresses to which the table has been subjected during earth movements have resulted in a certain degree of faulting and Assuring. Faulting occurred on a particularly large scale in early Tertiary times, and led to the formation of a series of tectonic troughs, disposed in a somewhat irregular manner. The smaller mass of Arabia was detached from the ancient continent of Gondwanaland ; and flooding of the sunken troughs give rise to the Gulf of Aden and the Red Sea, with minor extensions further to the north-west and north.

On the borders of the rift, more especially on the eastern side, extensive vulcanicity followed the fracturing of the crystalline basement. The imposing highlands of western Arabia are largely due to the development of volcanic cones and lava flows on the scarp edges of the rift. To the east and west of the trough region, faulting becomes less intense, and dislocation tends to be restricted to differential movements of merely local importance.

Nevertheless, despite the absence of fold-structures in the south, a certain variety in land forms occurs. Because of the prevalence of faulting, horsts and downthrow basins are fairly numerous ; and in addition, differential erosion acting upon horizontal rock series of varying hardness can produce an alternation of ridge and valley—e.g. as in the Mokattam Hills near Cairo, where an outcrop of limestone has proved more resistant to the erosive action of the Nile. A further element in the surface features of the foreland is provided by the exposure, in the southern Sinai, of the ancient Archaean landscape.

(b) *The Intermediate Zone.*—This is defined as extending over Palestine, and parts of Cyrenaica, Egypt, Syria, Iraq, and Oman ; and it may be considered as the region of junction of the foreland and geosyncline. Over most of the area sediments overlap the Archaean basement, which has had the effect of restricting disturbances to a mere wrinkling, but in the north the basement disappears, and sediments become progressively thicker. Krenkel has delimited a considerable area which he terms the Syrian arc, extending south-westwards into the Mediterranean, and even reaching as far as the extreme south-east of Tunisia. The greater part of this zone is characterised

by relatively thinly bedded rock measures, and by folding and fracturing on a restricted scale.

The fault zone of the Red Sea divides into two minor troughs at its northern end. One of these troughs continues towards Ismailia, but at a short distance towards the north-west is buried under alluvium. The other trough has a much greater extension northwards from the Gulf of Akaba through the Dead Sea and Jordan valley regions. The tectonic line then continues north-north-eastwards into the Lebanon and western Syria, but not, however, as a simple continuation of the Red Sea rift.

As far as the upper Jordan the trough is a normal rift, i.e. bounded by faults along the east and west sides. Further north, the valley is defined by one fault line only, the eastern side being formed by steeply inclined but not faulted series. This 'false rift' continues along the entire western border of the Lebanon and Syria, ultimately reaching the first folds of the Turkish system in the neighbourhood of Antakya (Antioch). A remarkable transverse fault zone striking east-west across the line of the rift west of Horns has sharply delimited the northern edge of the Lebanon Mountains, and given rise to a lowland corridor leading inland from the Mediterranean coast.

The highlands of the intermediate zone are all anticlinal in structure, with, in some cases, further modification by later faulting. The upfold of Judaea is perhaps the simplest structure, but is nevertheless very characteristic of most of the other highland masses of the area. Folding has been relatively gentle, and overthrusting almost absent. A similar anticline of larger dimensions forms the Lebanon Mountains—the highest in the median zone—and farther to the east a system of smaller but more numerous folds extends north-eastwards like the fingers of an open hand. The westernmost member, the Anti-Lebanon Mountains, is aligned parallel to the Lebanon, but the others diverge towards the north-east, with the minor knot of Mount Hermon forming the 'palm' in the south-west (see Fig. 66, p. 372).

As in the south, fracturing has been accompanied by lava flows, again of greater extent on the eastern side of the rift. In the Hauran of southern Syria, which has been the main area of vulcanicity, flows have been widespread, but of a quieter type, so that basalt sheets rather than volcanic cones are characteristic. Minor areas of igneous activity lie further to the north, between Horns and Aleppo.

The folds of western Syria can be traced in a huge arc around the

northern tip of the Arabian foreland, although structures are progressively smaller and even more open than in the west. The Jebel Sinjar and Jebel Makhal, on the borders of Iraq and Syria, are the principal members of the eastern fold system. The northward sweep of the arc would appear to indicate that the Archaean basement underlies much of the interior of Syria and Iraq, although no certain confirmation of this is as yet available.

The contrast between east and west in the median zone is very striking. For the most part, the rock series of Iraq lie almost horizontally, and edges of the various strata, outcropping one above the other, often provide the chief topographical features. In many parts of Iraq, this succession of rock measures has been worked upon by erosion, and appears as a cliff, which forms a western boundary for the valley of Mesopotamia. From this, according to some, the name Iraq (Arabic *cliff*) is derived.

Except for a small lava flow in N.E. Syria, the whole of the eastern portion of the intermediate zone has been unaffected by vulcanicity ; and the simplicity of structure in this area contrasts markedly with the disturbed conditions that occur further to the east and north. The abruptness of the boundary between Mesopotamia and the folds of the Zagros attracted interest in ancient historic times, even before Didalos Sicarus speculated on the nature of the ' Persian Ladder'⁹ which overhangs the level Mesopotamian plain.

(c) *The Folded Zone*.—Available evidence shows that the folded zone of the Middle East came into existence following pressure outwards from the interior of Asia ; that is to say, movement was from the north, and the deposits of the Tethys were folded towards the south. The north-eastern portions of the continent of Gondwanaland were thus passive agents against which earth movements acted. Only in a few restricted areas, and for special reasons, such as the presence of pre-existing structures, was this trend of folding altered. In southern Europe, on the other hand, movement is thought to have been from the south towards the north.

The Middle East came more directly under Asiatic influences, and hence the direction of folding is predominantly towards the south ; but in the west, another different component may have been superimposed upon the major thrust. This would seem to have produced a certain lateral deformation in the arcs of folding, which, instead of lying in parallel lines, have tended to assume a sinuous trend. In Asia Minor, shearing of the folds is also a feature.

Distinction can as a result be made between the east, where folding, although more intense, tended to be from a single origin ; and the west of the Middle Eastern region, where the basic pattern was complicated by other movements originating further in the south and west. Closely packed symmetrical folds with a single trend are hence more characteristic of the east ; and more widely disposed asymmetrical arcs and garlands, reminiscent on a smaller scale of eastern Asia, are more frequent in the west. The Cyprus arc, which is an outlier of the Amanus Mountains ; or the western Taurus, that plunges abruptly into the Mediterranean at Andifli, have few counterparts in the Iranian Zagros, where regularity of strike and continuity of folding are the outstanding features.

A complicating factor is the presence of older resistant blocks intimately involved in the folding of Asia Minor. No such juxtaposition of resistant and pliable series occurs in the Zagros, where folding was on a much larger scale ; and it is better to regard Asia Minor as comparable with central Iran rather than with the Zagros ranges. In Turkey, a relatively narrow band of sediments was compressed against numerous small and irregular blocks, with the result that folds are small in extent and often few in number : in Iran an entire geosynclinal trough was squeezed between two harder masses, both sub-continental in size, and of regular shape.

Considerable difficulty exists in ascertaining the origin of the central plateau block of Iran which separates the Elburz from the Zagros, and its role in influencing the folding of the regions round it. The position in Turkey is relatively clear : that of central Iran is at the present time the subject of some controversy. A recent study by Furon suggests that the Ural Mountains of Russia may continue far to the south, by way of central Iran, into the southern Indian Ocean. Unfortunately, however, the plateau area shows a large number of fold movements of differing geological phases, without any simple pattern or uniform direction of strike. Thus although signs of folding of Hercynian (i.e. Ural) age, and of north-south trend, can be found in central Iran, these are of such restricted extent that other authorities cannot believe that the Ural arc ever reached Iran.

A second problem of the Iranian plateau is the extent of its influence on later folding. The greatly restricted degree of sedimentation during Palaeozoic, Mesozoic, and Tertiary periods indicates a certain stability of the plateau ; and the extent to which it would seem to **have transmitted pressure to the Zagros on the south, either from its**

own movement, or from that of Angaraland, make it appear that central Iran could be regarded as an ancient stable mass comparable, on a smaller scale, with the major continents of Gondwanaland and Angaraland.

Recent studies have, however, drawn attention to the extensive fold structures of the region, and to the considerable thickness of Tertiary deposits in a few small areas. These are evidence of a considerably lesser degree of stability than was at first supposed ; and the previous conception of the Iranian plateau would accordingly seem to require modification. Further information on the geology of the region will be required before the question can be resolved, but it can, however, be stated in general terms that there is a fundamental similarity of structure between Iran and Turkey. In both areas there are local downthrow basins with relatively thick Tertiary deposits, and steep folding round the edges.

Rock Types.—It would not be appropriate in the present study to undertake a detailed description of rock series ; but interest attaches to certain strata which are of importance in the economic and social life of the region. Accordingly, without referring to age, or precise form of deposition, we may note the occurrence of a number of rock measures that have a special relationship to human activity.

It is first useful to note the abundance of *calcareous strata* in the Middle East. The Zagros is overwhelmingly calcareous in character, and many other series are markedly lime-rich. Parts of Turkey also show outcrops of calcareous sediments laid down in the Tethys ; and older limestones occur towards the north.

All the mountain ranges of western Syria and Palestine have a core of Jurassic or Cretaceous limestone, with calcareous beds of later age forming a cap in many places. Other limestone formations extend eastwards into the Arabian and Syrian deserts, as far as Iraq. Finally, many of the shallow bedded sediments on the southern foreland consist of calcareous series, with a particularly extensive development of Eocene limestone.

The strata termed calcareous include series ranging from limestone to chalk and marl. Thus in the Lebanon and north-west Syria massive Jurassic limestone, pale blue in colour, and of great chemical purity, is characteristic. Elsewhere, fine-grained yellowish or grey limestones occur, some of very variable composition ; and oolitic beds formed of minute concretions often provide a useful building stone. An intermixture of calcium and magnesium carbonates gives rise to

dolomite, a type of limestone with a grained texture that is more resistant to erosion than pure limestone.

A large number of marls occur in the Middle East. In Iraq and Iran brown, red, yellow, grey, or white marls alternate with limestone beds ; and the Judaeian wilderness is composed of a mass of chalky marl, grey-white in colour. Water can easily penetrate certain marl series, either downwards by seepage, or upwards, in response to capillary attraction due to heating of the surface. The latter movement may in time result in the formation of a hard 'pan' or crust.

The occurrence over wide areas of strata which are permeable to a varying degree has considerable effects on drainage and water supply, and therefore on human activity. The relationship between rock formations and drainage will be discussed in a later section of this chapter; at this stage we may, however, note that because of a deficiency of surface water supplies, the distribution of human settlement is in many areas sharply controlled by the occurrence of springs. Closely grouped habitations, rather than dispersed settlements, are hence highly characteristic in calcareous areas of the Middle East.

It may also be noted that the rock series described as permeable show considerable variation. In the case of coarser limestones, actual fissures may allow water to percolate rapidly downwards, even though the rock may not itself be porous. Other types of limestone may have a slower seepage, due either to more restricted fissuring, or to percolation within a porous structure.

With the limestones must be considered certain *basalts* which, although quite impermeable, are so highly fissured that water can penetrate to considerable depths. The plateau basalts of the Hauran and Transjordan include series of this kind, which give rise to springs where they are underlain by other types of non-permeable rock, or where fissuring ceases. Many settlements have grown up on sites determined by the apparently paradoxical phenomenon of springs issuing from basalt series.

The *igneous intrusions* of the north form a second group. Main interest lies in the fact that metallic ores occur in association with the igneous veins. Hence the greater part of the metallic mineral wealth of the Middle East occurs in those regions that have undergone disturbance, and where fracturing has allowed the rise of magma from below. Turkey is the most favoured region in this respect, since the more plastic series of the Zagros have tended to restrict fracturing.

A wide variety of minerals occur in Turkey, but owing to extreme

irregularity in disposition, the ore bodies themselves are generally small in amount and difficult to exploit. The gold fields in the Sardis district of western Turkey, once part of the domain of King Croesus, were among the earliest to be worked ; but modern attention is now focused on such metals as chromium and manganese.

The Archaean basement rocks also contain small amounts of precious ores, and these have also been irregularly exploited since earliest times. The wide extent of the Archaean table has made gold one of the traditional products of Arabia, though individual production is very small.

Precious and semi-precious stones, the product of metamorphism, also have a wide distribution in both the folded and pre-Cambrian series, but individual deposits are not rich, and cannot compare with such areas as the Rand. Nevertheless, metals and precious stones have formed part of the basis of commercial exchange in the Middle East since the dawn of history.

The mineral wealth of the sedimentary measures consists of oil, mineral salts, coal, and gypsum. Consideration of the oil resources of the Middle East is deferred to a later chapter, and there is little to say of the other three. Salt beds of many ages are known, and an extensive Cambrian series in the central and southern Zagros has had a modifying action on the later topographical features, and itself forms mountains in southern Iran. As a product of arid climatic regimes, surface salt deposits are frequent throughout the Middle East, and the inhabitants are often more concerned with the removal of unwanted salt from agricultural land, than with the commercial possibilities of its extraction. In a few areas, notably the Dead Sea, potassium and bromine are extracted from saline deposits, but with the exception of the Dead Sea area, exploitation is nowhere on a large scale.

The coal measures of the Middle East are extremely scanty. Deposits of Carboniferous age are preserved in a small district of Turkey between Eregli (Heraclea) and Zonguldak. This coal is of high quality, but is greatly limited in quantity, and cannot supply even the modest needs of Turkey. Nevertheless, the Turkish field is the most important in the Middle East. Other deposits of later age are believed to occur in Armenia—but are little exploited—also in northern Iran where coal of Jurassic age is mined in the district north of Teheran. Lignite of a poor quality exists in Turkey and in the Lebanon, but again deposits are few. In the Lebanon, following nearly a century of exploitation, supplies seem largely exhausted.

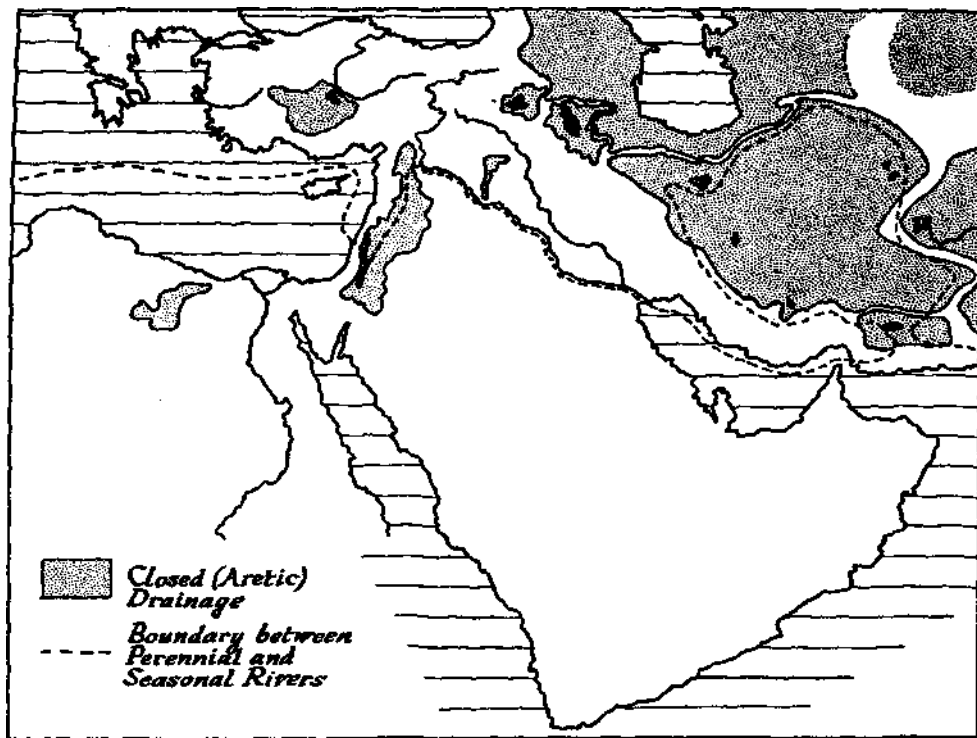


FIG. 3. Types of Drainage. The boundaries between drainage basins in eastern Iran and Turkestan are only approximate.

Hydrography.—In most regions of the world hydrography is largely controlled by rainfall, with land-forms and geological structure as subsidiary factors. As the result of a generally deficient rainfall, however, the Middle East shows to an unusual degree the influence of topography and structure in the development of its river systems ; and for this reason it is proposed to examine some of the general features of hydrography as an extension of physical structure, rather than defer consideration, as is more usual, until climatic factors have been discussed.

A demarcation must first be made between regions where rivers are permanent, with a flow maintained throughout the year, and regions where rivers dry up completely during certain seasons (Fig. 3). This latter division is surprisingly extensive, including central Iran,

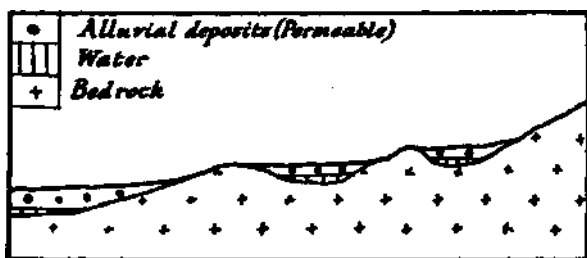


FIG. 4. Profile of a Wadi Bed.

the whole of Arabia and the plateau of central Syria, the Sinai peninsula, and, apart from the Nile valley and delta, the whole of north-east Africa. Here dry ravines or water-courses fill for a short time, and with great rapidity, after a fall of rain. A rushing torrent may rise 10 or even 20 feet, carrying abundant fine sediment, pebbles, and sometimes boulders. Erosion during this period can be rapid, but the effects are minimised by drifts of wind-borne material later in the year, and by the deposition of much eroded material at only a slightly lower level in its course by a quickly subsiding stream. Such river valleys, or *wadis*, tend to be irregular in outline, with the floor consisting of a series of discontinuous rock basins, each filled with alluvium or pebbles (Fig. 4).

In spite of the relative fertility of the water-borne deposits, and the availability of water, agriculture is often carried out in the wadis only with difficulty. Many streams change their course as the result of rapid erosion, or equally rapid deposition in their bed, so that floods are by no means uncommon, incredible though this might

appear in regions termed desert. If dams or irrigation channels are constructed, these are very liable to become filled with sediment brought down in flood periods; and, at the present time, several Roman irrigation works on the borders of the Syrian desert can be seen completely buried in alluvial deposits.¹

The area of perennial rivers corresponds, in the main, with the regions of heavier rainfall. Geological structure, however, plays a considerable part, since permeable strata may retain water in large quantities, and such water emerges as springs to feed rivers throughout the dry season. Extensive limestone outcrops to the south of the Anti-Taurus Range, along the Turco-Syrian frontier, give rise to numerous springs, from which rise the rivers Balikh, Khabour, and

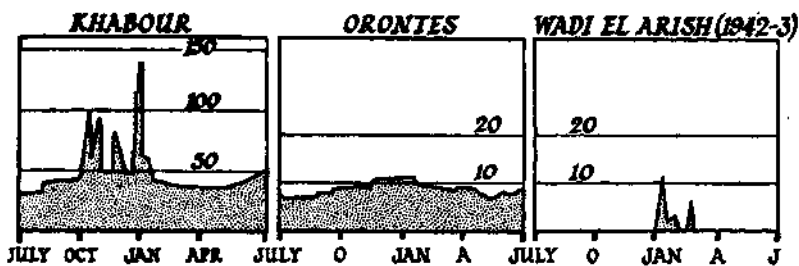


FIG. 5. Typical River Regimes (in part, after Dubcrtret and Weulersse). Flow in m^3/sec .

Jagh-Jagh to make their way across the Syrian desert to join the Euphrates.

Thus the effects of a limited rainfall, which might in regions of different geological structure be dissipated as torrents of a few days' duration, are spread throughout the year. Similar instances can be found in many areas of Asia Minor; in the Zagros, where a large number of important tributaries flow south-westwards to join the Tigris; and in the western borders of Syria and the Lebanon. The river Orontes, which rises from a spring in the Lebanon Mountains, is an excellent example of the effects of six months' rainfall spread throughout the whole year by slow percolation*through porous rock; the Khabour of north-east Syria shows the further superposition of direct run-off in the rainy season upon regular flow from springs; and the flow in the Wadi el Arish (Sinai) is an extreme case of intermittent flooding (Fig. 5).

A second feature of the hydrography of the Middle East is the frequency of aretic (i.e. closed or inland) drainage. One factor is, of

¹ The dam at Harbaqa (Palmyra), illustrated by Poidebard in *La Trace de Rome dans It Desert Syrie*.

course, the intermittent erosive action of many streams; but topography has again an important role. Interior basins shut off from the sea by encircling fold ranges; recent lava flows across existing valleys; warping of plateau-blocks; and the development of troughs along tectonic lines; all these, together with rapid evaporation and deficient rainfall, present too great an opposition to the relatively feeble erosive power of the rivers.

Practically all the closed basins are strongly saline: some exceptions do however occur when a stream is swallowed by porous rock measures. The greatest extent of inland drainage occurs in Iran, where almost all of the interior plateau is divided among salt basins. Only in the extreme north-west are the streams sufficiently developed to break through the surrounding fold mountains and find their way either to the Caspian Sea or to the Persian Gulf, this despite the presence of cross-faulted valleys.

Similar topography on a smaller scale exists in Asia Minor. In this region heavier rainfall on the coastal margins has led to a greater development of rivers, which have in many instances cut back through the coastal ranges into the plateau basins of the interior. The Kizil Irmak and Yezil Irmak Rivers, flowing to the Black Sea, have greatly reduced the areas of inland drainage in Anatolia, which now lie mainly in the south-central portion of the plateau, with an eastward extension through Lake Van to the Urmia basin of Iran.

An extensive zone of inland drainage lies at some distance inland from the coast of the Levant. The tectonic trough of the Jordan contains probably the best-known salt basins of the Middle East—the Dead Sea; but further to the north, in Syria-Lebanon, the trough has been broken through by the rivers Litani, Nahr el Kebir, and Orontes, all of which reach the sea. A region of inland drainage lies to the east of the trough, on the margins of the Syrian desert. It is noteworthy that the two great cities of Aleppo and Damascus (and also to a certain extent Jerusalem) stand on streams which ultimately terminate in salt basins—but in the upper reaches where the water is still sweet and fresh, and not as is more usual, in the lower, wider parts.

The normal course of river development, as defined by geographers for better watered regions, is only rarely achieved in the Middle East. In the absence of regular and permanent flow, with an increase of volume towards the mouth from the entry of tributaries, there exist certain anomalies and unusual phenomena in the rivers of the Middle East which from the earliest times have excited the wonder and

curiosity of all who observed them. The majestic Euphrates and Tigris, changing their relative level as they flow together in a single valley, the underground Lethe of Cyrenaica, the sacred Adonis River of Phoenicia, clear in summer and red in spring, the holy Jordan and Abana, and the Nile, greatest riddle of all, have together no parallel elsewhere in the world from the point of view of the association of human interest and speculation with geographical circumstances.

An approach to the development of a uniform thalweg in the shape of a parabola, typical of mature streams, is realised only by a few great rivers which have maintained a course antecedent in certain parts to the topography of their valleys. Of the remainder, the majority consist of short streams making a rapid way down steep and rugged mountain flanks. The Anatolian plateau is ringed by a number of

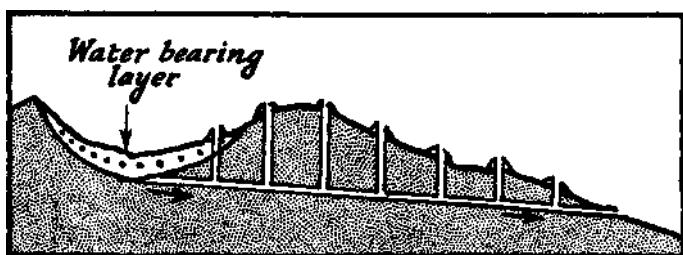


FIG. 6. Diagram of a Foggara. If because of a level topography the drainage tunnel cannot emerge at the surface, the last vertical shaft is used as a well.

such rivers that are broken by cascades and waterfalls, and frequently hidden in the depths of huge gorges. Only in a few instances, as for example that of the Buyuk Menderes (Meander), is the profile sufficiently developed to reach a mature stage. The western Zagros shows an even greater elaboration of short, immature streams plunging through spectacular rifts and gorges to reach the plains of Iraq. The Karun, a large and extremely swift river, carries down annually to the head of the Persian Gulf an immense mass of silt eroded from the central Zagros.

In areas where perennial streams are lacking, human existence, in the absence of water storage facilities, must depend upon wells and springs. Water can, of course, be found where a permeable rock measure, underlain by impermeable strata, retains a proportion of the rainfall. The quantity of water may in certain instances be sufficient to give rise to surface springs, or to maintain a level of water in a well sunk into the permeable rock ; but this is a feature only of favoured

areas. In drier regions more elaborate methods must be used to obtain water, the principal of these methods being the construction of a *foggara*. This consists of a very gently sloping tunnel driven into a water-bearing layer from a lower level, so that the water held in the permeable rock is drained off. As the work of construction proceeds, numerous vertical shafts are driven from the tunnel to the surface, in order to provide air for the tunneller, and to furnish a means of disposing of the rubble. A *foggara* may extend for several miles across country, and is always marked by a line of cones of debris, giving the impression of a number of miniature volcanoes spaced at regular intervals. The course of the tunnel is to some extent independent of surface features ; and *foggaras* of Roman construction are still important sources of water in several areas of the Levant. In Iran the name *qanat* is applied to similar tunnels, and certain tribes and clansmen have the reputation of being specially skilled in their construction. A third term *karez*, is used in Iraq, and *feledj* in Oman. Some *foggaras* may have a flow of several gallons of water per second, from which wide areas are irrigated (Fig. 6).

Water can also be found in the subsoil of dry river valleys in certain arid regions, provided that the underlying rock formation is impermeable. Although the greater proportion of the scanty rainfall soon runs away as a surface stream, a small amount sinks through the permeable alluvium or gravel of the wadi bed, and may be retained by the basin-like structure of the underlying rock. Such water-bearing strata, although small in extent, are of considerable value to the desert nomads of Arabia, Syria, and Libya. Temporary wells sunk in dry river beds may also support caravan traffic, and permit the establishment of trade routes across regions that are almost devoid of surface drainage. (See Fig. 4.)

Finally, the observer cannot fail to be aware of something of a discrepancy as between the immature and feeble drainage system described above, which prevails over large areas of the Middle East, and the actual land forms of the region, which show many large and well developed valleys. The physical map reveals a considerable number of structures that in better watered areas would be described as deeply dissected land forms : Arabia in particular, though devoid of permanent rivers, is deeply eroded by valley formations running inland from the Red Sea, Indian Ocean, and Persian Gulf.

This mature landscape is even more apparent to the traveller by air. Broad wadis several hundred miles in length, and occupied by

torrents only for several months, or even days, in the year ; extensive alluvial basins never entirely covered by a river, even at its maximum flood ; cols etched by water action in high mountain ranges—these phenomena, highly developed in Arabia and Iran, are also to be found along the Libyan coast. Moreover, in the region of perennial streams round the north-eastern Mediterranean, small rivers of inconsiderable volume lie in crevasses and canyons several thousand feet deep ; and the greater part of Syrian desert is diversified by dry, but well marked river beds trending towards the Euphrates. None of the present streams, which trickle among the pebbles for a few days in each year, could have carved out the rock basins marking their course, or have deposited the masses of sediment and scree that cover their beds.

The existing hydrographic system of the Middle East is thus obviously to a large extent a misfit, with attenuated rivers occupying channels that were developed at an earlier and wetter period. The precise age at which more abundant rainfall occurred, whether in historic time, or more remotely, is best considered as an aspect of climatology ; and discussion of climatic changes in the Middle East is therefore relegated to the succeeding chapter.

CLIMATE

IT is becoming increasingly difficult to separate climatology, which has been for the greater part the domain of the geographer, from meteorology, which in some respects is properly the concern of the physicist. Modern tendency is to make more and more use of the detailed mechanism of everyday weather to explain the larger features of climate ; and this new approach, known as * synoptic climatology is proving valuable in amplifying certain aspects of climate that up to the present have been dealt with rather inadequately. The geographer cannot be expected to follow in detail all the physical phenomena occurring in the atmosphere ; but in discussing climatic factors, an outline knowledge of the main physical features involved, with their broader effects, avoids the danger of loose generalisation. For instance, the development of the * Mediterranean' type of climate is usually ascribed to the northward migration of the Doldrum belt of high pressure. As we shall see later, this is only partly true for the Mediterranean itself. Similarly, it is not easy, except by reference to meteorology, to understand why rainfall in some parts of the world is sharply controlled by topography, whilst in others, this control is much less—why, for example, in the Black Sea region, Sebastopol should have less than 20 inches of rain annually and Batum over 90 inches, yet in France, at approximately the same latitude, Bordeaux has 31 inches, and Clermont-Ferrand 25 inches.

The Middle East lends itself admirably to the exposition of climate on the synoptic basis. The extreme variability of conditions both seasonally and as between sub-regions is best understood if reference is made to the air-masses of very different character that displace each other over the area. Our plan will be first to establish the scheme of pressure distribution, from which prevailing winds can be deduced. Following this, the origin and character of the air-masses that reach the Middle East can then be discussed. Finally, a survey of actual conditions of temperature, humidity, and rainfall will provide the basis for a climatic division on general lines. Local climatic distribution will be considered in more detail in the last section of this volume, under the appropriate regional study.¹

¹ A more detailed discussion of two weather factors which have special importance in the Middle East, namely adiabatic heating and cooling, and the development of atmospheric instability, will be found in Appendix II.

PRESSURE

Summer.—Intensive heating of the southern part of Asia gives rise to the well-known monsoonal low pressure area of India.¹ This low pressure zone, centred over the north-western provinces and the Gulf of Oman, is a permanent feature of the summer months, and the strongly developed wind system to which it gives rise affects not only India but, in addition, almost all of the Middle East (Fig. 7).

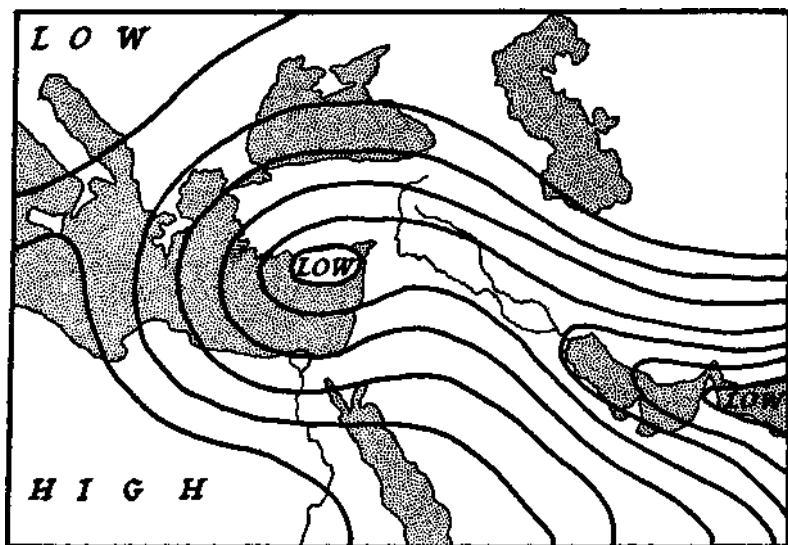


FIG. 7. Pressure Distribution in Summer.

The centre of the low is prolonged over the Persian Gulf towards Iran, and a minor centre of low pressure also develops over or near the island of Cyprus. This minor low is persistent, and has a marked effect on pressure and wind distribution in the Middle East. The Cyprus low develops primarily as the result of unequal heating of sea and land, and in all probability the basin-like structure of the island has a slight further effect. Any modifying influence from the sea is reduced by a ring of mountains that lies close to much of the coast, and in the interior heating is intensified by bare ridges that shut in the

¹ The atmosphere responds to changes of temperature by changes in volume and density. Increase in temperature leads to expansion, with a consequent fall in density; and, conversely, reduced temperature is followed by reduced volume and a higher density. Pressure is in direct relation to density, and hence atmospheric heating leads to a fall in pressure, because of the reduction in density; atmospheric cooling to higher pressure.

central plain. Abnormally high temperatures prevailing in the interior of Cyprus during summer justify a description of the island as a *plaque chauffante*.

The summer low of Cyprus maintains a separate existence, being divided from the main monsoonal low by a shallow isobaric col situated over N. W. Syria. Air currents originating over the Indian Ocean are thus drawn into the monsoonal circulation, and, except near the centres of low pressure, follow a somewhat involved path anti-clockwise round the entire low-pressure system.¹ Starting over the Deccan, winds turn northwards and westwards, parallel to the Himalaya, and then over the Zagros ranges into western Iran. Continuing northwards into Armenia, the wind track turns to the west in Asia Minor, then southwards over the Aegean, south-eastwards in the eastern Mediterranean, in response to the pull of the Cyprus low, eastwards over the Levant; and south-eastwards over Arabia.

Conditions over Arabia are less easy to define, but it is apparent that further deviation to the south-west then takes place, owing to the development of a third low pressure zone in the region of Abyssinia and the Upper Nile valley. This third area probably has the effect of drawing in the returning Middle East current from the north-east, together with a supply of very damp air either from the Indian Ocean to the south-east, or from the Gulf of Guinea in the Atlantic Ocean. From the latter is thought to come the well-known summer rainfall of Abyssinia and the Upper Nile that produces the Nile floods.² A second pressure col must lie over S.E. Arabia, separating the African centre from the main monsoonal low of N. W. India.

This composite pressure system is a permanent feature from late May or June until September. Minor variations of pressure occur

¹ A small proportion of the air in the monsoonal circulation describes a short, simple path round the centres of low pressure. In both instances passage over the sea takes place, and the air becomes sufficiently damp to give rain on reaching the land. This rainfall is more marked in India, where the low is more developed, but the Cyprus low would also seem to produce a slight summer rainfall in the south-east coastlands of Turkey, and in the Hatay.

² This distribution of winds would at first sight seem to be highly peculiar. Controversy has occurred as to whether the damp summer winds of Abyssinia and the Yemen do in fact come all the way from the Atlantic, or whether they are drawn in more directly from the Indian Ocean. At present, the more accepted view is that air currents originate far to the west, over the Gulf of Guinea; and important evidence in support of this theory is the entire lack of summer rainfall on the coastlands of southern Arabia—a steady monsoonal inflow from the Indian Ocean would presumably give a regime at Aden comparably with that prevailing at Bombay. This is definitely not the case, since only the interior of south-west Arabia receives any rainfall during summer.

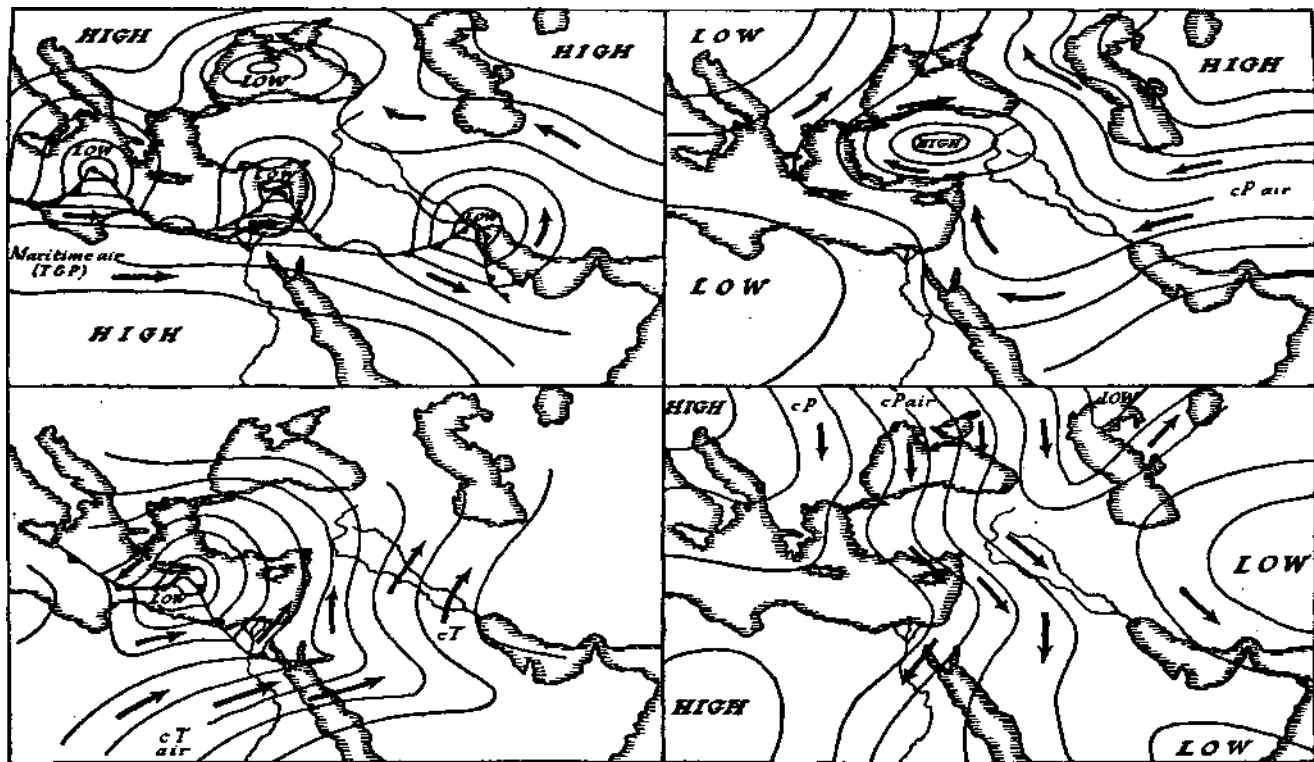


FIG .8. Pressure Situations in Winter.

from time to time, with a slight deepening or filling up of the three centres, but the general disposition of isobars remains unchanged, and remarkable regularity in wind direction is a feature.

Winter.—High pressure covers the interior of Asia, and extends as far south as Iran. Owing to the elevation of the Anatolian plateau very low temperatures occur ; and a second, smaller anticyclone develops over the region. This is a minor feature, hardly comparable with the Siberian anticyclone, since it disappears completely from time to time, as depressions advance eastwards across the Mediterranean or Black Seas. Over the entire Middle East, pressure conditions are very variable (Fig. 8). Outlying portions of the Siberian anticyclone may extend westwards for a short period, and cover much of the Middle East; but a disturbed cyclonic development associated with generally low-pressure conditions is more characteristic at this season.

Atlantic depressions arrive via N.W. Europe, Spain, or N.W. Africa, and, rejuvenated by contact with the sea, often continue via the Mediterranean as far as Armenia or Iran. More frequently, however, low pressure systems develop within the Mediterranean area itself, which, with its contrasts of sea and land, warm plain and cold mountain, and damp coastline and arid interior, favours the growth of atmospheric disturbances. Overspilling into the Mediterranean basin of air from another region provides the first impetus to development, and, once formed, these depressions are liable to further intensification as they pass eastwards.

Certain regions stand out as especially favourable for the development or intensification of low-pressure systems. Chief of these is in northern Italy, from which a considerable number of disturbances originate and move south-eastwards into the eastern Mediterranean. Since 1942 it has also been established that depressions can form south of the Atlas Mountains, and move into the central Mediterranean. In the east, the Gulf of Sirte has a marked influence on the weather of Cyrenaica and Lower Egypt; and Cyprus is particularly noteworthy as an area in which depressions develop. 'Cyprus lows', small, rapidly moving disturbances, are a prominent feature of autumn, winter, and spring (Fig. 9).

It cannot be too strongly urged that the Mediterranean must not be regarded as a simple eastward extension of the Atlantic Ocean, and therefore as a channel by which Atlantic depressions reach southern Europe and S.W. Asia. Although it is true that a certain **number of Mediterranean** depressions develop far to **the west, the**

majority are autochthonous in origin, and the weather to which they give rise is essentially different from that of* Polar ' depressions of the Atlantic. Warm sectors in depressions of cool temperate latitudes are associated with extensive cloud masses, and high humidities; in the

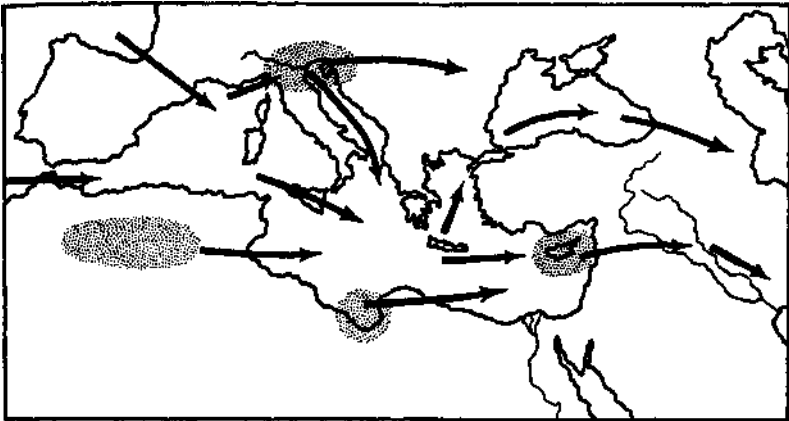


FIG. 9. Tracks and Regions of Origin of Mediterranean Depressions.

Mediterranean, warm sectors may be almost cloudless and quite dry : or again, the north winds of winter often give clear, brilliant weather in the south, but very different conditions in northern Europe.

A further point of difference arises in the relative shallowness and small extent of Mediterranean depressions. Whereas Atlantic depressions may cover half the entire ocean, with a minimum pressure approaching 960 millibars, disturbances in the Mediterranean are usually much smaller, and pressure rarely falls below 990 millibars. This does not mean that the depression is less intense; but the duration of bad weather is definitely shorter, and greater variety in conditions is experienced.

It is not considered necessary to follow the tracks of Mediterranean depressions in much detail. Carefully defined routes tend to be somewhat misleading, since a feature of any depression is its irregularity of movement. Broadly speaking, however, depressions tend to follow a sea track. From northern Italy, they frequently pass down the Adriatic into the Ionian Sea. Here the track divides, under the influence of the land mass of Asia Minor. Many depressions continue eastwards into the Levant and Iraq, whilst others move northwards into the Aegean and Black Seas, ultimately reaching the Caspian. A **second route** lies in the south of the Mediterranean basin. In this

case an uninterrupted sea track brings rain to the Levant coastlands, and depressions often reach the Persian Gulf, or even the interior of Iran.

In summer and early autumn, cyclonic disturbances rarely affect the Middle East. A more northerly track takes them across the northern Balkans to the Black Sea, where they bring rainfall to the eastern coaslands. (Cf. conditions at Batum.)

RAINFALL AT BATUM (INCHES)

<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	<i>Total</i>
10.2	6.0	6.2	5.0	2.8	5.9	6.0	8.2	11.9	8.8	12.2	10.0	93.3

AIR MASS CLIMATOLOGY IN THE MIDDLE EAST

Air masses are conservative with respect to changes of temperature and humidity ; that is, they tend to gain or lose heat and moisture relatively slowly. This has important effects for climatology, since if two air masses of differing temperatures are brought into contact, transfer of heat by diffusion from the warmer to the colder mass does not readily occur. In place of a rapid equalisation of temperature throughout both masses, original characteristics persist, with the two air masses in juxtaposition retaining a separate identity, rather than mingling to form a single larger mass of intermediate qualities. A sharp boundary develops between the warm and the cold air, and it is in this zone that relatively slow transfer of heat and moisture takes place.

From this change of heat and moisture in a narrow zone arise many of the phenomena of weather ; and Bjerknes has developed his well-known Polar Frontal Theory from consideration of the behaviour of air masses and their boundary zones, or ' fronts'.

Bjerknes* conception of weather as due to the juxtaposition of air masses of differing qualities is now recognised as of fundamental importance in the study of meteorology and climatology. First elaborated for the meteorology of temperate latitudes, frontal analysis can be applied to most areas of the world, although in doing so, it is necessary to introduce certain modifications. As regards the Middle East, the Polar Frontal Theory is valuable as a basis, but the principles elaborated for higher latitudes do not always apply in detail.¹ This

¹ One of these concerns conditions at a warm front, i.e. the boundary between cold air and an advancing warm mass. In high latitudes this is regarded essentially as a **stable area**, but in the tropics marked instability, leading to thunderstorms, is frequently observed.

reservation concerns not only the mode or origin of fronts, but also the weather conditions prevailing in frontal zones.

The observer should therefore be ready to recognise that frontal analysis, although an extremely valuable approach, does not offer a complete explanation of the weather phenomena encountered in tropical and sub-tropical latitudes. Moreover, at the present stage of development of the science of meteorology, certain fundamental questions (particularly those concerning the reason for the development of high and low-pressure areas) await a fuller answer.

The special situation of the Middle East with respect to temperature zones must first be noted. A link between Africa and Asia, the Middle East lies close to two of the hottest regions of the world, the Sahara, and N. W. India : yet at the same time it forms a part of the continent of Asia, which in winter develops the lowest temperatures occurring on the globe. Intermediate between these regions of extremes, the Middle East can easily fall for a short time under the influence of one or the other ; and the relative closeness of such reservoirs of heat and cold means that little modification can take place as air currents make their way outwards from their regions of origin. Here is the first contrast with cool temperate latitudes : air arriving in N. W. Europe, for example, whether polar or tropical in origin, is nearly always considerably modified during its long journey north or south, and best described as relatively cold (polar) or warm (tropical) ; but in the Middle East little doubt as to area of origin is possible. By reason of its scorching heat and dust-laden appearance, African air can be felt and seen to be a ' breath of the desert ' ; whilst at other times cold spells of Siberian intensity may freeze rivers in the north and east.

It is customary to divide air masses according to their area of origin, either polar or tropical. Further division is then made on the basis of humidity—continental air is generally drier than that originating over oceans. This gives four main types of air masses: polar maritime and polar continental; and tropical maritime and tropical continental. Division on these lines is, however, not entirely satisfactory for the Middle East, since maritime influences are less important, and continental origins cannot always be simply defined as tropical or polar.

For the purposes of this study, the following classification of air masses is adopted :

- (i) Monsoon air, originating over the Indian Ocean and therefore tropical maritime, but considerably modified by the time of arrival in the Middle East.

- (2) Maritime air from the Atlantic, reaching the Middle East via the Mediterranean. This can be either tropical or polar in origin.
- (3) Tropical continental air.
- (4) Polar continental air.

Monsoon Air.—A feature of the summer months only, and brought into the Middle East by the development of summer low pressure. This air originates over the Indian Ocean, and is drawn into the interior of India from the month of June onwards. Initially very moist, the monsoon current becomes progressively drier during its passage of the Deccan and Ganges valley ; and on arrival in Iran, it is almost completely devoid of moisture. An occasional shower may occur on final uplift over the Makran and eastern Zagros ranges, but for the rest of its course no rain clouds develop. During its passage over Iran, Armenia, and Asia Minor, the air is relatively stable, and stability is increased by slight adiabatic warming on descent from the Anatolian plateau to the Mediterranean (Fig. 7).

A short sea passage in the west is insufficient to restore its former high humidity, and the air arrives in Egypt and the Levant largely unaffected, except in the lowest layer. The Mediterranean has, however, some slight influence in that the lowest 2,000 feet of the air mass become highly charged with moisture. This is insufficient to give rise to rainfall, but a marked cloud effect is seen on the coast of the Mediterranean, and onshore winds are extremely humid. Dry conditions, however, persist above 2,000 feet, and the whole mass becomes dried out at a short distance inland.

For the rest of its course, the monsoonal current remains dry; and over most of the interior of S.W. Asia clear skies are common, with days and sometimes weeks of entire absence of cloud—an indication of the extent to which the original monsoon air has been modified.

Inflow of unmodified (i.e. humid) monsoon air from Africa occurs on a small scale in southern Arabia, and gives rise to the summer maximum of rainfall in the Yemen and Dhofar, comparable in regime, though not in amount, with that of India. (See footnote 2, p. 30.)

From the beginning of June till mid-September, no other air mass penetrates into the Middle East, so strongly developed is the monsoonal circulation. Later in September, however, bursts of maritime air from the Mediterranean increasingly disturb the monsoonal flow, and finally displace it towards the end of autumn.

Maritime Air.—Dampness is the chief characteristic, but a generally lower temperature is also found. This air usually originates over the

Atlantic, passing into the Mediterranean either by way of N.W. Europe, Spain, or N.W. Africa. There may thus be considerable differences in the air mass itself, some parts being polar and others tropical in origin. Temperature characteristics are, however, modified during the long passage over land and sea, so that often on arrival in the eastern Mediterranean no special features can be discerned. Humidity is, on the other hand, largely unaltered, as the track of the air has lain over sea areas. On uplift, or on intermixture with other masses, considerable condensation takes place, with consequent heavy rainfall.

Maritime air currents blowing generally from a westerly direction penetrate the entire Middle East region between October and May.

Differences set up by slight changes within the air mass itself, or by interaction with other masses of more widely divergent type, give rise to disturbances which produce a kind of weather similar to that of the cyclonic belt of cool temperate latitudes. Strings of small depressions are a feature of the maritime regime, and the intensity of these latter depends upon the degree of contrast in temperature and humidity of the varied air masses that form them (Fig. 8, top left).

Maritime air exerts its greatest influence on the western margins of the Middle East, but we have seen that depressions can penetrate as far east as Iran. Like the monsoon current in India, the westerlies of the Middle East become progressively drier as they advance into the continental interior, and the weather disturbances to which they give rise become increasingly feeble.

The inflow of maritime air, although predominant throughout much of the year between October and May, is interrupted from time to time by outbursts of air of two largely differing types, that are yet to be considered.

Tropical Continental Air,—A feature of the Middle East is the proximity of wide expanses of desert, from which intensely hot and dry air may be drawn by the passage of depressions. If a southerly gradient of pressure develops, air from north Africa and Arabia floods northwards on a large scale, producing highly special weather conditions (Fig. 8, bottom left).

A portion of the great quantity of heat energy is transferred to the pressure field, giving rise to strong winds, which frequently reach gale force. Temperatures rise—sometimes by 30° or 40° F. in a few hours; and relative humidity falls to figures of less than 10 per cent. Crops may be withered in a day, a rise in the death rate is often

noticed in large cities,¹ and nervous tension and irritability affect most people. Electrical disturbances interrupt communications, and can be a danger to telephone operators,² whilst driving sand or dust is a

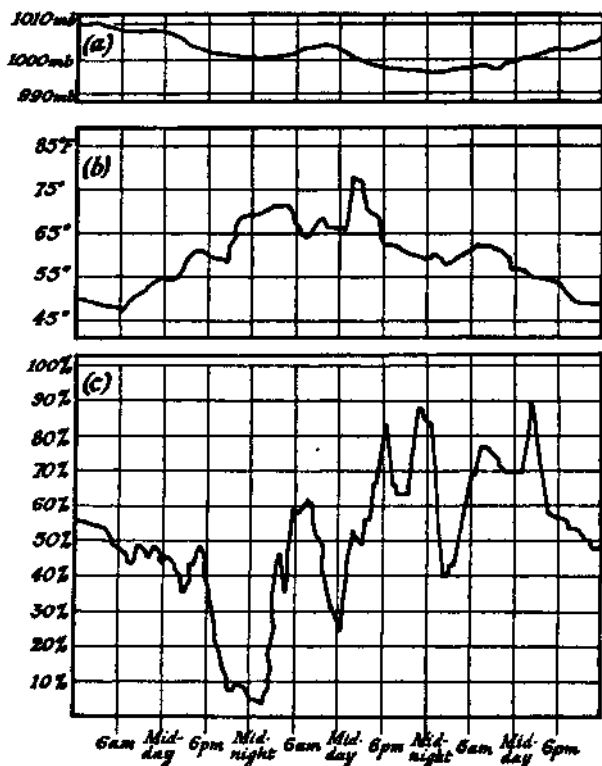


FIG. 10. Shloulq Conditions in Syria, March 10th to 12th 1928 (after Dubertret and Weulersse). (a) pressure ; (b) temperature ; (c) relative humidity.

frequent and unpleasant accompaniment of bursts of desert air even in settled districts.

The effect is so marked that local names have been given to these southerly winds. In Egypt the word 'Khamsin'⁸ is used, 'Gibli'

¹ Such an effect, common to-day in the cities of Egypt, may explain in part the Tenth Plague of the Old Testament.

² It was found necessary to instal special apparatus at the Tobruk telephone exchange, in order to discharge static electricity generated in telephone wires during periods of low humidity.

⁸ The word Khamsin (Arabic *fifty*) has been variously understood to refer to the average duration of the hot wind (50 hours), to its annual frequency (50 times) and to its

in Cyrenaica, and 'Shlouq' in the Levant. In Iran, * Simoom' (Poison Wind) is a good description. Similar winds on a somewhat smaller scale are termed ' Santa Annas' in California, and ' Brickfielders ' in Australia.

Winds of Khamsin type develop most often when tropical air is drawn in as the warm sector of a rapidly moving depression formed in maritime air. Such depressions give the most extreme weather conditions, but are usually of short duration. In desert areas, sandstorms are almost invariably produced by strong southerly winds, and these storms, often violent, may spread into settled areas. Cairo itself is not immune from visitations; and Herodotus records the fate of a Persian army which, setting out from Egypt against a rising south wind to subdue the oasis of Siwa, lost its way, and was never heard of again. Khamsin depressions can still be a danger even to modern armies, especially as regards air communications.

Autumn and spring, particularly the latter, are the chief seasons at which hot winds occur. In spring, the southern deserts heat up rapidly whilst the rest of the Middle East is still cold, and favourable conditions are thus established for mixture of differing air streams. Owing to the extreme dryness of the desert air, rainfall, which normally results from mixing of two air masses, is very scanty or entirely absent.

The frequency of hot spells during the season when new crops are beginning to grow is particularly unfortunate (chiefly spring, but also autumn, as both winter and summer crops are grown). Much damage can be done to young plants.

Polar Continental Air.—In winter and spring, waves of cold air flow southward and westward from the intensely cold interior of Eurasia. Two widely differing types of air can be distinguished. The first, originating in south-central Asia, overflows into Iran, and may for a short time reach the Mediterranean. The air is cold, but very stable, deriving from the Siberian anticyclone, and days are fine and clear. Over the Iranian and Anatolian plateaus very low temperatures occur but sunshine during the day mitigates the worst effects, particularly as humidity is low (Fig. 8, top right).

Further to the west, the air undergoes slight adiabatic heating as it descends the edges of the Zagros, and the plateaus of Anatolia and Syria. Fine weather prevails, with low temperatures inland, but

season of maximum onset, the fifty days around the Coptic Easter. The third explanation seems to us closest to the truth.

moderately warm conditions on the coastlands. Fog, the frequent accompaniment of winter high pressure in western Europe, is absent, as the air is very dry.¹ Anticyclonic waves are frequent in the Middle East during autumn and the early part of winter ; but later in the year continental air of a very different type makes its way in from the north-west (Fig. 8, bottom right).

Anticyclonic conditions frequently develop in central and eastern Europe during January, February, and March. A reservoir of cold air builds up, and this, unlike the air outflowing from the dry heart of Asia, is damp, since it is merely chilled and modified maritime air originating from the Atlantic. From time to time, currents of this European air are drawn into the rear of a cycle of depressions moving east along the Mediterranean ; and on reaching the Middle East, the lower layers of this quasi-continental air have been subjected to contact heating during the southward passage over the warm sea. Considerable quantities of moisture have also been absorbed.

Unlike the adiabatic heating of the Asiatic continental air, which affect all layers, differential heating of only the lowest layers in the European current produces much instability ; and this, together with high humidity, gives rise to heavy rainfall of a showery type.² Practically all the snowfall, and much of the rainfall of the Middle East, develop in outbursts of cold damp air from central and eastern Europe. Late winter and early spring are unpleasant seasons, liable to prolonged periods of raw, cold conditions, with frequent and heavy precipitation.

FRONTAL DEVELOPMENT

The ' classic ' theory of Polar Depressions postulates the existence in most atmospheric depressions of the ' warm sector ', bounded on the side towards which the depression is advancing, by a warm front; and on the rear, by a cold front. As the depression matures, the entire warm sector becomes occluded in the mass of cold air, that is, it is lifted away from the surface ; and the two fronts coalesce to form an occluded front, in which the characteristics of both warm and cold fronts are to some extent combined.

¹ Fog occurs for the most part in the Middle East only during inflow of maritime air from the west.

² Heating applied equally to an entire air mass raises the temperature absolutely, but does not alter the temperature *difference* between highest and lowest layers and has therefore no effect on the stability of the air mass. Heating applied only to the lowest layer increases this difference, and hence tends to produce instability.

As regards depressions affecting the Middle East, several qualifications must be made to this general theory. In the first place, many depressions form air masses that are homogeneous—that is, without discontinuities of temperature and pressure. Frontal conditions are therefore absent, and weather is fine. The summer low of Cyprus is an outstanding example, and we have the curious position that although pressure is on average distinctly lower in summer than in winter over most of the Middle East (because of the persistence of monsoonal lows), weather is uniformly good. Similar, but more transitory non-frontal depressions also occur in winter.

In cases where warm air is drawn northwards to form the warm sector of a normal frontal depression, dryness of the warm air, or the generally high temperature of the entire region, may prevent the development of weather conditions usually present at a warm front. In higher latitudes air forming a warm sector has almost always travelled over oceanic areas, and is extremely damp ; hence it gives rise to a dense mass of cloud extending for several hundred miles in advance of the warm front. Moderate, but prolonged and steady, rainfall is highly characteristic of such frontal developments. In the Middle East, however, warm air originates in continental areas, and, initially very dry, has no prolonged sea track during which it could absorb moisture. Warm fronts are thus very infrequent and poorly developed—some occurring almost entirely without cloud. As a factor affecting rainfall, their influence is slight.

Rainfall in the Middle East is almost entirely from cold fronts, which show an especially marked development. Cold fronts are always regions of instability, and this phenomenon tends to be greatly increased over regions of high relief (Appendix II). Cold fronts meeting mountain ranges or plateau edges are therefore much intensified ; but rapid weakening also occurs on the leeward side of the high ground. In this way, wide variation in climatic conditions may occur, since local topography assumes great importance in the development of weather. Rainfall is heavy on the windward side of mountain ranges, but much reduced on the leeward side. This helps to explain why the edge of the Syrian desert approaches so closely to the shores of the Mediterranean, although prevailing winds are onshore throughout most of the year.

Depressions of F4.W. Europe develop fronts that are in active motion, and aligned in a characteristic pattern *across* the isobars. Exceptions occur in the Middle East when a boundary develops between

two air masses, and frontal conditions are set up along a line *parallel* to the isobars (Fig. n). The phenomenon of air mass boundaries, using the term as implying something different from the 'front' of Bjerknes, is of importance in the Middle East, where air masses of different qualities may flow side by side without giving rise to the rapid formation of an atmospheric depression such as would occur in higher latitudes. Asia Minor and Libya are most liable to develop boundary fronts of this type, which are often more persistent than normal fronts. The practical importance of such boundary fronts is greatest for the meteorologist: to the student of climate, chief interest lies in the indication that air mass climatology developed for higher latitudes cannot be applied in over-strict detail to warmer regions.

TEMPERATURE AND HUMIDITY

Chief features are the high temperatures of summer, and a wide range, both annual and diurnal. Clear skies are the main factor in developing intense heating ; and it is useful to note the contrast with regions nearer the equator, where a summer rainfall restricts direct insolation, owing to the prevalence of cloud.

AVERAGE TEMPERATURE IN JULY

	°F.		°F,
Cairo	. 83	Colon	. 80
Beirut	. 82	Freetown . . .	. 78
Basra	. 97	Bombay .	. 80
Teheran .	. 85	Delhi	. 86

Minor influences are the mountainous coastline of much of the Middle East, which limits the tempering influence of the sea to a narrow strip ; and the absence of soil and vegetation, which favours intense heating of the arid surface.

In view of the wide range of temperatures, both daily and seasonal, averages such as those quoted above give a somewhat misleading impression of actual conditions, and it is preferable to refer to average maxima and minima of temperature. For instance, in the table above, it would seem that temperatures in Cairo and Beirut are very similar : in fact, Cairo often tops 100° F. during the day,* but has a cool night; Beirut rarely rises above 90° F., but there is only 11 ° difference **between** day and night temperatures. The figures on page 45 will

bring out more clearly the extent to which conditions actually experienced differ from statistical means.

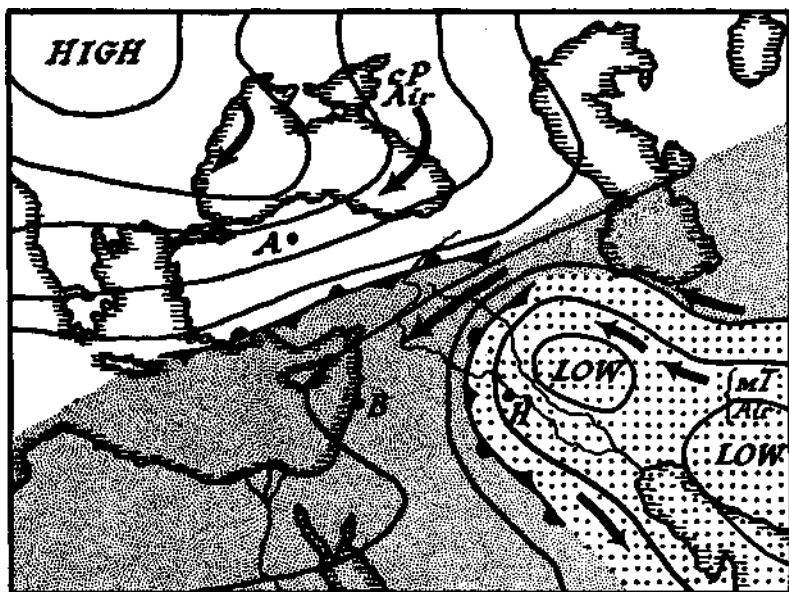


FIG. I I . Variation in Air Mass, with characteristic alignment of Fronts, as on 25/3/45. A—Ankara, temp. 36° F. ; B—Beirut, 61 ° F. ; H—Habbaniya, 72° F. ; Large dots—unmodified tropical air ; Stipple—modified tropical air.

A marked simplicity of rhythm prevails throughout the Middle East. With a few exceptions, July is the hottest month inland, but on the coast, the maximum is delayed until August, because of the slower absorption of heat by the sea. Egypt shows a good example of this tendency, with a July maximum in the Nile valley, and an August maximum on the Mediterranean and Red Sea coasts. Towards the extreme south, in Upper Egypt and Arabia, the maximum tends to occur in June, under the influence of the more direct solar heating at the solstice.

January is everywhere the coldest month, but any considerable rise in temperature is often delayed until the end of February or early March. Once begun, however, this is rapid. Considerable differences are apparent in winter between the north-eastern part of the Middle East, and the centre and south. Continental influences are marked in the former area, and these are heightened by the effects of topography. Extremely low temperatures occur in Asia Minor, Armenia, and

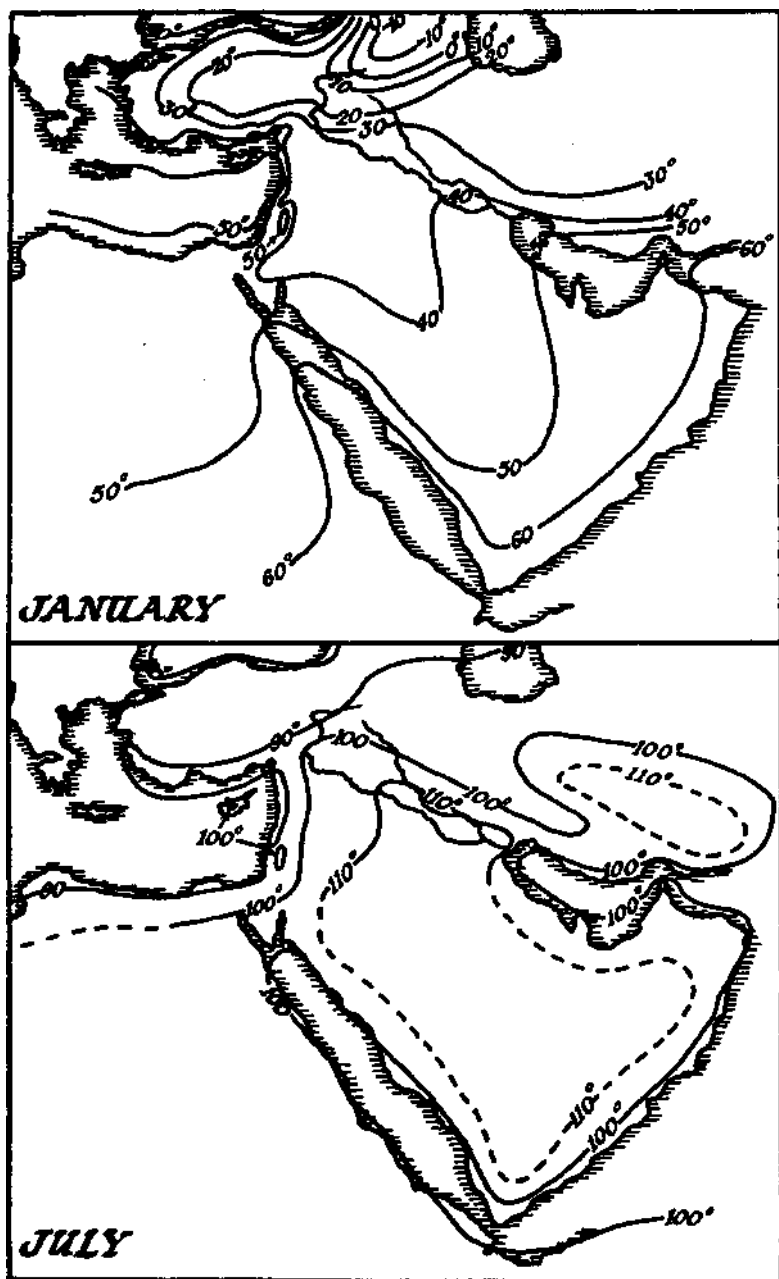


FIG. 12. Mean Daily Minima of Temperature (January) and Mean Daily Maxima (July). Broken isotherms based on scanty data.

much of Iran. Meteorological observations are scanty, but one small permanent glacier is known to exist in the Zagros, and conditions at Ezerum indicate the intensity of winter cold. (January mean 12° F., average day max. 34° , average night min. -17° , absolute min. -40° F.)

AVERAGE MEAN MAXIMA AND MINIMA, AND
RANGE OF TEMPERATURE ($^{\circ}$ F.)

	Monthly Av.		Mean Daily Max.		Mean Daily Min.		Diurnal Range		Annual Range
	Jan.	July	Jan.	July	Jan.	July	Jan.	July	
Istanbul .	41	74	46	82	38	67	8	25	33
Ankara .	28	73	39	86	17	54	22	32	45
Aleppo .	42	83	50	97	34	69	16	28	41
Beirut .	56	82	62	87	50	76	12	11	26
Mosul .	41	95	50	110	32	80	18	30	54
Basra .	52	97	62	111	42	51	20	30	45
Jerusalem	47	75	54	87	41	63	11	24	28
Teheran	35	85	44	99	26	71	18	28	50
Cairo .	54	84	45	96	45	72	9	24	30
Alexandria	59	80	66	86	51	73	15	13	22*
Tobruk .	56	79	62	84	51	73	11	11	13*
Aden .	79	88	85	94	73	82	12	12	9

* Taken between January and August (hottest months).

The Bosphorus and Black Sea sometimes become jammed by pack-ice ; and inland, snowstorms isolate many districts, even as far south as Syria, where the Beirut-Damascus railway runs for a few miles in permanent snowsheds. Small quantities of snow may fall in regions of lower elevation, and except for southern Arabia, no part of the Middle East can be said to be entirely free from snowfall. Even the plateau of Cyrenaica, the lower Nile valley, and the highlands of Yemen experience slight falls, when cold air makes its way south from Europe.

Diurnal variation of temperature is important at all seasons, but most developed in summer. In coastal areas, maritime influences restrict the temperature range ; but at a short distance inland, great heat during the day gives place at night to a most refreshing coolness. In Egypt, and the Red Sea coastlands, night cooling may even bring

the air below its dew-point, so that early morning fog is a feature of the summer in much of the Red Sea coast, the Lower Nile valley, and even the Mediterranean coast of the Libyan desert. Topography is a controlling factor—regions of high altitude have a reduced night temperature, although by day little difference is apparent. (Cf. the July minima for Istanbul and Ankara, or Basra and Teheran.) The Lebanon derives much wealth from numerous mountain resorts which by day have a temperature of over 80° F. whilst at night, temperature falls by 20° or 30°, as compared with 10° on the coast.

Humidity.—The Middle East shows considerable local variation in humidity—perhaps the widest of any region in the world. An average estimate for the area as a whole would show 50 to 70 per cent, relative humidity—a figure much below the average for Europe. On the coast, however, some unusually high humidities can occur. Wherever a narrow coastal plain is backed by a mountain barrier, well developed sea breezes bring in much moisture, which remains concentrated in the coastal zone, instead of spreading into the interior. High humidity, together with high temperatures, makes living conditions extremely unpleasant during the summer season, when inland transfer of moisture from the sea is greatest. Certain parts of the Middle East have an unenviable reputation in this respect: the Persian Gulf coast is most notorious but the shores of the Red Sea and Mediterranean are also unpleasantly affected.

'Jidda', de Gaury writes, 'is hot and damp almost beyond belief for some three hundred days of the year. . . . Newspapers flop into rag, matches refuse to strike, and keys rust in the pocket/

In some places (e.g. Beirut and Oman), humidity is actually at its highest for the year during the summer months, in spite of a complete absence of rainfall; and in many coastal towns roofs stream with moisture after heavy night dew. Heavy dew on the Red Sea coastlands is an important aid to agriculture in the Yemen, and in this respect, one will recall the similarity with western California.

NUMBER OF DAYS WITH DEW AT HAIFA (1938)

J	F	M	A	M	J	J	A	S	O	N	D	Total
0	3	1	11	17	25	18	19	22	19	0	0	135

In the interior, humidity is generally low, but a marked increase often occurs in winter, when maritime air replaces the dried-out monsoonal streams of winter. Winter mist and fog are by no means uncommon; and although these occur generally in riverine valleys,

they are also met with in arid areas. The salt marshes and deserts of Iran experience winter fogs which are at times dangerous to travellers.

Tolerance.—The effects of high humidity in bringing down for humans the limit of tolerability of high temperatures are very marked. Hence the high temperatures of the dry interior are often more easily borne than the muggy heat of the coastlands, and Beirut, with a summer maximum of 89° F. (70 per cent. R. Hum.) feels quite as hot and exhausting as Damascus (97° F., 30 to 40 per cent. R. Hum.).

It is also interesting to note one physiological effect of very low humidity. After a short time the nervous system is unduly stimulated, and irritability and nervous strain develop. In the Sahara, where low humidity is frequent, the name *cafard* has been given by Foreign Legionnaires to the peculiar state of mind resulting, at least in part, from continued exposure to dry heat.

Something has been said of the deleterious effects of certain features of Middle East climate ; but a more important aspect remains. Average conditions approach closely to the optimum for human and plant life. The extremes of prolonged growth-retarding cold, and overwhelming heat, are limited to certain regions only, and the influence of climate on the rise of civilisation in the Middle East would seem to have been profound. Primitive man, unable greatly to change his material environment, found best help in the region of * summer's shine and winter's rain '.

RAINFALL

Except in two small regions, one in the extreme north, and the other in the extreme south, the whole of the Middle East has a strongly marked Mediterranean rhythm of summer drought and winter rain. The underlying cause is inflow of maritime air from the west, due to the southward migration of certain pressure zones during the winter, which brings the disturbed zone of westerlies over the Mediterranean. During summer, higher pressures in the western Mediterranean act as a buffer between the low pressures of the north Atlantic and the monsoonal lows of the Middle East, shutting out oceanic influences from the west. For the Western Mediterranean then, these highs can thus be regarded as directly influencing the development of dry conditions. It is, however, hardly correct to regard the summer drought of the Middle East as directly due to the elaboration of a single zone of high pressure covering the whole of the Mediterranean, since

we have seen that in the Middle East region, pressures are actually lower in summer than in winter.

ATMOSPHERIC PRESSURE

(Monthly Average in Millibars)

	<i>Benghazi</i> <i>Sea Level</i>	<i>Istanbul</i> <i>Sea Level</i>	<i>Limassol</i> <i>Sea Level</i>	<i>Basra</i> <i>Sea Level</i>	<i>Muscat</i> <i>Sea Level</i>
Jan.	1010	1019	1017	1019	1019
July	1005	1012	1007	997	998

Rainfall occurs in early autumn, when dry air of the monsoonal circulation is shouldered out by damper and more vigorous currents from the west. A few short showers only occur during September, but towards the end of October, heavier and more prolonged falls, often with spectacular thunderstorms, announce the end of summer. These usually clear up after a few days ; and a relatively fine period ensues until December. The real rainy season does not begin until about Christmas, and may even be delayed until the New Year. Over the western half of the Middle East, January is the rainiest month but a slight tendency to a December maximum is noticeable in a few areas. Towards the east, the maximum is increasingly delayed. Syria shows a January maximum in the extreme west, and a February maximum in the remainder of the country. In eastern Iraq and in Iran, March is often the wettest month ; and on the shores of the Caspian, a double rhythm with a minor maximum in spring and a main maximum in autumn shows the influence of a different climatic regime.

Such influences are also apparent in Asia Minor, where the Black Sea coastlands as far west as Sinop have a pronounced autumnal maximum. In the Aegean area, November or December are the wettest months, but on the Mediterranean coast, more normal Middle East conditions once again prevail, and the maximum occurs in January or February. Inland, much local variation occurs, with traces of a double maxima in spring and autumn. Konya, with a maximum of 1.9 inches both in May and December, is probably typical of many parts of the western plateau ; and Diyarbekir, with a single maximum in March, shows the approach to Mesopotamian conditions further to the east.

By the middle of June, rain has ceased over most of the Middle East, and south of a line from the Elburz range to Iskanderun and

Crete, no rain falls for a period often to fifteen weeks. North of this line, a certain rainfall persists, though rather irregular, and except on the eastern Black Sea coast, very small in amount.

The distribution of rainfall in the Middle East is largely controlled by two factors : topography and the disposition of land and sea in relation to rain-bearing winds. It must be remembered that the Middle East is predominantly a continental area, influenced only in certain regions by the proximity of relatively small areas of sea. Hence air masses reaching the Middle East from the west, even though of oceanic origin, have lost some of their moisture ; and it is only where a sea track has allowed partial rejuvenation that considerable rainfall can develop.

It might therefore be said that in most regions, rainfall tends to occur in proportion to the length of coastline—or even in proportion to the length of westward facing coastline. Regional contrasts are striking : the westward facing shore of the Gulf of Sirte has a marked effect on the rainfall of Cyrenaica ; and the absence of such configuration *in* Egypt condemns the country to a scanty rainfall. The narrowness of the Red Sea has its effects on the rainfall of Arabia ; whilst, on the other hand, the influence of the broader Mediterranean is clearly shown in Asia Minor and Levant. It is also believed that the proximity of the Persian Gulf has a favourable effect on the rainfall *in* the Zagros.

With such a delicate balance between dampness and aridity, it is inevitable that topography should exercise a control equally as important, if not more so, than that of physical configuration. It has already been stated that the greater part of the Middle East rainfall develops under conditions of instability, to which the uplift of air currents as they are forced to rise over mountain ranges, is a very powerful contributing factor. Warm frontal rainfall develops over a vertical distance of as much as twenty-five thousand feet; and a few thousand feet of dynamical uplift *in* the lowest layers has no undue effect, as ascent of air has begun independently of conditions near the ground, and precipitation continues after high land is past. On the other hand, a cold front may not develop any precipitation whatever until the ' trigger action ' of sudden uplift over high ground is first applied. Attention has been drawn to the marked predominance of cold frontal conditions *in* the Middle East.

Control by topography is so great that isohyets tend to follow contour lines, with westward facing mountain ranges or plateau edges

experiencing heavier rainfall at the expense of eastward facing slopes and lowlands. The swing of the isohyets in response to the south-eastwards curve of the Turkish highlands towards the Zagros system gives rise to the beautifully developed 'fertile crescent' of steppe land linking the east and west of the Old World. Control by topography has resulted in the elaboration of striking regional contrasts—a short journey brought the Israelites from the rain-shadow areas of Sinai and eastern Transjordan into the milk and honey of the damper uplands of Judaea; and Palmyra, a caravan city of the Syrian desert, could pasture its beasts of burden on the grassy spurs of the Anti-Lebanon ranges a few miles away.

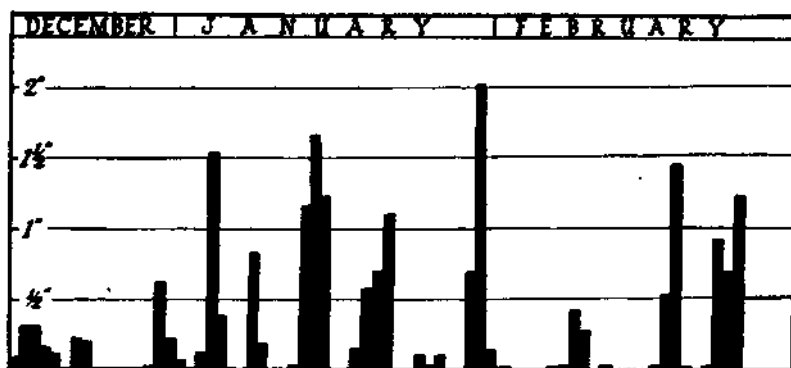


FIG. 13. Daily Rainfall at the Cedars, 1943-44- (Data by D. Buchanan).

In view of its occurrence under conditions of instability, rainfall in the Middle East is often extremely heavy, but short in duration, and very capricious. The coastlands of the Levant, with an annual fall of over 30 inches receive more rain than parts of the British Isles, but this is crowded into little more than six months; and even so, the wettest month has only fourteen to seventeen rainy days. Conditions at the Cedars, a mountain resort 6,000 feet above sea level, and one of the wettest places in the Middle East, are illustrative. (Fig. 13.)

A great deal of rain may thus fall in a short time. One inch per hour is by no means unusual; and in 1945 Damascus, with an annual average of less than 10 inches, received 4 inches in a single morning.

* 'Cloudbursts' are a feature of most years, but their effects are often extremely local, so that one side of a street may be quite dry, whilst the other is streaming with rain. Jarvis described a small valley of the Sinai region that had produced a record grain crop, yet two miles away, there had been insufficient rain to germinate the seed.

Rainfall is exceedingly variable in amount from year to year. There is little to parallel the regular onset of monsoonal rains in India ; and the failure of rain in a particular season is a source of considerable and frequent anxiety to the cultivator. Averages are again misleading; few regions outside the highlands can count on a regular rainfall, and whole areas in Egypt and Arabia may go years without a fall of any kind. A heavy fall once in several years appears in climatic statistics averaged out as a fictitious annual figure. Some, but not all, of the summer rain in Turkey and Iran is of this type.

ANNUAL RAINFALL AT KSARA (CENTRAL LEBANON)
(Inches)

1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
15	24	27	24	28	15	37	23	24	34	19	25	13

Some distinction must now be made in the case of two regions lying outside the area of true Mediterranean climate. In the extreme north, the summer track of westerly winds lies across central Europe into S. Russia. Reference has already been made to the fact that this air stream is kept out of the central and western Mediterranean by a * cushion 'of high pressure ; but in the north-east, intermingling with monsoonal air takes place, and a perceptible summer rainfall occurs. We have seen that over much of Asia Minor, the summer is not entirely arid ; and in the eastern Black Sea, a tendency to develop atmospheric disturbances is accentuated by the westward facing coast, backed by the Caucasus Mountains. The eastern Black Sea coastal region of Turkey has a pronounced summer rainfall, and so falls outside the Mediterranean climatic zone. Small, and of restricted importance, this region belongs climatically speaking, to the Caucasus provinces of Russia. Conditions at Rize are typical, and contrast with those of Istanbul, which has a dry, but not entirely arid summer.

RAINFALL (Inches)

	<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	<i>Total</i>
Rize	9.2	8.3	6.6	5.8	2.9	6.6	8.9	6.8	12.4	11.8	13.3	12.8	105.3
Istanbul	3.2	27	2.5	1.6	1.2	1.3	1.2	1.7	2.0	2.7	3.6	4.8	28.8

Some reference has also been made to a degenerate form of monsoonal conditions prevailing in south-west Arabia. Information is lacking, but there would appear to be heavy summer rains over the

highlands of the Sudan, Abyssinia, and the Yemen. As much as 25 inches may fall in the region of Sa'ana while, on the coast, Aden averages only 2 inches per annum, with a spring maximum that shows an affinity to Mediterranean conditions.

Cloudiness.—Study of clouds is more the concern of the meteorologist, but it is useful for the climatologist to note a few general tendencies in cloud development as indicative of climatic features. Conditions in Syria-Lebanon provide an accurate summary of the Middle East as a whole. Damascus typifies the open, arid interior ; and Beirut, where a range of mountains rises to 9,000 feet behind the city, the damper coastlands.

MEAN CLOUD AMOUNT

(Tenths of Sky Covered)

	<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	
Damascus		5	5	3	3	3	1	0	0	1	3	4	5
Beirut		6	6	5	5	4	2	2	3	2	3	5	6

The small amount of cloud prevailing at all seasons is very remarkable. Even Beirut, with 35 inches of rain annually, has no more than six-tenths of cloud during its wettest month. This is because most of the cloud is of the cumuliform type, rapid in development, but equally rapid in clearance. In summer, fair-weather cumulus develops regularly each morning, and disperses at dusk, so that nights are always quite clear ; and even in winter, the same tendency to nocturnal clearance is present. Days of thick layer cloud, with prolonged rain, are very uncommon ; and usually, even the rainiest day of mid-winter clears for some time to allow a glimpse of the sun.

VARIATION OF CLIMATE WITHIN HISTORIC TIME

One cannot proceed very far in any study of environment in the Middle East without encountering the problem of a possible variation in climatic conditions. We have already noted the existence of a misfit and attenuated river system in much of south-west Asia ; and it is difficult to relate present conditions of frequently hostile environment to the brilliant historical past of many Middle Eastern countries.

At a first examination, conditions appear to be strongly in favour of a marked climatic change, with progressive desiccation over a long period as the main feature. It is in fact indisputable that in comparatively recent geological time, a wetter climate prevailed. Many of

the rock series of late Tertiary and Quaternary Age were deposited locally in the Middle East under conditions of greater dampness ; conglomerates formed of water-worn pebbles with a matrix of fine silt; and other lacustrine deposits, indicate that surface erosion by river action was much greater than at the present day. In Quaternary times cycles of colder and wetter weather, comparable to those of Europe, gave rise to ice-cap conditions in the mountains of Turkey and Iran ; and numerous old shore lines round the Caspian and Dead Seas indicate oscillation of water level, with a volume generally greater than that occurring now. In this connexion, it is also important to note the evidence of archaeology, that early human settlement was considerable to the north and south of the mountain zone, but sparse or entirely lacking in the highlands themselves.

With these points in mind, it would seem reasonable to infer that minor climatic changes have continued into modern times, and that during the historic period (i.e. from about 4000 B.C. onwards) rainfall has tended to decrease. Again, there is much in the historic period that can be interpreted as evidence of desiccation. Many irrigation works now stand ruined or neglected in completely arid areas. Buried dams, empty channels, and dry wells or cisterns, often located in places where there is no obvious water supply, would seem to show that surface water has become scarcer. In some instances, modern efforts have been made to repair ancient irrigation works, with varying results. Certain wells were cleared in Transjordan, with the hope of finding water, but most of these remained dry. Further to the south, however, near the Gulf of Akaba, a number of Roman channels were repaired, and a new flow of water occurred, corresponding exactly in amount with that for which the channels were originally designed.

On the human side, the great wealth and power in ancient times of countries of the Middle East can be taken as an indication of a larger population and a higher level of economic development. For most regions of the Middle East, it is easy to point to at least one former period of outstanding prosperity ; and for the area as a whole, it is fair to say that population was more numerous in Roman and early Islamic times even than at the present day. Numerous ruins, particularly on the desert margins, indicate both a richness of culture and an intensity of economic exploitation that is often far in advance of modern conditions. In north-west Syria whole towns lie abandoned—Devlin and Gillingham counted over a hundred settlements of Byzantine age within fifty miles of Aleppo—and in Iran many caravan

routes are bordered by now deserted villages. Roman Palmyra was a commercial metropolis with continent-wide relations ; the modern village, less in extent than the burial grounds of the ancient city, is largely dependent for its existence upon a military garrison.

To these physical and human considerations must be added certain biological factors. Ancient Egyptian and Mesopotamian art frequently depicted crocodiles or such animals as the Uon and the gazelle—all of which are at home in a damper environment. Recent investigation has shown that a species of snail, which is restricted to regions with more than 20 inches of rainfall, once existed in the Libyan desert. In this case, however, it is probable that the snails are evidence only of wetter conditions at a period immediately subsequent to the Ice Age, and that they died out in Neolithic times.

On the basis of such evidence, Ellsworth Huntington postulated his well-known theories of gradual desiccation during historic time in south-west Asia. Unfortunately, however, later opinion inclines to the view that much of the evidence put forward by Huntington can be interpreted in more than one way ; and that, on balance, facts are definitely against any significant change in climate within the last five or six thousand years.

In the first place, many ancient irrigation works were abandoned solely because of unsettled political conditions. Misrule and exaction, but most of all devastation due to war and barbarian invasion, have greatly reduced irrigation in the Middle East; and in a survey of the economic potentialities of Iraq in 1911, Sir W. W. Cocks stated that the problem was in large measure that of restoring the ancient irrigation system, rather than that of developing entirely new canals. At the same time, it is undoubtedly true that in some instances, the water table in the soil has fallen. This can, however, be ascribed either to a lowering of the base line of drainage, due to continued erosion of the bed of the river ; * or to a loss of sub-surface water because of deforestation. The latter is a pronounced feature of many parts of the Middle East. Reckless cutting of trees, for timber and fuel, unrestricted grazing by herds of animals, and unintelligent methods of agriculture in a land occupied continuously since the dawn of history, have greatly contributed to extensive soil erosion, with consequent decrease in water resources.

• Moreover, archaeological research has shown that many of the

¹ The river Nile is known to have lowered its bed in the region of the Seventh Cataract by 25 feet since 1900 B.C.

deserted settlements were not contemporaneous—that is, they were not all inhabited at one particular time. Many factors—security, economic resources, or even, as commonly in the Middle East, a growing problem of sanitation, may have caused the abandonment of one site in favour of another ; so that a survey of settlement cannot, of itself, be taken as a reliable indication of population density. Even now, it is unwise to regard the size of a modern Oriental city as strictly indicative of the number of its inhabitants, because although some parts are heavily overcrowded, others may be completely derelict and abandoned.

The long continuity of life in the Middle East suggests that little change has taken place in environmental conditions. Desert herders—* plain men living in tents—are as characteristic of modern times as of the age of Jacob ; and agricultural technique, portrayed in ancient literature and art, still survives in many places with little alteration at the present day. Moreover, the weather conditions described in early literature bears close resemblance to actual conditions now—we have seen something of this earlier in the chapter from the writings of Herodotus—and many of the relics of Ancient Egypt would hardly have survived had the climate of the country been damper.

Another important point is the permanence of overland trade routes across arid regions. Caravans have followed tracks through certain oases for many centuries, and any deviations that occurred were largely due to unsettled political conditions—routes now drier than those at present in use do not seem ever to have been followed. It is difficult to see why such cities as Damascus and Aleppo should have maintained their function as points of departure for desert traffic over several thousand years if we assume that the cities did not at one time lie on the border between steppe and desert. The existence of the series of ancient caravan centres—Medina, Petra, Jerash, Bosra, Damascus, Palmyra, Aleppo, and Dura-Europus—can be related to present conditions of rainfall; if we move the desert boundary further inland, these towns lose their *raison d'être*. Similarly, many other ancient settlements of the Middle East show careful siting in relation to water supplies. This fact, together with the presence of numerous irrigation works, may be taken as showing that rainfall was no more plentiful then than now.

In short, it would appear that wetter climatic conditions prevailed in the Middle East only in late Tertiary and early Quaternary times. During this period, the comparatively recent land forms

described in a previous chapter came into existence as the result of fluvial and sub-aerial erosion. During Neolithic times, a period of desiccation accompanied the final retreat of the ice-cap in Eurasia ; but by the opening of the historic era this increase in aridity had come to an end. Environmental changes which have supervened during the last five or six thousand years can be traced to one or more of the following causes : (a) lowering of the bed of the streams as the result of normal erosion. This has also lowered the water table in the soil itself, and left many irrigation canal intakes above the new water level; (b) soil erosion, due to wasteful agricultural methods, or to destruction of existing types of vegetation ; and (c) misrule, war, and invasion.

By these means, a deeper layer of soil, and thicker vegetation cover, both relics of earlier wetter periods, were gradually removed. This natural patrimony might have been preserved by careful utilisation, but once soil and vegetation had disappeared, natural conditions were against a renewal. Thus it is man, and not natural causes, who is chiefly responsible for the gradual deterioration of conditions in the Middle East; and human occupation, not climatic variation, appears as the main factor in alteration of environment. This fact gives some hope for the future, because whereas man can do little to influence the operation of natural forces leading to climatic change, he can do much to repair damage that he himself has caused. If soil and vegetation could be restored, the prosperity of ancient days might return ; and accordingly, emphasis is now being placed on soil conservation, re-afforestation, and intelligent exploitation of the land as essential elements in the future development of economic life in the Middle East.

CHAPTER IV

SOILS AND NATURAL VEGETATION

I. SOILS OF THE MIDDLE EAST

THE study of soils in the Middle East has so far been restricted to Palestine, where Zionist colonisation has led to a number of investigations into soil character as a factor in agricultural development; to Egypt; and to Iraq. Elsewhere, little attention has hitherto been given to soils, although in certain instances geological surveys have attempted a generalised classification of soil-types, on a basis of underlying parent rock.

In the case of recently formed soils, the relationship between a soil and its parent rock is reasonably close, and classification on a geological basis is therefore valuable ; but modern investigation has demonstrated that for more mature soils, prevailing climatic conditions exert an increasing control, and parent rock is of much less importance—it has, for example, been shown by Reifenberg that in northern Palestine, limestone and basalt have weathered to give soils of almost identical chemical composition. Thus soil formation is best considered as a process controlled jointly by geological and climatic factors, with the latter exerting an increasing influence the longer the process continues.

A general theory of soil development has been elaborated by Russian writers, who distinguish an *eluvial* horizon or layer in the soil *from* which soluble compounds are washed by rainfall; and an *illuvial* horizon, *into* which these compounds are later carried by water action, and there re-deposited. In humid climates, the greater transfer of soil water is downwards, and the top layers of soil therefore form the eluvial horizon, with the illuvial layer below. In arid climates, scanty rainfall may penetrate the soil, but as the result of capillary attraction due to surface heating, it is soon drawn back to the surface, so that the final transfer of water is upward. Hence the illuvial horizon occurs in the top layers of the soil, the lower layers being leached of minerals that tend to accumulate near the surface. In

addition to a concentration of mineral salts in the upper layers of the soil, actual efflorescences of substance such as gypsum, lime, and sodium and potassium salts may occur on the surface. (Fig. 14.)

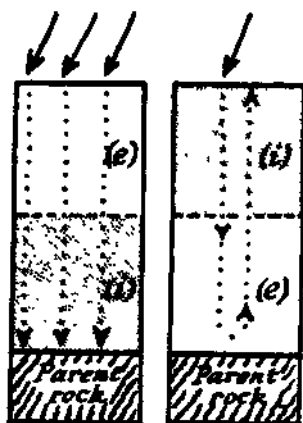


FIG. 14. Soil Profiles under Humid and Arid Climatic Conditions. Illuvial layer stippled.

As the result of a deficient rainfall over much of the Middle East, soils tend largely to be of the second type, with the illuvial layer uppermost. In favoured areas, however, a substantial rainfall may produce local reversal of these conditions, and a fairly wide range of soil type is therefore characteristic of the Middle East as a whole, with conditions varying from the heavily saline deposits of arid regions to the leached, almost 'podsolised' soils of higher mountain zones.

Climate and Soil Formation.—Because of the importance of climatic factors in the development of soils, attempts have been made to use climate, particularly

rainfall, as a basis of classification for soils; and Lang has postulated a 'rain factor,' which is obtained by dividing the total rainfall (in millimetres) by the average of temperature during the rainy season (in degrees Centigrade). For example, Gaza, with an average rainfall of 187 mm., and an average (winter) temperature of 20° C. would show a 'rain factor' of 9. This somewhat crude evaluation of the influence of rainfall is open to criticism in certain respects, and cannot be usefully applied to all climatic regions; but in the Middle East sharply defined seasons and a well-marked rainy period make 'rain factors' a valuable summary of climatic conditions. In Palestine, which although small, has a rainfall varying from less than 100 mm. to more than 900 mm., rain factors have been successfully used to demonstrate the relationship between climate and soil formation; and the classification of soil type by Reifenberg is the first detailed study of conditions in the Middle East. Although developed for one country, Reifenberg's classification can be applied to a much wider area, and the following paragraphs, based on Reifenberg's work in Palestine, can be considered as having a general application over much of the Middle East.

RAIN FACTORS ACCORDING TO LANG'S FORMULA

(Stations grouped by Countries) •

i	ii	Mean Temp. of Rainy Season (°C.)	Rain Factor		Annual Rainfall (mm.)	Mean Temp. of Rainy Season (°C.)	Rain Factor
Istanbul	745	14	53	Teheran	234	13	18
Rize	2450	14	175	Isfahan	112	11	10
Ankara	255	11	23	Resht	1120	15	75
Iskanderun	696	20	35	Seistan	44	11	4
Aleppo	380	16	24	Mosul .	410	17	24
Beirut	900	20	45	Habbaniya	165	20	8
Damascus .	235	16	15	Shaiba	165	22	7
Haifa . .	615	20	31	Aden . .	58	25	2 1
Jerusalem .	410	16	26				
Amman .	280	15	18	Alexandria	196	18	11
				Cairo .	30	16	2
Benghazi .	200	18	11				

CLASSIFICATION OF SOILS

Climate	Rain Factor	Soil Types
1. Arid	0 to 15	Desert sand and gravel, desert marl, loess.
2. Semi-arid	15 to 30	Steppe sods and marls.
3. Semi-humid	30 to 50	Brown and chestnut earths, hard pan.
4. Humid	over 50	Terra rossa, red and brown earths.
5. ..		Alluvium.

i. ARID CLIMATE

(a) *Desert Sand and Gravel*.—In one sense, it is hardly true to speak of these deposits as soil, since they are frequently merely the mechanical products of sub-aerial erosion by exfoliation and wind abrasion, and are hence coarser in texture than true soil. Many areas of loose sand occur, ranging in colour from pale brown or grey to bright yellow or red, and these sands consist for the greater part of fine quartz grains. A characteristic feature is the presence of angular masses of parent rock, with, in limestone areas, numerous flints. Picard

describes the eastern slopes of the Judæan plateau as ' covered with a vast accumulation of brown masses of flint. The soil over which these are scattered is a fine powdery dust/ Salt efflorescences are common in desert soils ; and where they occur, the surface may be hardened into a crust that is sufficiently strong to allow the passage of a motor car over otherwise loose sand. A slight shower of rain is frequently followed by temporary hardening of the loose surface of the desert, due to re-precipitation of salt deposits. Another feature of the desert is the presence on rock masses of a hard coating resembling enamel. This * desert lac \ often associated with limestone, is formed by the interaction under conditions of varying heat and cold, of compounds of iron.

(b) *Desert Marls*.—These were originally formed under moister conditions, and are thus, in contrast to desert sand and gravel, true soils. In some instances, they have been laid down as alluvial deposits in river or lake beds ; but whatever their origin, subsequent desiccation of climate has rendered them extremely saline. Pale brown or grey, or even almost white, these marls are sometimes described as ' white alkali' or *solonchak* soils. In certain places, a white salt crust may cover the surface, entirely preventing vegetative growth : where the salt concentration is a little less, a scanty covering of salt-resistant plants may occur. With irrigation, agriculture may be possible in a few localities, provided that the soil can first be washed clean of salts, and that steps can be taken to guard against a recrudescence of salinity after cultivation has begun.

(c) *Loess*.—These deposits are a feature in certain arid areas, particularly in the Sinai peninsula, and central Iran. Formed as the result of erosion of surface material by the strong winds of the region, loess differs from true desert sand both in physical character and in composition. Of necessity made up of minute fragments transportable by wind action, loess comprises not merely quartz grains, but a variety of other materials, chief of which are calcareous particles derived from the numerous limestone outcrops of the Middle East. Water-formed silt and clay may also be included. The following table clearly brings out the differences between desert sand and loess:

ANALYSIS OF DESERT SAND AND LOESS (REIFENBERG)

<i>Desert Sand</i>	%	<i>Loess</i>	%
Sand (quartz grains)	93	Fine sand	61
Soluble chemical compounds	7	Silt	25
		Clay	14

and it will be apparent from the analysis that, with irrigation, loess soils offer many more possibilities for agriculture. Given a non-saline water supply, good crops can be raised ; and there is not the same necessity to guard against gradually increasing salinity of the soil itself, following saturation by irrigation water, which is sometimes a feature of desert marls when these latter are brought under cultivation. By reason of its origin, loess can form comparatively rapidly, and certain parts of the desert zone and its margins are being gradually buried under loess deposits. Archaeological evidence shows that near Gaza, approximately 10 feet of loess has accumulated within the last 4,000 years.

2. SEMI-ARID CLIMATE

(a) *Mediterranean Steppe Soils*.—Bordering the loess regions, in areas where rainfall is heavier, are brownish loamy soils, formed by intermixture with loess of material eroded by water action. Owing to the damper climate, a lower concentration of mineral salts occurs, with a due balance between the small quantities necessary for successful agriculture, and the sterility of overcharged desert soils. Such steppe loams are among the most valuable in the Middle East; and when irrigated, heavy crops can be raised. The limiting factor is obviously water supply, and throughout later historic time, these regions have been extremely productive when developed by strong governments able to organise an efficient system of irrigation. During periods of weakness or anarchy, water supplies have failed, and the steppes have tended to return to desert conditions.

(b) *Dune Sands*.—Rainfall is still insufficient to hold down lighter material against the force of the wind ; and shifting dunes can sometimes occur. Although predominantly sandy, dunes of semi-arid regions can contain a small quantity of clay and silt, and their high degree of porosity generally prevents the formation of saline deposits at the surface ; since water percolates rapidly through the sand before capillary action can draw it back to the surface.

Dune sands thus offer a certain limited potentiality for agriculture, and citrus fruit plantations have been established on them in Palestine, in areas where relatively abundant quantities of non-saline water are available. Like loess, dune sands are mobile, and can overwhelm stretches of more, productive land. Hence efforts to stem the advance of dunes are sometimes necessary; and the Palestine Government

has been experimenting with species of grass and tamarisk as a means of 'fixing' the dunes.

3. SEMI-HUMID CLIMATE

A number of soil types occurring in this region are best considered as intermediate between the soils of other climatic zones. To this category belong red and brown earths ; the latter being related to brown marls and steppe soils, the former showing affinities to the well-known 'Terra Rossa' of humid climatic conditions. For this reason, little will be said of the soils of the semi-humid zone, except in relation to one very characteristic feature—the formation of the 'hard pan' or crust as a direct response to climatic conditions.

A rainfall somewhat heavier than any yet considered (rain factor 30 to 50), followed in summer by absolute drought and intense heating that may raise the temperature of the surface soils to 120-180° F., gives rise to considerable chemical activity of a rather special kind, leading to the production of colloidal compounds of silica, iron, and aluminium, in association with more normal mineral salts. During the hot season, capillary attraction brings these compounds near to the surface, and a later phase of chemical activity precipitates them on nuclei in the soil. A concretion resembling cement then appears as a hard, solid mass in the upper part of the soil; and as the mass is impermeable, the lower soil becomes sealed off from the surface. Such concretions or 'pans' may form in soils derived either from sandstone or from calcareous rocks. Dubertret draws attention to the Saida region of the Lebanon, where a hard pan over 13 feet thick has developed in chalky soils ; and Reifenberg describes a similar, though thinner layer, termed *Nazzaz*, in the red sandy soil of Palestine. In Australia, Woolnough has applied the name 'Duricrust' to a similar indurated layer.

The distribution of hard pan reflects a delicate balance in annual rainfall. Excess of water would prevent evaporation and the upward transfer of soil compounds : too little moisture would inhibit the prolonged chemical reactions by which the pan is formed. On the borders of the Jebel Akhdar of Cyrenaica, towards the Libyan desert, a discontinuous and rather poorly developed crust is formed—in the Tobruk area this is near the surface. On the somewhat better watered flanks of the Judæan and Syrian mountains, more extensive deposits occur at a greater depth, and the pan is continuous over many miles.

Similarly, the foothills of the Zagros and Anatolian ranges show local developments, although in the latter region a slightly different rainfall regime restricts the extent of crustal development.

Normally, hard pan occurs at some distance below the surface ; and in certain areas, its appearance actually at the surface raises the interesting question of a possible erosion of the former upper layer of the soil during a temporary and damper climatic phase at an earlier period. Some regions now too dry for crust formation show a well-formed layer ; and further investigation of crustal distribution, hardly as yet attempted, may increase our knowledge of earlier climatic cycles in the Middle East.

The presence of a hard pan, has, on occasion, considerable social and economic effects. Only relatively shallow-rooted plants such as cereal* can grow unless a hole is first driven by man through the hard layer. Orchards and groves of trees may thus represent much effort on the part of the cultivator, each tree having required an individual break-through to the subsoil. Once established, fruit trees are not easily replanted elsewhere—a factor in the extreme traditionalism of agricultural methods.

Areas of extensive crustal development have as a result a very characteristic appearance—wide, open landscapes, often highly cultivated with cereals, but entirely devoid of natural bush and woodland, and planted with a few fruit trees only in the vicinity of settlements. The absence of any kind of timber prevents the use of beams and rafters in building construction ; and the normal flat-roofed houses of the peasants are not found. Instead, a domed roof of hardened mud is characteristic, giving the impression of a cluster of large beehives ; and around Aleppo, many villages of this sort occur. Moreover, the presence of hard pan at a shallow depth demands a special technique of ploughing. The light wooden *araire* which can follow varying depths of soil, is better adapted to conditions in hard pan areas than the modern steel plough ; and efforts to replace this ancient implement, used for centuries in Mediterranean lands, have been unsuccessful.

4. HUMID CLIMATE

In view of the pronounced summer drought of the Middle East, the term * humid climate ' can have only a somewhat restricted meaning, though as compared with the regions already dealt with, rainfall is

definitely more abundant. Nevertheless, from the point of view of soil formation in general, one cannot rank the parts of the Middle East designated as 'humid' with other regions of the world (e.g. the tropical forest zones) in which abundant rainfall is well distributed throughout the year. Instead, a special type of soil has developed under the influence of the unusual climatic regime of abundant winter rain followed by summer drought; and to this soil the name *Terra Rossa* is given. As defined by Reifenberg, Terra Rossa 'develops on limestone under the conditions of Mediterranean climate. In comparison with its parent material, the limestone, it has been greatly enriched in sesquioxides of iron and in silica. In comparison with the soils of humid climates, it contains large quantities of salts of the alkalis. . . . The high iron content together with the low humus content, are responsible for the red colour, which is often brilliant.'

Emphasis is placed on climate as the principal factor in the development of Terra Rossa; and it was stated earlier that non-calcareous rocks such as basalt or serpentine could give rise to soils showing great similarity to true Terra Rossa, although slight differences of chemical composition may result in a duller red, or chestnut-brown colour. Thus Terra Rossa and its associated soils are a widespread feature not merely in the Middle East, but throughout the Mediterranean basin as a whole.

Cereals do well on this soil; and where the layer is at all thick, fruit trees can be grown. One disadvantage, however, is a marked liability to erosion, necessitating terracing in regions of varied relief. With an increase in rainfall, the red colour tends to disappear, so that in the most mountainous parts of the Middle East, a yellowish soil of Terra Rossa type is found on those rocks which are more easily eroded. Where the parent rock is resistant, as for example in the southern ranges of the Taurus, which consist of igneous and metamorphosed series, the soil cover is very thin or even entirely absent, and large expanses of bare rock pavement are a feature.

5. ALLUVIAL SOILS

Large areas of the Middle East consist of alluvial basins or troughs with a soil which is the product of fluvial erosion, and quite unconnected with any climatic regime. In sharp contrast to the generally light soils formed by surface weathering, the alluvial soils of the Middle East are heavy, with a high clay content. Because of close association

with water, amounting in many instances to periodic flooding, certain alluvial soils contain a proportion of humus derived from the lush aquatic vegetation of the river banks ; and such soils are hence comparable with the well-known Chernozems or black earths of Russia. There is little need to comment either on the distribution of alluvial soils, or on their great suitability for agriculture. It may, however, be noted that the cultivation of heavy soils demands a technique different from that necessary in drier areas ; and also that trees do not grow by any means as well as shallower rooted plants.

Lastly, mention must be made of the widespread lack of humus in most of the Middle East soils. Only alluvial soils possess humus in any quantity ; all the others, including Terra Rossa, showing a marked deficiency. This arises as the result of high temperatures during the summer, when most organic material is in effect burnt out of the soil by extremely rapid oxidation. In this connexion it is interesting to note that the burning of animal dung for fuel by natives of the Middle East, long condemned by more progressive Westerners as one of the root causes of agricultural backwardness, may be better adapted to geographical conditions than its detractors first realised. If animal manure were to be applied directly to the fields, much of it would be lost to the soil by rapid oxidation and the formation of gaseous products, as the result of high soil temperatures (see page 62). Because of the small residue left after direct application, much the same results accrue when dung is first burnt and the ashes used as fertiliser ; and, in fact, there would seem little to choose between western and indigenous practice, except that the latter provides, in addition, a much needed domestic fuel. The problem of using organic and chemical fertilisers in such a way as to avoid loss during the summer is one of fundamental importance to the Middle East agriculture, and still remains to be solved.

IRRIGATION

From the foregoing, it will be apparent that in the Middle East irrigation is not merely the supplying of water to arid areas, but in addition, the intelligent use of water in relation to soil deficiencies or to climatic conditions. Certain types of soil such as desert marl, or even river alluvium, at first productive under irrigation, can become saline and sterile, because the presence of water may induce chemical reactions that could not otherwise take place. Moreover, much

water obtained from artesian borings and wells in arid areas is brackish and often unfit for use ; and even originally sweet water may become contaminated by contact with mineral salts.¹ Irrigation canals, wells, and *qanats* must therefore be made with great care, to avoid contact with saline layers. A recent large-scale experiment in Khuzistan (south-west Iran) has shown that irrigation schemes can fail, unless soil problems are carefully studied in relation to water supply.

Besides the question of salinity, irrigation may disturb a delicate ecological balance involving insect pests. At the Middle East Agricultural Conference of 1944, it was stated that in one area of Egypt, the effects of increasing supplies of irrigation water had raised the incidence of bilharziasis and malaria from 5 to 45 or even 75 per cent, of the total population of the region. * In Iraq, the increased use of pumps, and the construction of permanent canals for irrigation has led to a very serious increase of malaria in the area between Basra and Baghdad during the last twenty-five years/² Such unfortunate consequences do not necessarily follow in all extensions of irrigation systems ; but sufficient has been said for it to be apparent that irrigation involves much more than problems of structural engineering.

II. NATURAL VEGETATION

Control by climate is very clearly apparent in both the character and the distribution of vegetation within the Middle East. Most outstanding are, of course, the effects of widespread aridity and high summer temperatures ; and we must first discuss the influence of these upon the plant life of the region. There are two ways in which vegetation can survive a prolonged period of heat and drought; the first is by completing the cycle of growth during the cooler, rainy season ; and the second is by special structural adaptation to resist deleterious conditions.

Plants of the first group usually germinate in late autumn, with

¹ Cf. C. S. Jarvis, 'An analysis of Sinai water is a most alarming thing to read, and one marvels at the ingenuity of the chemist at detecting so many weird constituents—until one has tasted it oneself, when one comes to the conclusion that less than justice has been done to it.'

* E. B. Worthington, *Middle East Science*. Another aspect of the malaria problem is the effect of irrigation schemes in attracting new settlers, many of whom are from non-malarial areas. * Reclamation of land has meant moving in an entirely new population, which is quite often unaccustomed and not immunised to the effect of the fever. It has been found, particularly in India, that many reclamation schemes have failed, due to the fact that people unused to malarial conditions are moved into an area where there is not adequate protection against fever.' Report of the Middle East Supply Conference, 1944.

the first onset of heavy rains, and grow rapidly throughout the winter, reaching maturity in late spring or early summer. As summer draws on, the plant itself is shrivelled and dies ; but the seeds survive, to repeat the annual cycle during the next season. To this group belong grasses and cereals—wheat, barley and millet, some of which are indigenous to the Middle East, and have later spread into other lands.

Structural adaptation to counter lack of rainfall may take the form of very deep or extensive roots—as for example in the vine. In some instances roots spread out just below the surface, and are hence able to absorb quantities of night dew which, as we have seen, is a feature of summer in coastal regions. Other plants lie dormant during the dry season, losing much or all of their portion above ground, and maintaining a stock of nutriment in bulbs, tubers, or rhizomes. To this group belong the anemone, asphodel, iris and lily, tulip and narcissus—plants characteristic of the Mediterranean—which flower in spring, and die down with the onset of summer:

Another group of plants remains in more or less active growth during the hot season, but shows special structural adaptation with the object of reducing water-loss. Certain species develop a thick outer layer ; on the stem or trunk as in the case of the cork oak ; or on the leaves, as in the case of evergreens (laurel, evergreen oak, and box). In other instances, leaf surface and size are reduced—the olive being of this type—and the process may be carried further by the shrinkage of leaves to scales or spines, e.g. in tamarisk and thorn bushes. Leaves may even be dropped at the onset of summer, the stem then performing the normal function of leaves ; and this occurs amongst certain species of broom and asparagus. Finally, a thick hairy coating may develop, by which the inner fleshy parts are protected from the heat. An example of this latter development is found in the hyssop.

Because of this adaptation to climatic conditions, involving in many instances a resting season during the summer, agricultural practice in the Middle East differs considerably in certain respects from that of cooler regions. Sowing can take place in early autumn ; and although outside a narrow coastal zone frost may retard growth for some weeks, the rapid change to warmer conditions in March allows harvesting during April, May, or June. Some plants, notably the orange and lemon, bear during the winter, and cropping begins in November, lasting until February or March.

The rainfall regime has a special significance. Heavy showers in

THE MIDDLE EAST

the latter part of October mark the end of summer, and the beginning of the annual cycle of growth. These showers are the ⁴ former rains ' of the Bible—the reviving influence that quickens new plant life. Then in the mid spring there is usually a final onset of rain : a week or ten days of intermittent showers following on an increasingly dry spell. This is the real end of the rainy season ; and the ' latter rains ', as the Bible terms them, though not of necessity particularly heavy, are of great importance in the agricultural life of the Middle East (Fig. 15).

Where abundant water supplies are available, as in the great river valleys, a short cycle of growth allows several crops in one year. By careful husbandry, involving the maintenance of soil fertility, as many as three, or even four crops per year are sometimes obtained in the Nile valley ; and with judicious use of cereals, vines, fruit trees and vegetables, together with such cash crops as cotton, a type of mixed farming with an almost continuous yield is possible. Certain districts of the Middle East are capable of considerable further development, providing that the two limiting factors of low soil fertility and deficient water supply can be overcome.

Aridity is, however, by no means characteristic of all parts of the Middle East; and towards the north, more abundant rainfall gives rise to extensive forests. It has shown how closely rainfall in the Middle East is related to topography, and the generally higher rainfall of mountainous areas, together with lower temperatures, favour the growth of a vegetation type very different from that of the warm dry lowlands. In certain parts of the high plateaus of Asia Minor and north-west Iran, conditions even approximate to those

of the fold mountains of central Europe, with a characteristic alpine vegetation of pasture and dwarf plants.

Reference must be made to a second controlling factor in the vegetation type of the Middle East—that of adaptation by man. Long occupation of the region has meant that much of the original natural growth has been removed : the most striking change is the replacement in many areas of forest and woodland by scrub and heath. Deforestation has been particularly widespread in the Levant, reaching a peak in the years 1914-18, when much timber was recklessly cut by the Turkish authorities partly for use as fuel.¹

In the Levant, as well as in southern Asia Minor and the Zagros region, woodland, when once destroyed, is not easily renewed, since it is now really a marginal growth, with natural conditions only barely suitable for its continued existence. In one sense, forests can even be considered as expendable legacies from an earlier, wetter past. Once removed, the balance turns against renewed growth : soil is quickly eroded, the water table may fall, and tree seedlings are not sufficiently vigorous to thrive in competition with scrub vegetation that springs up on deforested sites. More harmful than any of these, however, is the practice of unrestrained grazing, chiefly by goats, which destroys the seedlings as they develop. In the opinion of some, unrestricted grazing, particularly by ' the sharp poisoned tooth of the goat ' is one of the fundamental causes of agricultural backwardness in the Middle East. Gradual loss of forest cover leads to uncontrolled water run-off, with resultant soil erosion ; and this in turn lowers the water table in the sub-soil, making difficult the supply of water for cultivation. In Cyprus, Palestine, the Lebanon, and Syria, the problem is extremely acute ; and the difficulties of holding a just balance between the claims of herders and the rights of agriculturalists has been a principal concern for all four governments.²

A word must be said regarding the extreme richness of plant life in the Middle East. In the desert and on its margins alone, over 2,000 species of plants occur, and many of these are indigenous to the Middle East. Once again we are reminded of the corridor function of the region, for in addition to a type of flora associated specifically with the Mediterranean, there are plants belonging to

¹ Further factors in the disappearance of the forests of the Levant have been the accessibility of the wooded areas, and the absence of trees in the neighbouring regions of Arabia, Mesopotamia, and Egypt.

* The conflict between cultivators and goat-herders forms a principal theme of the documentary film ⁴ Cyprus is an Island \

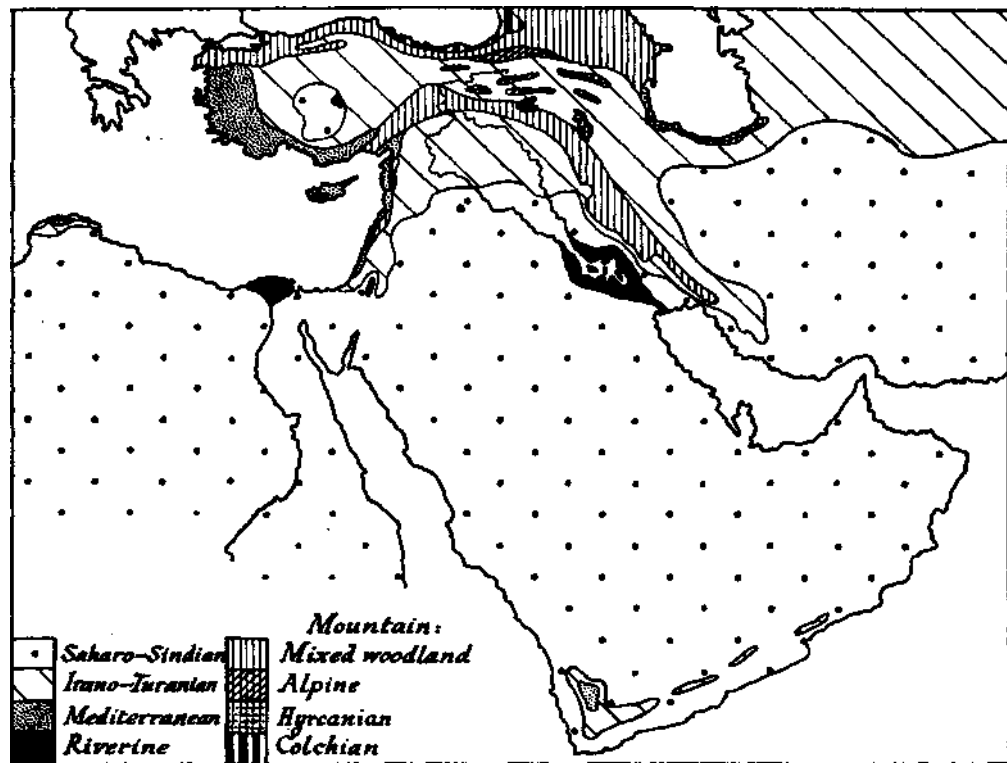


FIG. 16. Types of Vegetation.

two other botano-geographic provinces, one predominantly Asiatic, and the other African. Moreover, the regions of the Black Sea and the southern Caspian coasts each possess a special and distinctive type of vegetation that is without parallel elsewhere in the world (Fig. 16).

III. VEGETATION TYPES

(1) *Mediterranean Vegetation*.—This has a relatively restricted distribution, being mainly confined to the wetter parts of the Mediterranean coastal area—that is to say, to the narrow coastal plains of Cyprus, Palestine, the Lebanon, Syria, and Turkey, together with the lower flanks of the mountain ranges immediately inland. In addition to the 'classic' plants of the Mediterranean regime—vines, wheat, olive and fruit trees—a large number of shrubs and herbs, many evergreen, flourish in regions of thinner soil. During the spring numerous bulbs make a brilliant show. Walnut and poplar trees flourish in the damper places: cactus, although native to a drier environment, grows luxuriantly, and is often planted as hedges round fields.

Besides the plants mentioned above, the Mediterranean flora includes several highly characteristic plant complexes or groupings. Best known is the *maquis* or *macchia*, which, most fully developed in Corsica, is fairly widespread throughout the Mediterranean basin, in association with siliceous soils. Densely set evergreen oaks, myrtles, and broom, with a thick undergrowth of thorn bushes and shrubs, form a vegetative covering that is sufficiently extensive to afford shelter to refugees and outlaws. Because of this connexion, the term *maquis*, once of botanical significance only, has taken on a wider meaning involving human and even political relationships. *Maquis* is not especially widespread in the Middle East; instead, two degenerate types of *maquis* vegetation, *garrigue* and *phrygana*, are more characteristic.

Garrigue is associated with the thinner soils of calcareous outcrops. Evergreen oaks, which are tolerant of greater aridity, persist—although at wider intervals than in true *maquis*—but tall shrubs are much less common, and a low scrub of dwarf bushes and thorns takes their place. Because of the more open nature of this vegetation, which rarely exceeds 5 feet in height, perennial plants can develop, and for some weeks after the spring rains, a carpet of flowers and herbs makes a striking display. *Garrigue* is often discontinuous, with bare patches of soil or rock interspersed with plants; and if *maquis* is cleared, it is

frequently found that garrigue takes its place, especially if animal grazing prevents the re-growth of taller trees and shrubs. For this reason, garrigue is more characteristic of the Mediterranean zone of the Middle East than is true maquis, and much of the vegetation of Cyprus, and western Palestine and Syria, is of the former type.

Phrygana, a term employed by the ancient Greeks, denotes a special type of thorn scrub, which is restricted to western Asia Minor and the Aegean region. Unlike garrigue, which includes many differing types of plant, phrygana consists principally of thorn bushes, of only moderate growth, but very spiny and closely set. Bands of thorn scrub, occupying the deeper valley bottoms, can be a considerable obstacle to movement in districts where they occur.

(2) *Steppe Vegetation*.—A special type of vegetation has evolved under the influence of steppe climate, of which the chief features are wide seasonal variation of temperature, and generally lower rainfall. A botanical province has been recognised, corresponding to the geographical distribution of steppe conditions ; and to this province the name Irano-Turanian is given. As the name implies, Irano-Turanian vegetation is best developed in central Asia, but a westward extension has occurred through Asia Minor and Iraq into central Syria.

On the lower slopes of the mountains flanking the steppe, a park-like vegetation is found, with scattered carob, juniper and terebinth trees, and bushes of Christ thorn, wild plum, or thorn and wormwood, separated by expanses of smaller shrubs (sage, thyme, and thorn cushions) or creepers. In regions of true steppe, trees are absent, and various species of grass appear, although these have sharply restricted seasonal growth. Many grasses show adaptation to semi-arid conditions : one species has a hygroscopic seed casing with a stiff pointed top, by means of which the seed, after being driven into the hard ground, is supplied with water ; and another has developed a system of propagation by means of small swellings on parts of the leaves that remain underground.

More than half of the plants of the steppe region disappear in summer. There is hence a considerable difference in aspect between late winter and early spring, when numerous species of flowers and grass are in rapid growth, and the rest of the year, when most plants are shrivelled up or have not yet germinated. For a few weeks each year the steppe presents an amazing picture of luxuriant, almost lush, vegetation; but with the approach of summer, only hardier

bushes and thorns remain above the ground, and vast expanses of bare earth appear, upon which are strewn the withered remains of earlier plant growth.

The steppes are the home of pastoral nomadism, and it will easily be seen how narrow is the margin of existence in these regions—an extra week of rain (i.e. prolonged latter rains), will mean a more than corresponding lengthening of the spring pasture season, with great increase of flocks and herds during the ensuing year ; and early cessation of rainfall means a long summer, with much hardship until the next spring. Under such conditions even a small climatic fluctuation can have a disproportionately large effect upon human activity, and a few seasons of deficient rainfall may lead to widespread movements within the steppes, culminating in the invasion of adjoining lands, with vast consequences for human societies as a whole. Such great events as the Indo-Aryan invasions of Europe and the Middle East during the second millennium B.C., the Israelitish occupation of Palestine, and the rise of Islam in the seventh century A.D. can all be traced to slight changes in environmental conditions within the steppe lands of Eurasia. (Chapter VII.)

(3) *Desert Vegetation*.—To a third major botanical grouping, characteristic of arid conditions, the name Saharo-Sindian has been given. Many plants of this grouping show an extreme degree of adaptation to dry or saline conditions; and of these, thorns (chiefly tamarisk) are the most important.

Camel thorn, a shrub of the pea family, exudes a brown, sweetish sap, which, when hardened on contact with the atmosphere, forms the Biblical manna. Other desert plants complete their growing cycle within a few weeks after the end of the winter rains ; and throughout late spring, one sees an extraordinary variety and abundance of flowering grasses. Such vegetation may, however, last only for a matter of days.

(4) *Mountain Vegetation*.—Four distinctive types of vegetation occur on the higher mountains of the Middle East. Of these, three are forest growths, and the fourth, alpine pasture or heath.

The first type of woodland is of mixed evergreen, coniferous and deciduous trees. Evergreen oaks generally grow on the lower hill slopes, up to about 3,000 feet, and associated with these are the carob, and a species of pine that is native to the Mediterranean basin. At higher levels are found cedars, maple, juniper, firs, and two other species of oak and pine—the valonia oak, which yields an extract

valuable for tanning leather, and the Aleppo pine, which like the Mediterranean variety, is smaller and more bushy in appearance than the conifers of northern latitudes. The famous cedars of Lebanon, large but extremely slow growing trees, now exist only in scattered clumps as the result of centuries of exploitation. The largest of these clumps, numbering some 400 trees, occurs at a height of over 6,000 feet between Tripoli and Baalbek ; and, like many isolated groves in the Middle East, has acquired a semi-sacred character that may help towards its future preservation. By far the greatest extent of forest land exists in Asia Minor (with limited extensions southwards along the crests of the Zagros) and in western Syria and the Lebanon. About one-eighth of the state of Turkey is classified as forest land.

Above 5,000 to 6,000 feet, or exceptionally, 7,000 to 8,000 feet in the Elburz Mountains of Iran, forests die out, and are replaced by scrub or dwarf specimens of true forest trees. In eastern Anatolia and Azerbaijan, temperatures are lower than elsewhere in the Middle East, and a kind of Alpine vegetation appears. In the wetter parts, small areas of grassland reminiscent of Swiss* pastures may occur ; but more often, conditions are too dry, and vegetation is limited to bushes, creepers, and 'cushion' plants.

The second type of "forest is found on the northern slopes of the Elburz Mountains, towards the Caspian Sea. Oak, hazel, alder, maple, hornbeam, hawthorn, wild plum, and wild pear are the characteristic trees, and these are festooned by a dense growth of brambles, ivy, and other creepers. Here and there are openings occupied by box, thorn-bushes, pomegranate, and medlar trees. To this luxuriant growth, peculiar to the region, and developing under conditions of abundant rainfall throughout the year with high or moderate temperatures, the name Hyrcanian forest is sometimes given. One interesting feature is the absence of conifers.

A third type of woodland—the Colchian or Pontic forest—has developed in response to the warm humid climate of the southern Caucasus and eastern Black Sea.¹ An indigenous species of beech, with oak, hazel, walnut, maple and hornbeam, form the chief trees, and a dense undergrowth of climbing plants is again found, with widespread occurrence of the rhododendron. Best developed near the

¹ One element in the unusually high winter temperatures of the south-eastern Black Sea coastal margins is the frequent occurrence of Fohn winds which descend from the high inland plateaus of eastern Anatolia.

southern Caucasus, the Colchian forest extends westwards in an increasingly attenuated form along the north-eastern edge of the Anatolian plateau as far west as Sinop. It has been suggested that, like the Hyrcanian forest further to the east, the Colchian forest is the remnant of a flora that was characteristic of much larger areas of the Middle East during Tertiary and early Quaternary times.

(5) *Riverine Vegetation*.—The extensive alluvial lowlands of the great rivers have a special type of vegetation. Aquatic grasses, papyrus, lotus, and reeds that sometimes attain a height of 25 feet, make up a thick undergrowth in deltaic regions, and in the lower courses of the Tigris and Euphrates. Scattered willow, poplar, and alder trees occur, particularly in Mesopotamia ; but the outstanding tree is the date-palm, which is extremely tolerant of excessive water, provided that the temperature remains high. Cultivated palms are therefore a feature of riverine lowlands in Egypt and lower Mesopotamia. Another wild plant of economic importance is the liquorice, a bush that is fairly widely distributed along the banks of the middle and upper Euphrates and Tigris. Juice is extracted from the underground stem, and this forms an important item of trade in the districts of Aleppo and Mosul.

PART II

SOCIAL GEOGRAPHY

CHAPTER V

PEOPLES

FEW regions in the world can surpass the Middle East in heterogeneity of population. From earliest times, the region has attracted waves of immigrants from various parts of the Old World, and fusion of diverse elements has sometimes tended to be slow, or even incomplete. Frequent reference in the Uteratures of various peoples of the Middle East indicate an acute awareness of racial and cultural distinction ; and insistence by these groups on their separate identity can be taken as an indication of the close juxtaposition of many types of racial stock, cultural patterns, and social organisation.

The pictorial art of ancient Egypt was always concerned to depict the Egyptians themselves, by means of a special coloration, as a separate and distinctive group : and there is little need to comment on the theme of fierce tribal exclusiveness that permeates much of the Old Testament. The Greeks too had a marked appreciation of racial differences, not merely at between themselves and their neighbours, but also in a wider sense, as, for example, when Herodotus notes that Egyptian skulls could be distinguished from Persian, owing to the greater fragility of the latter. Distinctions between Jew and Christian, Believer and Infidel, Turk or Arab, Semite and Hamite, or between mountaineer and plainsman, and Badawin (herders) and Hadhar (cultivators) have long coloured the geography of the Middle East, and are still at the present day factors of prime importance in the human relations of the region.

It has proved difficult to establish criteria by which the peoples of the world may be classified. Physique, language, religion, and nationality have all been invoked as a basis of definition, but none is completely acceptable. For the Middle East, the insufficiency of any one of these criteria is easy to demonstrate. We speak of an ' Arab ' people ; but, as will be seen later, physical type amongst this group shows very wide variation : or we may adopt language as a basis of

division, in which case we find that an Arabic-speaking group would include some inhabitants of Iran, but would exclude important Armenian, Circassian, and Greek-speaking minorities in Egypt, Syria, and Transjordan. With religious beliefs as a criterion, we find firstly that a number of undoubted * Arabs ' are Christians ; secondly, that Islam itself is much divided, with sectarian divisions almost as extensive as those of Christendom ; and thirdly, that religious life within the Middle East shows an infinite gradation from almost complete paganism to the fullest development of Christianity, Islam, and Judaism. Finally, nationalism offers little guide to effective classification. For some Middle Eastern communities, nationalism has no meaning, and sectarian feeling takes its place—when asked their nationality, some individuals would reply ' I am a Christian \ In other communities national consciousness exists, but various practical difficulties such as smallness of numbers, intermingling with other groups, or external political obstacles interfere with its effective realisation. Moreover, one can hardly say that existing national frontiers in the Middle East allow complete political expression to all nationally conscious peoples of the region.

Hence, in an attempt to throw further light on the complicated question of cultural, political, and social organisation, the population of the Middle East will be considered in turn from the standpoint of the five criteria of race, language, religion, social organisation, and national consciousness. This examination will, however, of necessity be limited in detail, since in some instances, our knowledge of facts and events is only in the earliest stages.

Before commencing such an examination it is, however, first useful to note the influence on the peoples of the Middle East of certain geographical factors. The region has a dual aspect—that of a broad corridor linking several major parts of the globe, whilst at the same time a number of smaller component areas show an isolation and remoteness that is at complete variance with the character of the Middle East as a whole. Viewed generally, the Middle East has served as a route way for the migration of peoples ever since early man began to disperse throughout the world. Here and there, however, as it were in quiet backwaters, local environment has favoured the preservation of racial and social strains as remnants of wider movements that in more open areas have been submerged by later arrivals.

A discontinuous belt of relatively fertile land runs along the southern slopes of the Elburz Mountains of Iran, and is followed by an

ancient route that in the opinion of some anthropologists was one avenue by which certain types of early man spread into western Eurasia. Further to the west, the route divides, one branch turning south-west into south-west Iran and Iraq ; and the other continuing through Azerbaijan to Asia Minor. A zone of steppe-land in inner Anatolia completes the link between central Asia and Europe.

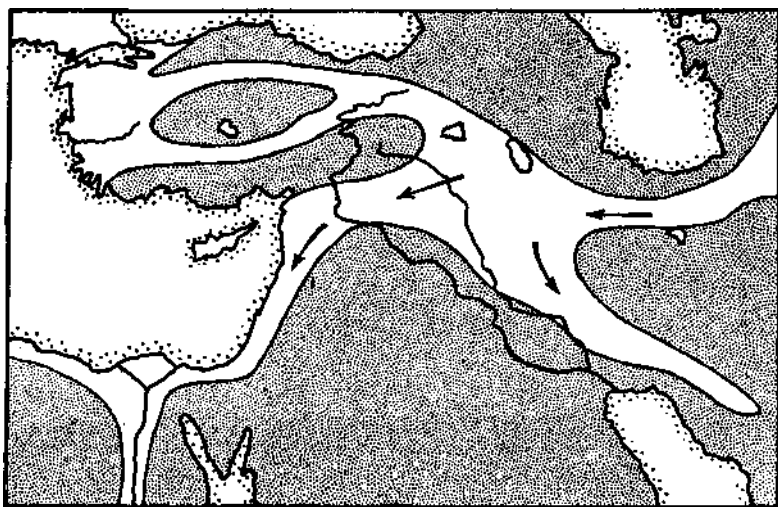


FIG. 17. Regions of relatively Easy Movement (unshaded).

More strongly marked is the steppe area of the Fertile Crescent which links western Iran, Iraq, south-east Anatolia, and the Levant. By this route numerous invaders from the east and north have gained the shores of the Mediterranean and the Nile valley ; and as a return movement Egyptian culture has also spread into Asia. The Mediterranean itself has facilitated rather than impeded intercourse between the peoples near its shores. The island-studded Aegean was a nursery for man's first sea adventures ; and it is not surprising that some of the earliest cultural developments occurred in Cyprus, which is visible both from Asia Minor and the mainland of the Levant. In the south, close physical connexion between Arabia and north Africa is paralleled by similar cultural contact. The Sinai has formed a major route for movement of peoples, and some authorities stress the importance of the Bab el Mandeb region as a gateway between Arabia and Sudan.

Alongside the *durchgangsland* of the Middle East, there occur regions in which difficulty of access or hostile natural conditions have

restricted penetration. Largest of these is the desert of Arabia, the Jezirat al Arab (Island of the Arabs), where, in the words of Hitti, 'ethnic purity is a reward . . . of ungrateful and isolated environment'. Other such regions may be seen in the highland plateaus of the Mediterranean seaboard, and here Samaritans, Druses, Maronites, Metwalis, Alawites, and various sects of Asia Minor such as the Bakhtahis and Takhtajis, have preserved a certain cultural autonomy, if not always a pure racial type. Further east, the Kurds of the Anatolian and Zagros mountain belts have maintained a separate identity ; and smaller units can be traced in the Yezidis of the Jebel Sinjar of north Iraq, the Circassians (Cherkesses) and the Turcomans.

This alternation of intermixture and seclusion is the keynote of population distribution in the Middle East. In the easily penetrable lands assimilation of successive ethnic influences has produced a mixed race, in which original elements are difficult to recognise. Away from the corridor regions the palimpsest of communities gives place to a simpler structure of isolated groups preserving their characteristic racial stock or culture.

R A C E ¹

A scheme of classification based on certain physical qualities that are in the main susceptible of actual measurement recognises head form, bodily build, and hair character as principal distinguishing features. Of head form, the cephalic index, or breadth of head expressed as a percentage of maximum length ; and, to a less degree, nasal character, are generally considered the more important elements.²

For a discussion of ethnology and anthropology in general terms,

¹ Before discussing racial theories in detail, it is first necessary to make a general qualifying comment. At one time, much importance was attached to racial characters, and it was thought that by developing a comprehensive scheme of classification, it might be possible to arrive ultimately at a complete understanding of the origins of all peoples. This hope has not been entirely fulfilled : instead, recent evidence has revealed a number of inconsistencies in earlier views, and diverging opinions have arisen. On the one hand, there is difficulty in deciding how far mental qualities can justifiably be related to physical characters, and on the other, the more serious problem of evaluating the influence due to environment as opposed to that exerted by heredity, and of relating both factors to accepted biological theories of evolution and inheritance. Again, by carrying race theories to absurd lengths, the Nazis of Hitlerite Germany have also served to cast a certain discredit on the subject. Nevertheless, there is still considerable value in race-study, particularly as an indication of the movements of peoples, and their cultural connexions.

* Within the last few years blood grouping has also been recognised by anthropologists as an important distinguishing feature between races. Little information is, however, as yet available for the populations of the Middle East.

the reader is referred to studies such as Haddon's *Races of Man* and Buxton's *Peoples of Asia*. In the present instance, it is proposed merely to sketch the outstanding racial elements of south-west Asia and to indicate their distribution, as an aspect of the social geography of the region. Once again, detailed information is scanty ; and anthropologists are not entirely agreed, even on matters of nomenclature—hence it is difficult to arrive at a simplified, yet adequate, picture of racial distribution.

As a preliminary, we shall describe in outline the racial strains which are to be found in the Middle East, and afterwards proceed, region by region, to a discussion of the actual population itself. Racial strains are :

(i) *Mediterranean Race*.—The majority of peoples living around the Mediterranean have been recognised as forming a special racial group termed by some anthropologists the Mediterranean, and by others the Brown, race. This group, one of five principal divisions of mankind, is characterised by long-headedness—cephalic index ranging from 67 to 75 per cent.—by marked brunetness, by wavy hair, and by relatively small stature and slight or moderate build. The Mediterranean race has a wide distribution in the Old World, not merely around the sea basin itself, but also in India, where the Dravidian population is recognised as part of the same race, and on the Atlantic coast of north-west Europe, where Irish, Welsh, Cornish, and Breton peoples show some racial affinity to the Mediterranean.

It is believed that at one time, peoples of Mediterranean type formed the bulk of the populations of the Middle East. Later arrivals, in all probability from central Asia, displaced or intermingled with the older established race, so that at the present time, relatively pure Mediterranean stocks are found only in the south and west of the Middle East areas.

(2) *Armenoid Race*.—A second major race of mankind is associated with the highland belt that runs from east to west across southern Eurasia. The chief distinguishing features are roundness of head, and moderate height, together with stocky or somewhat heavy build. Several sub-types of this highland or Alpine race are recognised, of which the Armenoid or west Asiatic race is one. This latter race, or better, sub-race, has certain outstanding characteristics. Head form is markedly round, with a cephalic index that averages 86 per cent., but occasionally exceeds 100 per cent. ; whilst dark hair and eyes, thick lips and a strong jaw, 'frizzy' hair, and a strongly curved nose

make up the physiognomy that is often, although sometimes falsely, caricatured as typical of the Jewish people. Another characteristic of the Armenoids is a flattened ' wall-like * back of the head, with little or no occiput.

This people would appear to be closely related to the central Asiatic groups of Turkic stock ; and it is more than likely that they spread westward from central Asia into various parts of the Middle East. Such movement must have started at a very early date ; and Buxton suggests that the Armenoid race may even have formed the aboriginal stock of the north-eastern parts of the Middle East, since they may have been associated with two of the oldest civilisations of the area—those of Akkad and Sumer. The appearance of Armenoids in the Mediterranean basin at a very early date is confirmed by the fact that they had reached Malta within Bronze Age times.

(3) *Iranian (Scythian) Race*.—More difficulty attaches to discussion of this third group, since opinion is divided both as to nomenclature and as to affinity, and there is even some doubt as to whether the Iranians can justifiably be distinguished as a separate sub-race. On the whole, it would seem that this group should be regarded as a branch of the great Alpine race, because head form is round (cephalic index, 78 to 79 per cent.) although much less so than among the Armenoids. Stature, too, is more variable, and the almost universal brown hair and eyes of the Armenoids is rather less frequent. Lighter colouring and less strongly marked facial characteristics have led some anthropologists to link the Iranian race with the Nordic peoples, who may well have developed on the plains of Turkestan. Such connexion is more doubtful, although later intermixture with Nordic strains is possible.

As would be expected, the Iranian race is best represented in Iran, where it forms a large part of the population of the plateau, and a less important sub-stratum elsewhere. Waves of this people also appear to have spread westward across the Middle East from time to time, and their influence can be traced as far as the shores of the Levant.

(4) *Proto-Nordic (Indo-Aryan) Race*.—Observers have recorded the presence of a long-headed, tall, and often surprisingly fair element in the population of the Middle East and northern India ; and most are agreed that this element is in some way related to the Nordic strain of Europe. Cephalic index averages 69 to 70 per cent, and various names have been used to describe the people. Haddon's ' Proto-Nordic ' is probably best: the nearest alternative of ' Indo-Aryan '

being properly a linguistic term, and totally inapplicable to a single racial group, since Indo-Aryan languages are often spoken by non-Nordic or mixed racial communities.

The Proto-Nordic race became differentiated in the plains of west-central Asia ; and at a comparatively late date various groups moved south into India and Mesopotamia, and west into Asia Minor and Europe. The social and historical implications of these invasions by Nordic peoples, with the possibility of Nordics forming an aristocracy of higher culture and initiative amongst population of different racial character has given rise to much discussion. In view of the fact that early civilisation first developed in those regions of the Middle East where intermingling of diverse racial strains has been a pronounced feature, it would, however, seem preferable to attach greater importance to intermixture of stocks as a factor in human progress, rather than to ascribe the greatest proportion of ability and initiative to one particular group such as the Nordics. Hybridisation as between a number of varied racial strains, not strict selection involving only one people, would appear to have had the greatest favourable influence on man's cultural development.

(5) *Turki (Turanian) Race*,—In Asia Minor and Iran certain elements of the populations show affinities to the Mongoloid races of central and eastern Asia. Again, opinions are somewhat at variance : Deniker uses the term 'Mongoloid' in a general way, to describe a large number of peoples living in central and eastern Asia ; whilst others prefer to distinguish a Finno-Ugrian or western branch of the Mongoloid race, in which racial characters best developed in eastern Asia appear somewhat modified by contact with non-Mongoloid groups. At all events, it will be sufficient for our present purpose to note the existence within the Middle East of certain groups of people, relatively small in number, that derive racially from the north and east of Asia. To these the collective name of Turki or Turanian has been applied ; and a number of small communities have migrated south-westwards from the steppes of inner Asia. Most prominent of such groups were the Mongol 'hordes' of Gengis Khan and Tamerlane; and the Osmanli or Ottoman Turks, who entered Asia Minor during the eleventh century A.D.

Round-headedness, small stature, and a yellowish skin are the more outstanding features of Mongoloid peoples. In addition, hair is almost always straight and black ; and two well-known characteristics, high cheek bones and the ' almond eye ', are frequent but not

universal. It is easy to recognise this physical appearance as the one colloquially termed 'Asiatic'; but in the Middle East, by no means all these characters are present in the Turki population. Almond eyes, for example, occur in only 25 to 50 per cent, of the Turki people living on or near the Siberian plains, and in Iran and Asia Minor the proportion of Mongolian features is much less. The slightness of the distinction between Mongoloid and non-Mongoloid becomes apparent in western Asia Minor, where the Turki race approximates closely to the Armenoids. Buxton has even suggested that the peoples of central Asia, of which the Turki form a part, represent a specialised development from a basic Armenoid stock.

(6) *Negrito Race*.—Little need be said about this race. Although many negroid elements can be traced in south-east Asia, it is very doubtful whether there are any indigenous negrito populations of long standing in the Middle East. On the other hand, a certain negroid element of recent arrival can definitely be found in the descendants of African slaves brought into the Middle East from the south-west. Here and there, particularly in Arabia, north-east Africa, and south Iran, darker skin, coarser features and thickening of the lips suggest African influences, just as in the Levant occasional blond Arabs with Arabicised family names of European origin recall Crusader invasion.

It is hardly possible to follow in detail the processes of intermingling by which the present populations of the Middle East have come into existence. Nevertheless, it can be seen that in the main, there has been a drift of peoples south-westwards from Iran and central Asia into the Middle East. This trend of movement has predominated, although a slight return movement north-eastwards from Egypt has had an influence on the populations of Palestine, Transjordan, and south Syria.

Four large-scale migrations of peoples can be traced within historic time.¹ The first, occurring at about 4000 B.C., brought a round-headed race from the mountain zone of the north into the riverine lands of Mesopotamia. This so-called Akkadian migration was followed at some time before 2500 B.C. by a second wave of peoples from the north-east, less markedly round-headed, and possibly of the Iranian sub-race. These latter established themselves on the shores of the Mediterranean, where they formed the well-known Phoenician and Canaanite peoples. In about 1350 B.C. the Aramaeans, of similar origin and ethnic character, pushed into Syria and north Palestine

¹ For a possible reason for these migrations see page 73.

by way of Damascus. Finally, the Islamic migration outwards from central Arabia during the seventh century A.D. was anthropologically speaking of much less importance, the actual numbers involved being small. Cultural changes as the result of this invasion were, however, enormous, and most countries between Spain and Java were affected, some to such an extent as to alter completely the course of their history.

DISTRIBUTION OF RACIAL STOCKS IN THE MIDDLE EAST

Most outstanding in the population of *Asia Minor* is the Armenoid element, which appears in its purest form in the mountainous districts of the interior, and in various swampy and marshy regions. Armenia itself is, as would be expected, a stronghold of this racial type ; but complete racial homogeneity amongst all Armenians does not seem to occur, since some authorities see a slight strain of long-headedness in this people.

Intermixture of Armenoid and Mediterranean stocks is found on a much larger scale in western Anatolia, where the majority of the population shows an even balance between long- and round-headedness. This mixed population occurs on the coast, and in the towns; and is due, in all probability, to later immigration of Armenoids into a region at one time predominantly Mediterranean in ethnic type.

Further complication arises in the extreme west from a possible invasion by Nordic elements in early historic time. Whether or not this view of the existence of the Proto-Nordic (Indo-Aryan) groups in western Turkey is held, the basic facts of population composition in *Asia Minor* are beyond dispute : in the difficult mountainous terrain of the east, racial purity is best developed, with Armenoids as practically the only type. Further west, intermixture increases, until near the shores of the Aegean extreme heterogeneity prevails. Invasion after 1000 A.D. by various Mongoloid groups had only a small effect on the population. In particular, the Ottoman Turks added little to the ethnic character of *Asia Minor*, since the number of people involved was small. The Ottomans settled down for the greater part as a landed aristocracy, in a way somewhat similar to that of the Normans in England.

Cyprus, structurally an outpost of *Asia Minor*, shows a similar affinity in racial distribution. The population of the island, partly long- and partly round-headed, closely resembles that of maritime Anatolia, and appears to have varied little since Neolithic times.

Important off-shoots of Armenoid peoples occur in the *Levant*

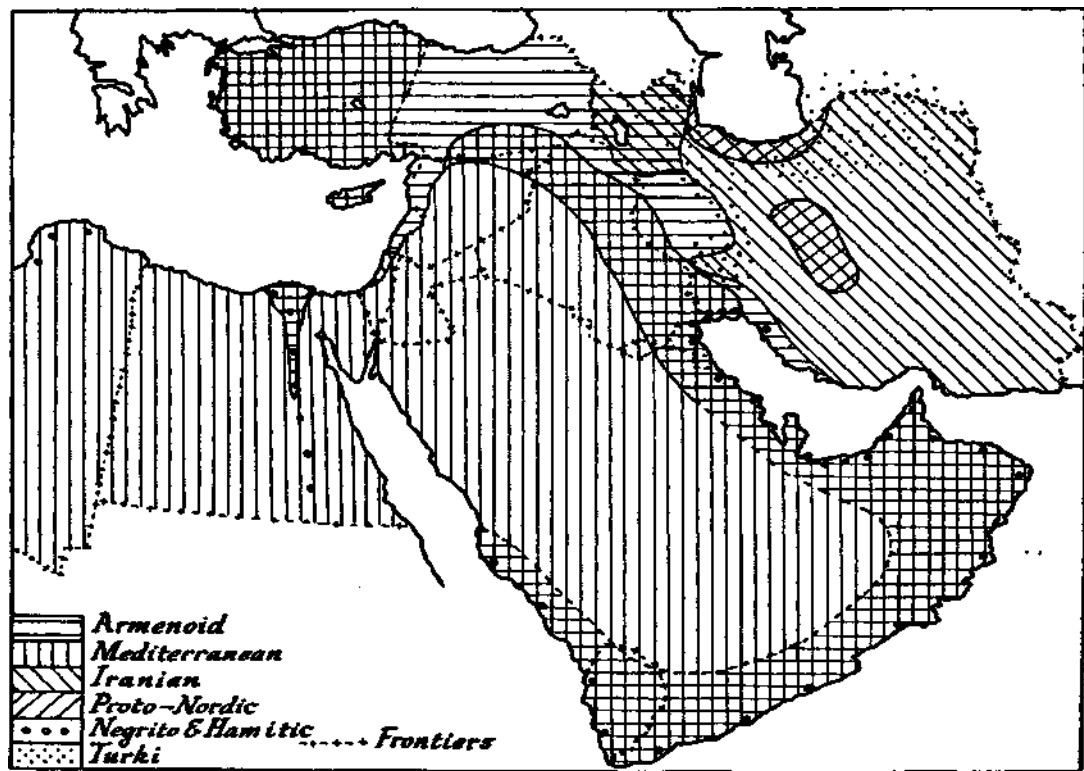


FIG. 18. Racial Stocks in the Middle East.

and in *Iraq*. The southward continuation of Turkish mountain chains into south-west Syria, the Lebanon, and north Palestine has an ethnic parallel in that the populations of these areas are racially akin to those of the mountains of Asia Minor. The Alawites of the Jebel Ansarieh, the Metwali of the Orontes valley, the Lebanese, and the Druses of south Lebanon and the Jebel Druse stand apart, by reason of rounder head form and heavier build, from the slighter Syrian population immediately to the east. Further south, the Armenoid strain dies out at the plain of Esdraelon in Palestine, leaving the northern Jews racially somewhat distinct from their kinsmen of the plateaus of Samaria and Judaea.

On the east, Armenoid affinities are easily discerned in the peoples of northern and central Iraq. 'A religious sect known as the Chaldeans, fairly widespread in the Fertile Crescent, and strongest in northern Iraq, shows this strain to a considerable degree ; but Armenoid influence is also dominant in most of the Iraqi population north of the latitude of Baghdad. South of Baghdad round-headedness decreases but is still present. In Mesopotamia we therefore have once again a Mediterranean population overlain by an Armenoid element that becomes progressively weaker away from the highland zone.

The two southward extending tongues of Armenoid peoples partially enclose a large area in which occur populations of two contrasting types. We have seen in the case of the Armenians that hostile environment tends to favour the preservation of a single unmixed racial stock ; similarly, the Badawin of the deserts of Syria and North and Central Arabia show a high degree of ethnic purity, as a branch of the Mediterranean race. Cephalic index is amongst the lowest of any population of the Middle East; and slimness of build often differentiates the desert dweller from Arabs of the towns.

Between the Badawin and the round-heads of the northern Levant occur a group of peoples about whom little has so far been said. Mention was earlier made of the Canaanite-Phoenician and Aramaean invasion of Palestine and south-west Syria, for which the Damascus region seems to have been the gateway ; and the name Iranian was tentatively given to the racial stock from which these invaders may derive. The Canaanite-Phoenician-Aramaean type stands out as neither markedly long- nor round-headed ; and in this connexion, it is useful to note the difference in cephalic index between a mixed population of long- and round-heads, such as that of western Anatolia, in which the arithmetical average of two measured maxima peaks (at

73 and 83) falls at 78; and a homogeneous population like the Aramaean stock, with a single measured peak at 78.¹ Most of the Palestinian Arabs are of Aramaean stock ; and we therefore have the important point that racially it is impossible to speak of a pure * Arab ' type, since within a relatively small area of the Levant, three distinct racial stocks occur, typified in the Metwali (Armenoid), Badawin (Mediterranean), and Palestinian (Iranian), all of whom would unhesitatingly describe themselves as * Arabs '.

The racial affinities of the Jews have been much studied, but in this matter, *tot homines quot sententide*. A recent survey by Kappers states a view that will commend itself to many, namely, that the Jews are of two different racial types. The Hebrew nation probably originated on the northern edge of the Fertile Crescent, and, according to Petrie, entered the Holy Land in two waves, a first c. 1900 B.C., and the second c. 1200 B.C. In the light of this, it is reasonable to suppose that a strongly Armenoid strain prevailed ; and the appearance of many Jews lends support to this theory. Cephalic index also confirms the Armenoid affinities of the Jews, as the following table, drawn up by Kappers, shows :

CEPHALIC INDEX

Armenians, Lebanese, Chaldeans	83 and 87
Jews (Mosul)	. . . 83 and 88
Jews (Germany)	. . . 83-5

By no means all Jews are of this type. Tallness and blondness occur, and the cephalic index of southern Jews is on the average, 77. It has therefore been suggested that in the south, inter-mixture with the Canaanite population has taken place, and Iranian characteristics are therefore intermingled with Armenoid. This interpretation may not advance us far, in view of the doubt attached to the Iranian race itself; and a further opinion is that the Jewish people frequently tend to approximate in physical character to the races amongst which they have lived since the Dispersal. At all events, one can, however, perceive an anthropological factor in the cultural differences between Galilean, Hebrew, and Samaritan, and between Sephardim and Ashkenazim,² with the Plain of Esdraelon serving as a boundary zone between slightly differing racial groups.

¹ I.e. the first is in a sense artificial, and fictitious; the second does in fact correspond to actual conditions amongst the population.

² Names used to distinguish Jews who have lived in southern and northern Europe since the Dispersal, see p. 100.

For *Southern Arabia*, data is scanty, but Buxton believes that there has been a considerable influx of round-headed people from Mesopotamia by way of south-east Arabia. The aboriginal long-heads, still characteristic of north and central Arabia, have been absorbed into the composite stock, in which round-headedness may even predominate. With its mixture of peoples, southern Arabia to some extent resembles Asia Minor ; but in the absence of detailed information, no answer can be given to the interesting geographical problem of how such a region of extreme difficulty came to acquire a mixed population.

Although the population of *Egypt* is in the main of Mediterranean stock, important round-headed elements are found, showing considerable entry from the north. Worrell also draws attention to various cultural and ethnic features which seem to have been derived from the negro populations to the south. Neither of these tendencies is surprising, in view of the topography and space relations of Egypt : a corridor *par excellence* between tropical Africa and the Eurasia. Outside the Nile valley intermixture is much less a feature, and a predominantly Mediterranean racial type is found similar to that of northern Arabia. The persistence of this type both in the Nile valley, and on the margins, including *Cyrenaica*, since very early times, is perhaps the most important single feature in the ethnology of Egypt. In *Cyrenaica*, however, there is a slight admixture with Berberine elements from the west.

Iran remains to be discussed, but little can be said with finality, since extensive intermingling of peoples, and inadequacy of information have given rise to many conflicting theories, particularly in relation to the Nordic or Indo-Aryan element of the population. The Iranian race forms a sub-stratum of most of the population, with strongest representation in the northern plateau regions. To this basic element have been added groups of Armenoids, most important of whom are the Bakhtiari tribes of the central Zagros. This people, which has greatly influenced the history of Iran, exhibits a very high cephalic index ; and, according to Hitti, is related to the Druses of south-west Syria. In this connexion, it is interesting to note that the Bakhtiari themselves have a tradition that they originated in Damascus. The Qashqai tribes, also of the central Zagros, seem, on the other hand, to be descended from Mongoloid invaders of the Asiatic steppe.

In central Iran a long-headed strain occurring amongst the Zoroastrian sect suggests connexion with the Proto-Nordic race ; and an even more markedly long-headed group settled around the southern

shores of the Caspian may be direct descendants of a wave of Indo-Aryans that migrated from the steppe-lands of central Asia in approximately 2000 B.C.

Much anthropological contact seems to have taken place between lower Mesopotamia and southern Iran. The districts of Shiraz, Kirman, and Bushire have a very mixed population, in which racial strains from many areas are represented. To what might be called the indigenous peoples of the Middle East are added African slave elements, and, towards the coast, a slight Indian admixture. Negroid characteristics are so apparent in certain populations living at the head of the Persian Gulf as to have given rise to speculation whether or not an indigenous negrito population did not at one time exist there.

Besides the peoples described above, numerous small, but racially and socially distinct groups also exist in the Middle East, often as political minorities in a larger national state. Many of these groups are best characterised as the heterodox religious sects, but certain racial differences sometimes appear, since a marked clan feeling has resulted in a strong tendency to marry within the group, with a consequent preservation of original racial stock. Von Luschan saw in these minority groups remnants of ancient peoples that elsewhere were submerged by later immigrants ; but it is more likely that some minorities were themselves the last comers, and remained unabsorbed by the indigenous population of the regions into which they came.

Chief of such minorities are the Kurds, a people living in the debatable hill country between Turkey, Russia, Iran, Iraq, and Syria. Physically, the Kurds are of large stature, and vary considerably in colouring. An average cephalic index of 78 may indicate affinities to the Iranian race, or may equally well indicate an intermixture of Armenoid and Mediterranean types, since variation from this average is wide. A further suggestion has been made that there is a Nordic strain in the Kurds. Colonies of this people are found away from the main group of the mountains, in Iraq and Damascus. It has also been suggested that the Yezidi, a small group of people living on the Jebel Sinjar of Iraq, and notable as a semi-pagan community, may be Kurdish in origin. As, however, the Yezidi seem to show more strongly marked Armenoid characteristics, this connexion appears doubtful, although a certain intermixture with the Kurds may have occurred.

To the east of Kurdistan, the peoples of Azerbaijan are considered to show intermixture of Iranian and Armenoid stocks. Wide variation in physical type makes it difficult to discover any marked racial

affinities ; and it is likely that traces of Turki blood have been added at a comparatively recent date. Turki strains also occur further to the south-east, along the Zagros and in Iran, where, as we have seen, certain tribes, e.g. the Qashqai of the central Zagros, stand apart in physical type from their neighbours. Finally, some reference must be made to the Circassians, numerically a very small group, but of a certain renown in the former Ottoman Empire, and now existing in scattered groups in Turkey, Iraq, and the Levant. The Circassian homeland was originally in the north-western Caucasus, from which active migration took place to various parts of the Ottoman Empire. This migration was not always voluntary, particularly during the nineteenth century, when Russian expansion southward drove many Circassians to seek refuge in a Moslem state. Before this too, for many years previously, the beauty of the Circassian women had made them eagerly sought after as occupants for Moslem harems.

Summing up, we may say that from the point of view of the anthropologist, it is impossible to speak with any accuracy either of an Arab or of a Semitic people. Both terms connote a mixed population varying widely in physical character and in racial origin, and are best used purely as cultural and linguistic terms respectively. Similarly, present national frontiers are often far from coinciding with ethnic boundaries, although it must be added that intermingling of races is so pronounced a feature that no system of delimitation could possibly be devised on a strictly ethnic basis. Racial minorities are therefore likely to remain a feature of the human geography of the Middle East and in many instances the claims of one community to achieve political and national unity appear to have succeeded only at the expense of denying the same privileges to smaller ethnic groups with which the first group is in close contact.

LANGUAGE DISTRIBUTION

As regards language, the position in the Middle East is much clearer. Although it is possible that at one time each racial group had its own language, intercourse soon breaks down linguistic differences, and one language may quickly establish a dominance, to the complete exclusion of others. Whereas physical characters can persist through many generations as a result of biological inheritance, a cultural feature such as language often becomes modified within a short time, and may even die out, particularly if the language itself possesses no literature.

Our present purpose is merely to note the distribution of existing languages within the Middle East, with incidental references to earlier periods only as they affect modern conditions. In the north, Turkish, as the language of Osmanli conquerors, became dominant in Asia Minor. Spoken only by Asiatic nomads, Turkish at first possessed no alphabet, and Arabic characters were borrowed ; but as these letters are not particularly well adapted to expressing the sounds of Turkish, Roman letters replaced Arabic script in 1923, by decree of the Turkish Republic.

At the present time, Turkish is by no means universally spoken in Asia Minor. Towards the east, Armenian, a more ancient language with its own characters and literature, still persists ; and further to the south, Kurdish has a wide extension. In the difficult and inaccessible hill districts near the Russian frontier many remnants of Caucasian languages occur—Circassian, Lazi, and Mingrelian being among the chief. Some of these represent ancient cultural or racial groups submerged by later arrivals, but others are Finno-Ugrian dialects brought in at comparatively recent dates by invaders from the east.

At one time Greek was spoken by a considerable minority in western Anatolia ; and until the forcible deportations of 1922, Izmir (Smyrna) was at least as much Greek as Turkish. At the present time, Greek is still spoken in the islands of the Aegean, and is the native tongue of three-quarters of the inhabitants of Cyprus—the remainder speaking Turkish. Greek cultural influence is of great importance in the life of the island, and recent political developments have given emphasis to the question of a possible union of Greek-speaking peoples.

From the interior of Arabia have come two great groups of languages, North Semitic and South Semitic. To the first group belong the Aramaean and the Canaanitish dialects—Aramaic proper, Hebrew, Phoenician, and Palmyrene (the now extinct language of the inhabitants of Palmyra) : to the second group, Arabic. In the first and second millennia B.C., extensive folk migrations spread North Semitic languages into Mesopotamia, Syria, and the Levant. Aramaic, the language of a people living on the western edge of the Syrian desert, became current over a wide area in the Middle East, most probably because of the extensive commercial relations developed by the Aramaean states. Aramaic dialect was the vernacular of Palestine during the time of Christ; and at least one of the Gospels can be considered as pure Aramaic literature, with several words even

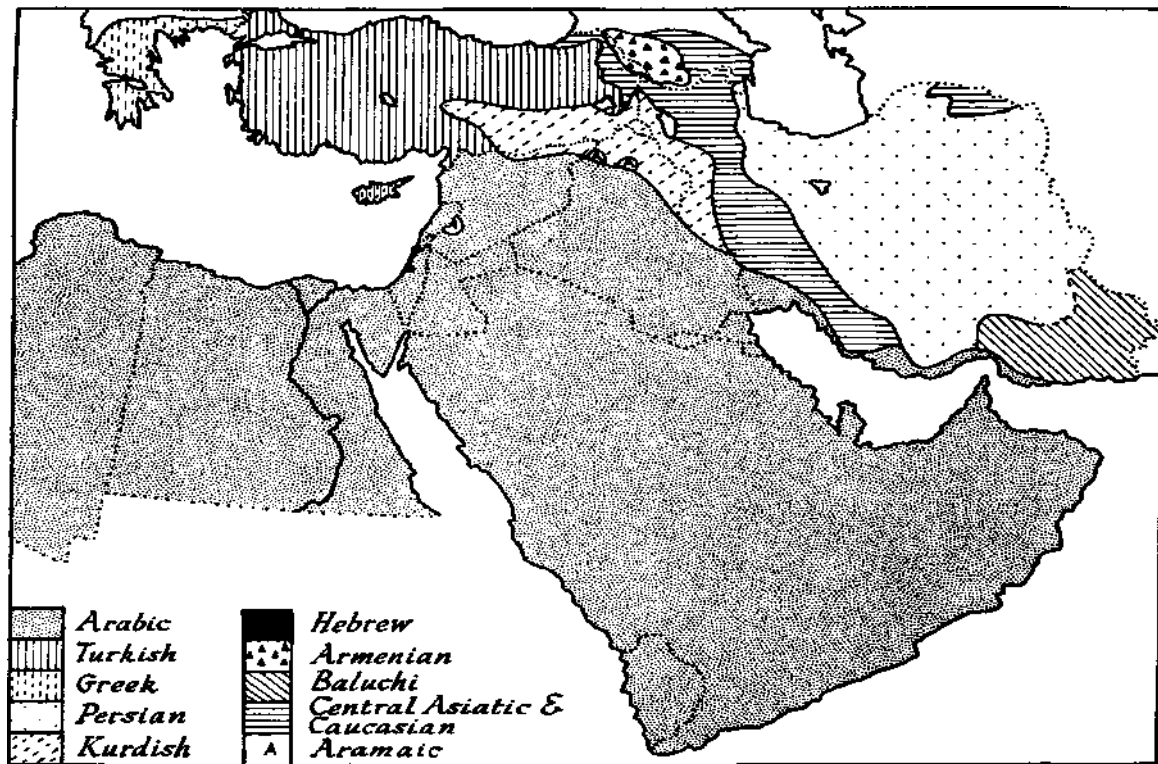


FIG. 19. Language Distribution in the Middle East.

surviving unaltered in the English translation of the Bible.¹ Aramaic also had a considerable effect on the language of Iran, and traces are still apparent in the north-west of the country to-day. The language is not completely dead ; it lingers still in a few villages near Damascus and Mosul, and is the sacred language of a number of Christian sects in both countries.

Arabic, originally spoken by a small group of traders, townsfolk and desert nomads in the district of Medina and Mecca, was the language of Muhammad and his early followers, and with the rise of Islam in the seventh century A.D. quickly replaced existing languages in Libya, Egypt, the Levant, and Iraq. As the language of the Koran, Arabic is one of the great unifying influences of the Muhammadan world, since although local deviation in vocabulary and pronunciation occur, a standard form of classical Arabic is understood by most literate Moslems.²

It should be noted that the dominance of Arabic in the Middle East is by no means complete : penetration of the mountain zone of the east and north did not occur. In Asia Minor, as we have seen, Arabic script only was adopted, and the numerous non-Semitic languages of the region remained in current use. Similarly, Iran retained its own distinctive speech, which can best be described as an ancient indigenous language (termed Pahlvi) much modified by extraneous influences. Extensive interchange of vocabulary and ideas between Persian and Arabic shows that the cultural influences of Arabic have been strong, yet not sufficient to drive out the native form of speech. Again reminiscent of Asia Minor, Iran has a number of minority languages, chiefly spoken by tribes living in the Zagros regions.

Broadly speaking, the Middle East can thus be divided into (a) an Arabic area, in which a single language predominates to the virtual exclusion of all others ; and (b) a composite region, in which many languages, recent and ancient, remain current. It may be significant that the boundary of these two areas coincides for the greater part with the southern edge of the geological folded zone; and the effect of topography in restricting the spread of language would seem to be marked.

¹ E.g. The Last Words of Christ (Mark xv, 34).

* North African, Egyptian, Palestinian, Syrian and Iraqi 'dialects' of Arabic occur, so that whilst for example a Syrian would be understood in Egypt, his nationality would be apparent in his speech.

SPECIMENS OF SCRIPTS IN CURRENT USE IN THE MIDDLE EAST

(I) Read from right to left:

Arabic, في البدء كان الكلمة

Aramaic (Syriac), ܠܒܪܝܬܐ ܕܡܬܠܟܐ ܕܠܗ

Hebrew, בראשית היה הדבר

(II) Read from left to right:

Armenian, Մի խոսքով էի ասելի

Greek, 'Εν ἀρχῇ ἦν ὁ λόγος.

Cyrillic (Russian),¹ Въ началѣ было Слово.

The examples given are all translations of John I, i, " In the beginning was the Word ".

RELIGIOUS DIFFERENCES

Religion, which may be defined as the awareness by man of the existence of forces which are outside his own control, has been a feature of the human race at all stages of development. In the view of Dr. Marett, religion is an effort to face a crisis—whenever man feels that he is likely to suffer, or to incur danger, he tries to control and influence outside forces, in the attempt to achieve a result favourable to himself. From this it is therefore possible to argue that the practice of religion by a group of people can be regarded as an endeavour, by indirect means, to serve the collective ends of the community involved.

In the view of some ethnologists, though the point is open to argument, religious belief shows stages of evolution paralleling the grades of social development in human societies. Amongst communities at a low level of civilisation, religion has a correspondingly simple form : as culture develops, spiritual beliefs assume an increasingly complex and mature pattern. Among the most primitive peoples, religion is probably most frequently concerned with efforts to ensure a plentiful supply of animals for prey. The Australian aborigines hold ceremonies in which the kangaroo and witchetty grub * spirits ' are conciliated and cajoled, in order that both of these

¹ Used by a very few Slav-speaking groups formerly living in the Balkans and Russia.

creatures may be abundant in the path of the hunter ; and similarly, the Eskimo practise a form of placation of the spirits of the walrus that they are obliged to kill.

In this way, there develops in the mind of the savage a certain connexion between animals and a number of unseen but powerful forces, of which the animals tend to be regarded as a living embodiment. Such ideas, involving the association of living creatures with the forces of nature, are termed *animistic*, and would seem to be a widespread feature in human societies at an early stage of development. By a process of extension, not merely animals, but also trees, rocks, and other natural features may come to be regarded as in some way linked to the unseen powers of the world, i.e. sacred, and hence to be conciliated or invoked in order to further man's personal desires.

In societies at a higher level of development, agriculture may replace hunting as a means of livelihood ; and religious practices show a corresponding evolution. Man is still concerned to invoke the forces of nature in order to increase his food supply, but abundance of animals for prey is now made much less desirable—instead, importance centres on the ' annual miracle ' of plant fertility, by which regular crops are assured to the community. Favourable wind and temperature conditions, and rainfall at the due season, are essential to agriculture, and are hence matters over which man might attempt to exercise control, however indirect and remote, by means of entreaty (prayer), and bribery (sacrifice). Most of all, however, the mystery of annually recurring fertility, by which the cycle of seasonal growth is perpetuated, comes to be the fundamental element in religion ; and a number of deities have personified the revival of Nature after a period of death and absence from the earth.¹ Worship of fertility can be traced in various forms in most parts of the world, and is at the present day highly characteristic of India and central Africa.

It is also interesting to note that whereas primitive man tended to ascribe to his deities an animal form, amongst agricultural peoples divinities took on human attributes. This evolution is well seen in the religion of ancient Egypt, which, at first purely animistic, with gods in the form of animals, developed at a later stage into a system in which the gods were partly human and partly animal in form, but entirely human in mental attributes. Another feature was the growth of moral and ethical ideas. Animistic religion is in effect wholly self-seeking ; at a later stage, general standards of conduct appear,

¹ Cf. the legends of Adonis, of Persephone, and of Balder.

to which all men must conform—that is to say, altruism begins to exist alongside self-interest; and the practice of religion involves a wider conception of man's obligations as a member of a community. If, therefore, man has a duty to his neighbour, some sort of compulsion becomes necessary at times to make him understand this. We thus arrive at the idea of a judgment of souls after death, by which 'good' is rewarded and 'evil' is punished. In this way, altruism is strengthened at the expense of self-interest. Such a development in ethical ideas occurred in Egyptian religion as early as 3000 B.C.

Vegetational growth is influenced by many factors, a large proportion of which are purely local in origin. Moreover, agricultural communities tend to live in small, scattered groups rather than in large agglomerations, because of the necessity of being in close contact with the fields. A further factor—that of local variation *in* terrain—also enters in; and this, as we have seen, is highly characteristic of geographical conditions in the Middle East. The deities of agricultural communities therefore tend to be numerous, as reflecting the varied natural forces that affect the growing of crops; and because of small local differences in environment, the relative importance of each natural force, and therefore of each deity, varies from one place to another, with different names for individual deities. Rain, sunshine and wind gods—sometimes one god for each wind—river deities in places where rainfall might be deficient; and even spirits, dryads or nymphs associated with particular topographical features, all come to be regarded as having special attributes and powers as members of a vast divine community or pantheon that exerts control over man's activities on earth. Very frequently, there also appears the idea that the most important member of the pantheon is a mother-goddess, the source of fertility, by whose beneficent power life is maintained. Such a belief can be traced amongst many agricultural communities, from the ancient Egyptians and Greeks to modern Hindus, and would seem to be particularly characteristic of the agricultural civilisations of the Mediterranean basin.

Among pastoral communities, fertility is much less of a mystery since herders control it for their own purposes in the breeding of their animals. The nomadic way of life, involving extensive journeys from one region to another, also involved a certain acquaintance with many types of environment and many ways of life; so that unlike the settled cultivators, whose activities were influenced by **local factors and whose** view of life was often sharply circumscribed,

the nomads tended to develop a broader outlook, and a wider conception of the world. This difference is clearly shown in the religious practices of many pastoral communities. By their wanderings, which brought them into contact with numerous local gods worshipped by settled peoples, the nomads had a better opportunity of realising that the spiritual forces that influence men's lives are fewer, but of greater magnitude—the sun has the same beneficent effect throughout the world, even though it might be worshipped, by different rites, as Apollo in Greece, as Baal in Phoenicia, and as Ra in Egypt; or, at a higher plane, ethical principles often have the same validity in human society whatever the deities with which they may be associated.

Hence the elaborate pantheon of agricultural communities, with its emphasis on fertility, was rejected amongst nomads in favour of a simpler code that was based on the relationship between individual man and the powers of morality and personal behaviour—* What does God require of thee ? '—and so self-interest, the original impulse in primitive religion, gave way in more evolved societies to a doctrine of right for right's sake. This growth of ethical content in religion can be traced in agricultural communities; but it was frequently overlain by other, often sensual, elements ; and its highest elaboration would seem to occur amongst pastoral peoples.

The idea of close individual relationship to God has another implication. It is significant that from nomadic peoples, or from peoples closely in contact with nomadic ways of life, has come the belief in personal revelation of the deity. The prophets of the Old Testament, Zoroaster (Zarathustra), Jesus Christ, and Muhammad, all proclaimed the doctrine of divine revelation through man himself.

Finally, there would seem to be some connexion between the religious beliefs of pastoral peoples, and the idea of a single god. The influences tending to reduce the number of gods in nomadic societies have already been touched on ; and although the link between environment and religion is tenuous and may easily be over-emphasised, there remains the historical fact that practically all of the great monotheistic religions of the world seem to have arisen on the margins of the great deserts of Eurasia, where pastoral peoples came into contact with the polytheism of settled areas. Zoroastrianism, Judaism, Buddhism, Christianity, and Islam, at once the highest developed of all religious systems of the world, share one common feature—the fact of origin under closely similar geographical environment.

The development of religious thought has been treated at some

length, because in the Middle East older beliefs and practices have not entirely died out, and their influence remains to colour the observances of the newer religions—often to a surprising degree. The Greek Orthodox Church has recognised as saints and martyrs a number of what would seem to be local deities of an older, pagan, pantheon ; whilst in the Lebanon a group of trees near the mouth of the Nahr Ibrahim, once hung with votive rags by the worshippers of Adonis, are still decked with strips of cloth at Eastertime by a Christian population.

Perhaps more striking still, the Ka'aba or Black Stone at Mecca, now a holy relic of Islam, had originally no connexion in any way with Muhammad, but was worshipped long before his time as a tribal fetish. Other influences deriving from more primitive forms of religion will be discussed at a later stage : it now remains to sketch the origin and features of the chief religious groupings in the Middle East, as an important element of the social life of the region.

Zoroastrianism and Judaism.—These were the first of the monotheistic religions. Zoroaster, or Zarathustra, a native of Iran, lived during the period 700-550 B.C., and his teaching that human life is a battleground for opposing forces, good and evil, was adapted as the official creed of the Persian Empire under Cyrus and his successors (page 127). The religion of Zoroaster, by its insistence on moral and ethical standards, represented a great advance on the older pagan and polytheistic creeds, which had frequently appealed to the baser human instincts of self-interest and sensuality. The older gods were, however, not entirely abandoned, but retained æ subsidiary in influence to a single Lord of Goodness and Light, or sometimes as demons. Association of the Lord of Goodness * with light led in time to the use of fire as an important element in Zoroastrian worship ; and with the spread of religion amongst peoples who found difficulty in appreciating the abstract conceptions of Zoroaster, some earlier ideas were abandoned in favour of a simpler form of belief that was greatly influenced by pre-existing pagan creeds. Fire also came to be used as the principal element of ritual. Thus Zoroastrianism became associated with fire-worship, and remained the distinctive religion of Iran until the rise of Islam. Moslem persecution over a long period has reduced the fire worshippers to a small remnant, who now exist as a minority in the Kirman and Yezd districts of Iran. Large numbers emigrated to India, where they form the Parsee community.

¹ Ahura-Mazda, or Ormuzd. Cf. a modern commercial use of the name.

The Jewish people entered Palestine during the second millennium B.C. and successfully established a small state in the highlands of Judaea. It was subsequent to this entry into Palestine that the religion of the Jewish people, at first worship of a purely tribal deity, and strongly influenced by a pastoral way of life,¹ developed the lofty conceptions which now characterise it. Following conquest by the Assyrian king in 722 B.C. the first dispersal of the Jewish people took place, when numbers of Jews were forcibly settled in Mesopotamia. Later, however, these immigrants were allowed to return, and the Jewish state revived. In A.D. 71, as the result of a revolt against Roman overlords, a second and more permanent Dispersal (Diaspora) took place. Jews became established in many parts of Europe and Asia, where they absorbed much of the culture and even some of the racial traits of the peoples amongst whom they settled. Yemenite, Iranian, Turcoman, Georgian, and even Abyssinian Jews are distinguishable at the present day ; and by reason of their oriental culture and outlook, these groups are in sharp contrast to the Jews of Europe. Numbers of Oriental Jews settled in Palestine during the Ottoman period, and recently have shown some disinclination to identify themselves with Zionist political aspirations.

Of the European Jews, a minority settled in the Iberian peninsula and adopted much of the Spanish-Arab culture of the region. These Jews, spoken of as Sephardim, have been considered by some to be the elite of the Jewish people. The remainder, settled chiefly in Poland and adjacent countries, are known as Ashkenazim ; and it is from this latter group that the majority of modern immigrants to Palestine have come.

Christianity.—In A.D. 313 Christianity was adopted as the official religion of the Roman Empire.² This adoption led to many changes in Christianity itself, which, from being the fiercely held creed of an active, but disliked and mistrusted minority, became an accepted and integral part of the Roman state. In undergoing this development,

¹ Of all the books in the Old Testament, only one, that of Ruth, shows the predominating influence of an agricultural tradition.

* There were many reasons for this change, some of which were mainly political in character. The Roman Emperor Constantine saw in Christianity a strong, positive social bond, by which the increasing disunity of a declining empire might be counteracted. The older Roman state, vigorous and secure, could afford to ignore the cohesive power of religion, and therefore tolerated many religious beliefs within its frontiers. At a later date, in face of disintegration within, and barbarian pressure without the empire, tolerance was abandoned in favour of a single positive religious system from which the state could derive support, and which in turn could benefit from official recognition:

Christianity was subjected to two influences. The first, an attempt at defining a single body of dogma and ritual in order to preserve unity within the Church, is of little concern to the geographer ; but the second, the creation of administrative provinces on a territorial basis, has much geographical interest.

With the Roman world, four cities could claim a certain material and intellectual pre-eminence. Rome itself, for long the centre of the empire, began to decline in influence with the increasing economic and political importance of the lands of the Eastern Mediterranean during the later Roman period ; and a symptom of this shift of balance was the corresponding rise of Constantinople, which supplanted Rome as the capital of the Roman Empire in A.D. 330.

Further to the east, Alexandria and Antioch, both extremely wealthy commercial centres, had each developed a distinctive tradition based on special regional interests. Accordingly, the early Christian Church was organised into four provinces, based on the four cities, with each province headed by a patriarch. Within a relatively short time, however, instead of the unity that had been hoped for, strong regional particularism came to be manifest.

The province of Constantinople was in closest touch with the seat of government, and therefore came to be identified with imperial authority. Moreover, by reason of its location, the Church in Constantinople was greatly influenced by Classical Greek rationalist thought, and, like the older pagan religions of the country, tended to employ much painting, sculpture, and music in its ritual.

In the west, the patriarch of Rome inherited much of the ancient authoritarian tradition of the former capital city, and in spite of the newer supremacy of Constantinople, was able to exert a dominating influence on the Christians of the west. Far less affected by Greek thought, the Church in Rome developed a separate tradition of its own, more particularly as a western European church.

Christianity in Alexandria and Antioch was influenced to a varying extent by Oriental mysticism and speculation. Traces of the religion of ancient Egypt were manifest in the dogma and ritual adopted by the province of Alexandria; and other differences became apparent in Antioch. How far we can ascribe these variations in observance to historical accident, and how far to the slow operation of geographical factors is a matter beyond our present scope : the main result is, however, of immediate importance, since within a relatively short space of time increasing divergence in doctrine and ritual led to a

complete separation of the four provinces. From Constantinople arose the Greek Orthodox Church ; from Rome the Roman Catholic or Latin Church ; from Alexandria the Coptic Church ; and from Antioch the Syrian or Jacobite Church ; all of which soon came to possess complete independence in organisation.

Further division, reflecting other regional diversity, rapidly occurred. By the fourth century, an independent Armenian (Gregorian) Church had come into existence ; and the teachings of Nestorius, denounced as heresy in the west, were adopted by many in Iraq, Iran, and countries further east. At a somewhat later period the sect of Maronites, followers of St. John Maroun, came into existence in north-west Syria.

Later political developments in Europe and western Asia had great influence on the various religious communities of the Middle Eastern region. The supremacy of Constantinople passed away, and effective leadership amongst Christian peoples was taken over by the Church of Rome. The impact of Moslem conquest fell chiefly on the Christians of the east, so that groups like the Copts, Jacobites, Maronites, and Nestorians (or Chaldeans) dwindled to tiny communities, whilst the Churches of Rome and Constantinople continued to flourish. At a later date, further expansion of Moslem power reduced the importance of the Greek Orthodox community, but later still this decline was partly offset by the rise of Russia, which adopted the Greek faith in preference to that of Rome.

During periods of Moslem persecution, the autonomous Christian sects of the east obtained support from the Church of Rome, but often at the price of obedience to Rome. Agreements were made whereby in return for recognition of the Pope as head of the community, local usages in doctrine and ritual were permitted to continue. Hence a number of eastern Christians broke away from sects such as the Jacobites or Nestorians, and formed what are known as the Uniate Churches—i.e. communities with practices that differ widely from those of the main Roman Church,¹ but which nevertheless accept the supremacy of the Pope. There have thus come into existence the Armenian Catholic, the Greek Catholic, the Syrian Catholic, the Coptic Catholic, and the Chaldean (Nestorian) Catholic Churches. The entire Maronite Church entered into communion with Rome in the twelfth century. Formation of the Uniate Churches did not

¹ Chief of these are the use of Aramaic or Arabic instead of Latin in the liturgy, and a dispensation allowing lower orders of priests to marry.

extinguish the older sects, some of which preferred a precarious independence ; hence at the present time representatives of both groups, Uniate and non-Uniate, are to be found in the Middle East.

The Lebanon, and western Syria, where a mountainous topography has afforded shelter to refugees, yet has also offered some reward to exploitation, now hold the greatest number of religious sects ; and it is noteworthy that even as late as 1939, when the region of Alexandretta (Iskanderun) was ceded to Turkey, a number of Armenian Christians preferred to emigrate to Syria rather than remain to become Turkish citizens.

CHRISTIAN SECTS OF THE MIDDLE EAST

<i>Ecclesiastical Provinces of the Later Roman Empire</i>	<i>Churches which derive from Roman Provinces (Independent)</i>	<i>Uniate Churches (in communion with Church of Rome)</i>
Constantinople————>	Orthodox (Greek)	Greek Catholic
Rome————>	Latin (Roman Catholic)	
Alexandria————>	Coptic (Egyptian)	Coptic Catholic
Antioch————>	Jacobite (Syrian)	Syrian Catholic

Later Churches (also independent)

Armenian Orthodox	Armenian Catholic
Nestorian (Chaldean or Assyrian)	Chaldean Catholic
Maronite (until twelfth century)	Maronite (after twelfth century)
Protestants (small in number. Due to missionary activity in nineteenth cen- tury from Europe and America)	

Political Effects.—The origin and character of certain religious communities has been described at some length, because many features of social and political life in the modern Middle East derive from religious matters. Following conquest of much of the region by the Osmanli Turks after 1229, the *Millet* system was adopted as the basis of civil administration in the Turkish Empire.

A *Millet* was a separate religious community, with a leader who was recognised by the Ottoman Sultan as having important religious and

civil functions.¹ This arose from the fact that, owing to the view that Islam was both a religious creed and a form of civil government, the status of non-Moslems was dubious, and had to be regulated in a special manner. Each head, of a *millet* was a member of the local provincial administrative body, with right of direct access to the Sultan; and was in addition permitted to maintain a kind of law-court of his own, which supervised such matters as marriage, dowries, and even the inheritance of property among his co-religionists. A most important feature was the fact that non-Moslem communities were in some cases allowed to operate their own code of law, even when this differed from the official law of the Ottoman Empire.

Hence, in addition to his ecclesiastical function, the head of a *millet* had a considerable legal and civil power ; and he could also call upon Turkish civil officials to give effect to his decisions. Moreover, considerable economic power sometimes lay in the hands of the head of a *millet* by reason of the Moslem system of land tenure, which gave him some responsibility for the division of holdings amongst a number of tenant farmers (see page 181).

The result of such organisation was ultimately to create a number of * states within a state ' ; and as time elapsed, the heads of certain millets grew sufficiently powerful to obtain substantial privileges from the Sultan.

Another feature of the *millet* system was the opening given to interference by outside powers. France, as ' eldest daughter of the Church', assumed the role of champion of the Roman Catholic and Uniate communities ; and, after the eighteenth century, Russia, a Greek Orthodox state, increasingly intervened in favour of the Greek Christians. One of the many issues of the Crimean war concerned the rivalry of Uniate and Orthodox communities in Jerusalem, and their position in relation to the Ottoman government.

In the nineteenth century, American, British, and German Protestant missionary activity gave rise to a number of educational and cultural establishments in various parts of the Middle East. These enterprises were unofficial, and, generally speaking, the various national governments concerned made little attempt to use them as grounds for intervention in the politics of the Middle East.² The

¹ Many, but not all, of the Christian sects enumerated above, were recognised as *Millets*. Most important was the Greek Orthodox *millet*.

* There were no Protestant *millets* in the Ottoman Empire. The cynic might also argue that Britain and Germany had no need to concern themselves deeply with religious

intellectual influence of these institutions has, however, been great, particularly in the case of certain American schools and universities, so that at the present time there is something of a cultural link between the United States and the Middle East.¹

A further feature deriving from the *millet* system has been the emphasis given to religion as a basis of political grouping. Although *millets* ended with the fall of the Ottoman Empire in 1918, the habit of associating politics with religion still persists in the Middle East. Insistence on sectarian differences as a basis of political grouping has tended to produce an atmosphere of strife and conflict, and the restlessness, faction, and extreme individualism that characterise many present-day political affairs hinder co-operation, and hence retard the development of a stable form of government.

At the present time, party politics in a number of states are still organised on a religious basis. The Lebanon, where parliamentary seats are allocated on a pro-rata basis of so many per religious group, and where the Maronites, as the largest single party, have the tacit right of nominating the President of the Republic, is an extreme example ; but other instances occur, notably in Iraq and Palestine. This leads to a degree of clerical influence in politics that has been unknown in Britain and America since the eighteenth century.

Islam,—Shortly after A.D. 600 Muhammad,² an obscure member of the Arabian tribe of the Qureish, began to preach a doctrine that had come to him by divine revelation. His message was first received with amusement and indifference, later with hostility ; so that in A.D. 622 he decided to leave his native city of Mecca, and establish himself at Medina. This flight, or *Hegira*, from Mecca to Medina is taken as the beginning of the Muhammadan era, though it was not until some time after that Muhammad's doctrines were accepted by the Meccans. Much of Muhammad's teaching was his own ; part was derived from Christian and Jewish beliefs, with which he had a slight acquaintance ; all was strongly influenced by the circumstances of his life as a semi-nomad. A disdain of agriculture,³ a * snobisme du

matters, since much more fertile pretexts for intervention in Ottoman affairs could be found in economic and external political spheres.

¹ It is probable that during the French occupation of Syria and the Lebanon the Mandatory power did not always view the American educational establishments of Beirut, Tripoli, and Aleppo with whole-hearted approval, because of the non-French outlook of these institutions.

² This form of the name is somewhat closer to the Arabic sound than the more usual Mohammed.

³ Cf. Koran, 'A plough is never taken into a house without baseness going in also '

desert', the inferior status of women,¹ simplicity of organisation both in political and economic matters, and insistence on almsgiving and hospitality, are still as characteristic of the desert people as they were in the seventh century A.D.

Muhammad preached submission (Islam) to the will of one god, Allah, of whom Muhammad was the chosen prophet. The chief duties enjoined on Moslems were (a) prayer, five times daily, (b) the giving of alms, (c) abstention from alcohol, tobacco, and the flesh of the pig,² (d) fasting during the month of Ramadan, and (e) pilgrimage to Mecca. Islam was a brotherhood of men, with no social distinctions, and with no consecrated priesthood. Any man, even a youth or a slave, might act as leader in prayer; and the mosque was regarded merely as a convenient meeting place for prayer.

One important feature of Islam was the close connexion between religion and civil government. To Muhammadans, Islam is the state, so that whilst acts of civil government have had religious sanction, religious leaders have also been able to exercise important influence on policy.³ The political head of the state held important religious functions which were recognised in the title Defender or Leader of the Faith (Caliph).

Within a very few years, from being an obscure doctrine held by a small group of townsfolk and nomads in the arid interior of Arabia, Islam had spread into Palestine, Syria, Egypt, Iraq, and Iran. The surprising political success of the new religion in establishing itself alongside the Byzantine and Iranian Empires, which at that time divided the Middle East, is startling when one considers how poor were the followers of Muhammad in numbers and material resources. In order to explain how a group of shepherds, merchants, and camel drivers came to wrest the greater part of the Middle East, within a few decades, from the successors of Imperial Rome, a number of factors must be considered.

Politically and militarily, both the Byzantine Empire to the west and the Sassanid Empire of Iran were exhausted. Long continued

¹ How far St. Paul, himself closely in touch with desert life, held a similar view, will be a matter of discussion.

* The geographer may note with some interest the possible operation of a climatic factor. Pigs in the Middle East are much less healthy than in cooler latitudes, being often infested with parasites that can be transferred to humans. It would also seem that in a warmer climate, the intoxicating effect of alcohol is heightened.

³ Cf. the institution of Waqf (page 181). At the present day, capital sentences in the Law Courts of Egypt are confirmed by a religious body, the Ulema.

warfare between the two powers, with Armenia, Syria, Iraq, and Palestine as a battleground, had achieved no definite result, since both belligerents were too large and too remote to be entirely over-run by the other. Border raids and skirmishes, had, however, devastated much of the central part of the Middle East,¹ and high taxation and misery that resulted had made local populations very ready to acquiesce in a change of masters. Rigid social divisions, and indifference to the lot of the peasant did not serve to popularise either Byzantine or Sassanid rule.

Spiritually too, the common people of the Middle East had become weary. Unending theological debates in the Christian world, with intricate discussions of forms of belief and doctrine, were frequently beyond understanding by the average Anatolian or Syrian peasant; but the charges of schism and heresy that resulted led to much general persecution and oppression, first by one sect, then by another. This in contrast was not without direct effect on the native population. In Iran, the finer ideas of Zoroaster had become overlain by a number of gross practices borrowed from earlier religions, or else were too abstract in conception for the mass of the people. In either instance the appeal of a new religion, direct and simple to understand, with a clear relationship to matters of everyday life, and which offered a brotherhood of man in place of the formalities of Zoroastrianism or the strict class distinctions of Byzantine society, had an immediate appeal. Sectarian differences among Christians were in fact so acute that on some occasions, persecuted minorities opened the gates of Byzantine cities to Moslem attackers.

Later Developments.—In 632 Muhammad died, leaving no sons, and the question of a successor as Caliph immediately arose. The majority of Moslems took the view that succession should be made elective—that is, the Caliphate should not be hereditary, but could pass from one family to another. A smaller group maintained that succession ought to remain as a hereditary office within the family of Muhammad; and a nephew of the Prophet named Ali, who also married Muhammad's only surviving daughter, was recognised by them as rightful Caliph. Ali was murdered by the majority party, who became known as Sunni²; and a division was perpetuated between the Sunni and the

¹ Jerusalem was burnt by the Sassanids in 615; and a retaliatory expedition shortly afterwards devastated the centre of Iranian fire worship at Urmia, the birthplace of Zoroaster.

² Sunni means 'majority' or 'orthodox'.

followers of Ah, who took the name of Shi'a (partisans). This divergence was at first purely political, but very soon differences of doctrine and outlook also entered in.

The stronghold of the Shi'a party came to be Iran and Iraq, where a cultural life somewhat separate and distinct from that of the rest of the Middle East appears to have developed. In this one can see the operation of certain geographical factors. Iraq, and more particularly Iran, are to some extent isolated from the rest of the Middle East by vast deserts, swamps, and mountain ranges. Civilisation had to 'overcome the obstacles Nature had placed in the way of bare existence' (Haas) rather than profit from the opportunities that were more freely offered in the Mediterranean lands. In the second place, because of the widely dispersed character of Iranian settlements, with scattered towns dominating a relatively empty countryside, Hellenic influence spread by Alexander the Great took deeper root in Iran than in more closely settled agricultural regions of the Levant and Egypt (see p. 130). Some authorities see in the differences between Sunni and Shi'a a reflexion of the separate cultural evolution of the Iranian world.

Iranian contributions to the development of Islam were numerous, particularly during the period A.D. 750-1258 when, following a century of rule from Damascus under the Omeyyad dynasty, the Caliphate moved to Baghdad. It is, however, interesting to note that whilst Arabian religion penetrated into Iran, even though in a slightly altered form, the Arabic language made little headway.

Moslem Sects.—As time went on, divisions within Islam increased. A number of Shi'a Moslems held that divine succession in the family of Ah came to an end when the twelfth * Imam' or leader, a young boy, disappeared at Samarra, in Iraq, in the year A.D. 878.¹ These Moslems are known as 'Twelvers'; and one group with the local name of Metwali form a compact community in the eastern Lebanon.

A son of the sixth Imam, named Ismail, was disinherited by his father for unworthy conduct, and is hence not regarded by some Shi'a adherents as a true Imam. Others, however, regard him both as divinely inspired, and the last of the Imams, seven being a mystic and complete number. From the 'Seveners' have developed numerous sects:

¹ It is, however, believed that one day, this Imam will return to the earth as the Mahdi (divinely guided one) and will conquer the world for Islam.

- (a) The Qarmatians, who flourished in Iran and Iraq during the Middle Ages, and had pronounced views of a revolutionary and communistic nature. Following persecution, the sect has now almost died out.
- (b) The Druses. These people combine Shi'a rites with a certain degree of animism, and a belief in the transmigration of souls. Fairly widespread in the southern Lebanon, many Druses migrated to the volcanic plateau of the Hauran as the result of Sunni persecution, and a few settled in northern Palestine. Small groups also occur in Iraq, and in western Iran.
- (c) The Ismaili or Assassins developed as an extremist political group about the twelfth century A.D.¹ By daring attacks on their enemies they terrorised large parts of the Middle East and held much power until they were suppressed in 1250. Ismailis still live in north-west Syria, and other communities are scattered throughout Iran, Oman, Zanzibar, and India. The head of the Ismaili Moslems is the Agha Khan, who is a descendant of the last Sheikh el Jebel, himself a descendant of the seventh Imam.
- (d) The Alawi (Ansarieh or Nusayris). Ostensibly Shi'a Moslems, the Alawi have adopted some practices, i.e. the recognition of Christmas, from Christianity. Other features, such as fertility ceremonies, have a pagan origin. The Alawi, numbering about 300,000, live in the Jebel Ansarieh of north-west Syria, and also further to the north, in the mountains of Cilicia.
- (e) More recent Shi'a offshoots. These include the Zaidis, who are the predominant group in the Yemen; the Ah Ilahis, a sect recognising Ah as the deity, and who occur in Iran and Turkestan; and a number of Turkish communities—the Bakhtahis, who live in Albania and Anatolia, the Qizil Bashis (red-heads) of east Anatolia, and the Takhtajis (woodcutters) of west Anatolia.

Shi'a Moslems, including the communities named above, number some 25 million, that is, approximately 10 per cent, of the Moslem world.

Sectarian divisions on a less important scale have also occurred within the Sunni group. A tendency to mysticism, with the worship of saints, has given rise to a number of various orders of dervishes, who by their demonstration of 'wonders' like the handling of snakes and scorpions, or self-wounding without pain, recall the fakirs of India.

¹ According to contemporary accounts, the Ismailis were organised under a Grand Master known as the Sheikh el Jebel (Old Man of the Mountains). From his strongholds in the Elburz and Syrian mountains, the Sheikh dispatched retainers to carry out spectacular assassinations of leading statesmen, both Christian and Moslem; and the retainers, young men stupefied by hashish (hence *hashishin* — *assassin*) showed complete indifference to their subsequent fate—a feature that added terror to their attacks.

Another group comprises the Sanussi of Cyrenaica. This community, with centres at the oases of Kufra and Jarabub, has played an important part in the history of the region, particularly by reason of its hostility to Italian penetration during the twentieth century. Traces of shamanism brought in from the steppes of Asia by Turki invaders appear in the Sunni Muhammadanism of parts of Anatolia and western Iran ; but these influences are of restricted importance.

Finally, some reference must be made to the Wahhabi movement of Arabia. In the eighteenth century, a desire arose for the purification of Islam, with a shedding of all the accretions that had obscured the primitive simplicity of the faith as preached by Muhammad. It was felt that there had been much backshding ; many of the precepts of Islam, especially those relating to self-indulgence,* were ignored; and, in addition, much superstition and unnecessary elaboration had crept into religious observance. The Wahhabi preached a return to austerity and simplicity, and may thus be called the Puritans of Islam. After some three centuries of existence as a small and uninfluential desert group, the Wahhabi have recently come into great prominence under the leadership of King Ibn Saud ; and by their conquest of the Holy cities of Mecca and Medina, the rest of the Moslem world has been forced to give attention to Wahhabi doctrines. The newly created state of Saudi Arabia, which in one or two respects recalls the early Moslem Empire of the time of Muhammad, has under die strong and skilful rule of Ibn Saud become an important factor in Middle Eastern affairs.

Modern Political Developments.—In Turkey and Iran, modern nationalist feeling has largely taken the place of religion as a mainspring of political activity, whilst the opposite extreme, approaching complete theocratic government, prevails in Saudi Arabia and in the Yemen (which is ruled by an Imam). Egypt, Iraq, and Transjordan occupy a middle place, with Sunni orthodoxy as a pillar of constitutional government; but in Iraq it should be noted that whilst most of the ruling class is of the Sunni faith, the majority of the population is Shfa in adherence.

With the question of closer political union among Arab states—a matter that is in the forefront of present-day Middle Eastern affairs—religious matters assume a certain prominence. The rulers of Iraq and Transjordan, nephew and uncle, claim uninterrupted descent from the

¹ I.e. the prohibition of smoking, and drinking of alcohol.

Prophet Muhammad and from Ali, an advantage not possessed by the King of Egypt, whose family was of Albanian origin ; but the house of Sharif, to which King Feisul and King Abdullah both belong, was

DISTRIBUTION OF RELIGIOUS SECTS IN THE MIDDLE EAST

(figures not available for all regions)

(ooo's omitted)

	<i>Sunni</i>	<i>Sin a</i>	<i>Christians</i>	<i>Jews</i>	<i>Yezidi</i>	<i>Others</i>
Iraq (1940)	1,170	1,720	180	120	40	20
Syria (1937)	1,737	390	33i	26	2	—
Lebanon (1942)	226	272	577	6	—	6
Palestine (1946)	1,059	18	145	608	—	15
Egypt (1937)	14,524		1,151	40	—	—

CHRISTIAN AND MOSLEM RELIGIOUS SECTS IN THE LEVANT

(ooo's omitted)

	<i>Lebanon</i> (1942)	<i>Syria</i> (1937)	<i>Palestine</i> (1943)
<i>Sunni</i>	226	1737	932
<i>Shi'a</i>			
Twelvers	201	12	4
Alawi	—	274	—
Druses	72	79	10
Ismaili	—	25	—
<i>Uniates</i>			
Latins (Roman Catholic) .	3	5	20
Maronites	3i8	12	4
Greek Catholics (Melkites)	62	42	13
Armenian Catholics	10	12	—
Syrian Catholics	5	14	—
Chaldean (Assyrian) Catholics	1	4	—
<i>Others</i>			
Greek Orthodox	107	115	40
Armenian Orthodox	58	87	4
Syrian Orthodox (Jacobites)	4	33	1
Assyrian (Nestorian)	—	—	—
Protestants	10	8	7

during 1923 dispossessed of its territories in the region of Mecca and Medina by the Wahhabi Ibn Saud.

Moreover, the practice of Islam in Egypt and Syria is somewhat

suspect to the stricter Wahhabi by reason of the broader view taken by Egyptians and Syrians in regard to cultural and material amenities, and by the somewhat greater willingness to compromise with modernity and innovations from outside the Middle East. These, and other problems, deriving from sectarian differences and personal rivalry have served to divide the Middle East in the past; now that a strong impulse towards unity has been given, and it has become necessary to find a leader from amongst Arab statesmen, it remains to be seen how far old antagonisms can be forgotten

Paganism.—Something may be said concerning the survival of pagan customs in a few districts of the Middle East. Reference has already been made to traces of Adonis worship that still persist near the Nahr Ibrahim of the Lebanon ; further inland, less innocent rites are said to occur in one or two localities. Two distinct communities practice religious observances in which both Christian and Zoroastrian borrowings can be discerned—curiously enough, little seems to have come from Moslem sources. The Yezidi of the Jebel Sinjar region, on the borders of Turkey, Iraq and Syria, are usually spoken of as worshippers of Satan, but it would be more exact to describe their religion as propitiation of the power of evil, which, possibly not without some justification, they regard as the chief influence in the world. Numbering between 40,000 and 50,000, the Yezidi owe their survival as a separate religious community to the difficult nature and isolation of the terrain they inhabit.

The Mandeans or Sabians, much smaller in number, live in Lower Mesopotamia, in close proximity to the rivers. About one-fifth of the community lives in the Iranian districts of Ahwaz and Khurramshahr, the rest in Iraq.

CHAPTER VI

HUMAN SOCIETY IN THE MIDDLE EAST

WRITING in the thirteenth century A.D. the Arab geographer Ibn Battuta was greatly impressed by the contrasts in ways of life and social organisation shown by various communities of the Middle East. In particular, he devoted special attention to the differences between nomadic peoples, known collectively by the Arabic term of *Badawin* (singular : *Bedu*), and settled cultivators, or *Hadhar*. Such contrasts are still as characteristic of the peoples of the Middle East now at the present day as they were in the time of Ibn Battuta, and in examining the problems of human relationships in the region, it is useful at the outset to outline some of the chief features of social organisation. Attention will first be given to two relatively small groups—nomads and townspeople : conditions amongst the *Hadhar*, who form the majority of the population of the Middle East, will be dealt with at more length in succeeding chapters.

The Badawin.—The main feature of this group is of course regular movement in search of pasture for animals. For the greater part, this movement is from one district to another—i.e. true nomadism ; but in mountain regions different levels in the same district are occupied successively, and this is termed transhumance.¹ The *Badawin* of Arabia may be cited as true nomads whilst the Kurds of Anatolia and the western Zagros tend rather to practice transhumance.

With rainfall, and therefore pasture, both scanty in amount and liable to much variation from one year to another, the nomads have found that experience provides the best means of survival. Thus to the oldest members of the group is given the task of making decisions which guide the activities of the entire community—accent is, so to speak, on age, not youth. Frequently too, in the face of sudden crisis—failure of wells, or attack by outsiders—rapid decision is called for, and one man alone rather than a group, is looked to as supreme leader—in warfare particularly more confidence is felt in a single man than in a committee. This type of social organisation, termed patriarchal, places the life of a community under the control of a chosen man, and

¹ True nomadism is in effect, horizontal movement, transhumance is more a change in altitude.

is highly characteristic of nomadic pastoralists. The chief (sheikh) of the community has considerable personal power, which is tempered only by precedent (the collective experience of the group as a whole) and by the opinion of older members of the tribe. There is little place for individuality, or for innovation, and patriarchal communities have kept their ways of life largely unaltered through many centuries. It has been said that if Abraham were to return, he would find little change in the habits of the present inhabitants of the Syrian and

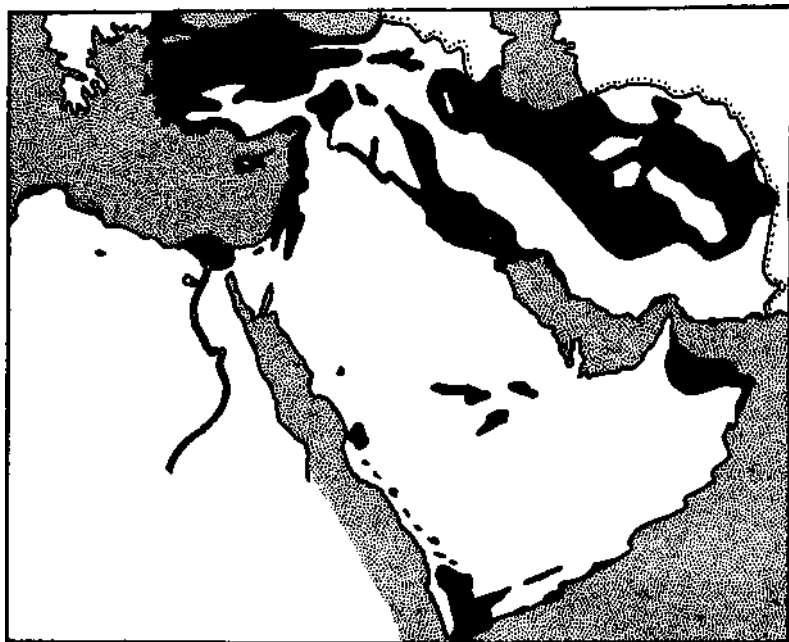


FIG. 20. Nomadism. Areas of nomadism unshaded. Settled and semi-settled occupation shown in black.

Arabian deserts ; and, apart from effects following the introduction first of iron in the second millennium B.C., and later of firearms, life among the Kurds seems scarcely to have varied since their present homeland was first occupied in c. 2400 B.C.

A sharp limit to the size of social groupings amongst nomads is set by natural resources, which in a given district can support only a relatively small number of people. Thus the unit amongst Badawin is the tribe—a group large enough to profit by advantage of numbers, yet small enough to exist under desert conditions. Family relationship is strong, and perpetuated by emphasis on intermarriage within

the group. Yet although tribal solidarity and discipline are conspicuous features, it has been the weakness of Badawin society throughout the ages that political combinations larger than the tribe have been achieved merely for a very short time. An outstanding leader has brought together a number of tribes into one larger unit, but union has proved temporary ; and more often than not on the death of the leader, his organisation has dissolved again into smaller groups. Large-scale political organisation is therefore not a feature of Badawin society, and resulting inter-tribal feuds, inveterate warfare, political instability and inconstancy have had an effect not merely on desert and steppe life, but also on that of the settled lands of the arid borders. It is also possible to see why, in the absence of strong internal political organisation, so much of the Middle East has in the past fallen under the control of outside powers.

To each tribe belong certain rights of pasture and occupation. The limits of each tribal territory are carefully defined, and generally comprise a summer and a winter camping ground. Exact size of territory usually has a certain relation to the physical force and prestige commanded by each tribe, and limits therefore vary from one period to another. Weaker tribes seek 'protection' from a larger.

As a sample of tribal division, the distribution of Badawin in Syria is given below. It should be noted that in certain instances, tribal territories cross international frontiers, and thus there arise special problems of administration. Agreements have been concluded between the governments concerned, whereby nomads in effect assume temporarily the nationality of the country in which they find themselves.

Because of the necessity for constant movement, the material culture of the Badawin is poor. Chief possession of the tribesman, after his animals, is a tent, usually black, and woven of camel or goat hair. When in good repair, these tents are quite waterproof—sufficient to withstand the infrequent, but severe downpours which occur—and the size of the tent, shown by the number of tent poles used, is an indication of the affluence and social standing of the owner. The interior is divided, on the right for men, and on the left for women. One side away from the wind is usually left open, with a coffee hearth in front. The coffee hearth is the social centre of the household ; and the head of the family, although leaving the entire preparation of food to his womenfolk, will himself undertake the preparation and serving of coffee. True Bedu coffee is strong, devoid of milk or sugar, but

GEOGRAPHICAL DISTRIBUTION OF BADAWIN TRIBES
IN SYRIA

<i>Tribe</i>	<i>Region</i>	<i>Approx. Number of Tents</i>
(I) Large-scale movement.		
Abu Assaf	Upper Bahkh and Tel Abiad	1,400
Afadiless	Both banks of Balikh	1,000
Beggara	Left bank of Euphrates, Deir ez Zor to Madan	2,500
Bu Sbec	Euphrates, Madan to Tibni	1,400
Bu Shaban	Euphrates, Meskene to Tibni	—
Cherabine	Khabour valley.	500
Feddaan	Euphrates—Deir ez Zor district	2,100
Jebbour	Hassetche district	2,500
Ruwalla	Transjordan, to region south of Horns . .	4,250
Ogeidat	Euphrates, Tibni south-eastwards into Iraq .	3,200
Sbaa	Horns, Hama, to Hauran and south-east Syria .	3,400
Sabkha	Euphrates, Rakka to Tibni	1,000
Shammar	Upper Jagh-jagh.	800
	Dmeir Kapu.	800
	Central Syria.	1,500
Weldess	Euphrates.	1,800
(2) Local Movement		
Bu Khamis	Aleppo district	300
BuLeil		350
Gayar		250
Leheib		275
Rayess		520
Wahab		200
WuldAli		150
Hadidiyin	Aleppo-Hama.	3»350
Karachim	Hama district	120
Moualiss		2,000
Nairn		150
Turki		170
Nairn	Horns district	400
Ogeidat		600
Nairn	Damascus district	1,000
Ogeidat		200
Beni Khaled		700
Fauara		400
Ghiat		400
Naer		200
Omur		500
Slout		800

flavoured with herbs; and its consumption is the occasion of much social activity—the rounding off of the day, and an opportunity for discussion, and the reception of guests. For the Badawin, if not for city dwellers, coffee is truly the 'wine of Islam' and the equipment of all Badawin households includes at least one carpet, which is spread before the hearth, a mortar, and coffee pots and cups. A few cooking pots, and one or two large trays and bowls for communal eating make up the remainder of the culinary equipment.

Clothing of the Badawin is simple. A long robe of thick material is the principal, sometimes in fact the only, garment. In winter a waterproof cloak of woven camel hair is worn. A voluminous headcloth, held in place by a rope or band, is wound round the head so as to give protection to the face and neck, and rawhide, heelless sandals are worn on the feet.

Water is usually too precious for much washing^x—indeed, the Koran permits the ceremonial use of sand in the daily ablutions which are enjoined on all Moslems—and animal urine is frequently used as a substitute. Badawin food is monotonous and scanty. Most important are milk products: curds, buttermilk, various kinds of cheese—of which *labne*, a kind of cream cheese, is the most widespread—and *samne*, or butter. In addition, wheat, barley, and occasionally a little rice are obtained by barter, blackmail, or brigandage from agriculturalists, or else grown very sporadically by the nomads themselves.² Small amounts of dried fruit, usually dates, are also eaten. Meat is provided only as a great luxury, since animals themselves are in effect a kind of fixed capital—owners must live from the yield, not upon the animal itself. Apart, then, from occasions of high festival, when special slaughtering takes place, only those animals that die naturally are eaten.

Meals are served first to the older men of the tent, each man using his dagger as a knife, and fingers as a fork,³ after which, when they are satisfied, it is the turn of the younger men and boys. Later still come the women, and finally the girls—the sexes never intermingling during meals. On occasion when supplies are plentiful, the Badawin

¹ It has been said of a present-day certain Wahhabi tribe of Arabia that all adult members have at least once in their lifetime been forced to exist on water taken from the hump of a camel.

² Patches of ground are roughly sown with grain, and later in the year tribesmen return to harvest the crop.

³ As far as possible, use of the left hand is avoided in polite Arab society—this hand is employed for menial and unpleasant tasks.

eat copiously, because the time and scale of the next meal may be uncertain. In general, the standard of nutrition of the Badawin is low—in the opinion of some, below the level necessary in other regions to sustain life. As a result, the Badawin are small, even stunted, and lightly built, though their physical powers and endurance are great. Life is, however, very hard; and by forty, particularly in the case of women, old age has begun. Fifty years is a long life for a nomad.

One means of supplementing the deficiencies in arid areas is by raiding. Amongst Badawin the *rhazw* (*razzia* or *rezzou*) is a recognised activity amounting almost to sport, but it also fulfils a definite economic function. The effects of a bad season are mitigated, as when rains have failed in the desert, the Bedu has a choice of taking what he requires by force from other people, or of starving. The word 'sport' has been used, because although fundamentally a serious matter, Badawin raids are conducted under certain conventions—almost, one might say, rules.¹ Rapid, unlooked-for coups, using cunning and guile, are most favoured: bloodshed is as far as possible avoided, though goods, womenfolk, and children become the property of the victors under a kind of slavery. Successful leadership in tribal raids is the means by which personal reputation and power is built up: King Ibn Saud, originally a dispossessed desert nomad, has gained absolute power in Arabia through successful tribal encounters on an increasingly large scale. Badawin raids may be directed against other tribes, but frequently, toll is levied on agricultural settlements on the fringe of the desert. Less able to resist, and with more at stake than the nomad, settled cultivators sometimes remain under permanent tribute to Badawin tribes, and supply a quantity of needed foodstuffs to their overlords. The name *khaoua* (tribute of friendship) is applied to such transactions. Raiding is now declining, because of increasing control by local governments, but in addition to the political problem presented in controlling outbreaks, there is the economic factor of providing alternative occupation to ensure a livelihood.² Though declining, the practice is still not extinct. For as recently as 1946, J. C. Crowfoot could write, * Arabs are now raiding each other in Fords and Chevrolets '.

¹ There are only three sources of amusement or distraction in Badawin life: conversation round a coffee hearth, family life, and raiding.

* Cf. the decline in population of the Barbary coastlands since the suppression of piracy in the Mediterranean. There, precisely the same economic factor was involved.

Strict discipline, necessary both in everyday routine and because of liability to attack, has left its mark on Badawin ways of thought. In religion, there is little room for compromise or doubt—a strong, vivid, and intolerant faith is held. Similarly, there is a strict code of behaviour. Hospitality, in an environment without fixed routes or settlements, is a highly regarded virtue, and ordinary social intercourse has been developed into an elaborate code of manners and conduct. In view of the vagaries of human existence amongst the Badawin, it is hardly surprising that superstition and fatalism are also strongly marked. The operation of the 'evil eye' and malevolent spirits is seen in everyday life—nothing is praised directly without attributing its excellence as due to God—and men and animals wear charms.¹

Possibly as a result of reduced physical strength, and their enforced preoccupation with household tasks, the status of women is low. Although not veiled, like the women of the settled areas, Badawin women are regarded as in all things the inferiors of men. It may be significant that among pastoral communities, religious deities are regarded as masculine in attribute. Only in the religious systems of non-pastoral peoples do we find female deities—mother-goddesses of wide influence—with a corresponding rise in importance of women above the level of mere drudges and bearers of children.

Though Badawin life is hard and unrewarding, those who follow it value it highly. A true Bedu looks down with disdain on other ways of life, particularly that of cultivators in better watered districts, for whom he often has a profound contempt as effete and subservient. Despite their own strict social organisation, the Badawin can contrast the dull routine of agricultural practice, and the looseness and self-indulgence of city life with their own courage, independence of thought, abstemiousness, and mobility.

Nomadism is a special response to environment, by which the frontier of human occupation is pushed farther within a region of increasing difficulty. In the past, nomadism has often been regarded as an unsatisfactory alternative to agriculture; it was believed that primitive man passed from a life of hunting and collecting first into a stage of pastoralism, and later, in places where conditions were favourable, to the fullest development of a life based on cultivation. In the opinion of H. J. Fleure and others this view must be modified—pastoralism may, in some instances, represent a special, later development *from* agriculture—a dynamic response to environmental

¹ Even Arab taxis in the cities carry a charm on the radiator.

conditions, and not a degeneration, or a mere half stage towards something better.

In certain cases, nomadism represents the only possible utilisation of limited geographical opportunities. This observation may seem trite, but it would not seem to be fully appreciated even by some governments of states in which pastoral nomadism exists. A number of Middle Eastern rulers have tended to regard their nomadic peoples as an inferior community to be *civilised' as quickly as possible by the imposition of a different way of life, usually agriculture.¹ This attitude, coloured too by political motives, largely influenced the policy of Riza Shah in Iran. Compel the nomads of the Zagros region to give up their unsatisfactory wandering habits, and settle down as respectable cultivators, was the underlying principle. In fact, when forcible measures were taken to settle nomadic tribesmen, mental qualities declined, and poverty and disease increased to such an extent as to bring about virtual extinction of some communities. Nomadism has, therefore, under certain conditions, a due part to play in Middle East economy.

Commerce and the Growth of Towns.—Situated at the junction of three continents, and fringed by areas of sea or desert, both of which may be considered as open to navigation of a certain kind, the Middle East region has developed extensive trading relations, not only within itself, but more important, with China, India, Europe, and to a less extent, Africa. From earliest times commerce has played a conspicuous part in Middle Eastern affairs, and the existence of a merchant community, with special outlook and interests, has had considerable repercussion on cultural development.

Commerce as carried on under Middle Eastern conditions can be said to represent a kind of integration of several ways of life. Besides the merchant body, directly engaged in exchange of products, the organisation of long-distance transport involves a supply of foodstuffs and other agricultural products, and hence the Hadhar of the countryside have some part to play. Caravan activity across desert and steppe also necessitates the employment of Badawin as guides and drivers—and sometimes subsidies are paid to tribesmen to secure safe passage of caravans. The list could be extended to include woodmen and foresters, useful as producers of timber for shipbuilding, and of charcoal, the only fuel (until the modern use of petroleum) that was

¹ Cf. Genesis xlii, v. 34, 'For every shepherd is an abomination unto the Egyptians' (quoted by Issawi).

available for local industry. To an unusual degree, therefore, activities related to commerce permeate the life of the Middle East; and though the benefits from trading fall very unequally as between merchants and others, yet a slight influence can be traced amongst almost all communities.

By its need of fixed points and a measure of security in which exchange can take place, commerce can be regarded as the main contributing factor to the rise and growth of towns; and because of the unusual extent of commercial relations in the Middle East, town life also shows exceptional development—so great, in fact, as to give rise to disharmony between urban and rural areas. The countryside, given over to agriculture or nomadism, is on the whole poor in resources, and the general standard of life is low; but in cities, continent-wide trading relations have led to considerable accretion of wealth. Trading involves acquaintance with many different communities and ways of life—hence open-mindedness, adaptability and receptiveness for new ideas tend to be characteristic of commercial peoples, and in towns, material progress has often been accompanied by cultural development.¹

In addition to commerce, there are other factors which have contributed to the extraordinary development of town life in the Middle East. We may first note the purely geographical control of a restricted water supply—because of salinity or deficiency of water, people have been forced to congregate in a few favoured spots where supplies were available. Secondly, the course of Middle Eastern history reveals that time and time again, a vigorous yet small community has asserted political domination over a large area, but because of numerical inferiority, has been unable to undertake extensive colonisation: instead, a hold has been maintained on towns, from which an alien countryside has been ruled. The ancient Persians, Greeks, Romans, early Arabs, and the Turks have all followed this plan, so that a tradition of rule and dominance has come to be characteristic of the towns.

Thirdly, there is the religious aspect. As we have now seen, the great religions of the Middle East spread from small beginnings,

¹ Nowhere is it better shown than in ancient Palmyra. The wealthy merchants of the Roman city determined deliberately to introduce the best in art both from Rome and from Iran, even though they did not fully understand either. The general effect was somewhat incongruous, giving the effect of a *nouveau-riche* suburb, or, 'classical Parvencupopolis; but at least, the inflow of foreign ideas was encouraged, and a leaven introduced into a relatively stagnant Syrian society.

and this spread has been easiest and most marked among urban populations, who by their receptiveness for outside ideas, formed a favourable ground for the propagation of new creeds. Amongst a conservative and backward peasantry, propagation was slower : even now Christianity and Islam as practised in remote rural areas are often very different from the same religions in the towns.

To a great extent, therefore, religious life has come to be associated chiefly with towns and cities—we need only think of Jerusalem and Mecca in this connexion, though the list could be extended to include the holy cities of Iran and Iraq. The growth of religious traditions has in turn further stimulated commercial activity, especially through pilgrimage.

It is interesting to observe that, with a basis of trading activity, administrative control, and religious association, the cities of the region have been able to maintain an uninterrupted tradition over several thousand years. Political groupings come to an end, but the importance of towns continues : in the Middle East cities outlast empires.

By contrast to China, where towns are of relatively minor importance, and social life derives most closely from the countryside, urban life in the Middle East stands out sharply against a background of rural poverty and backwardness. The wealthy landowner, unlike his counterpart in Europe, avoids living on his estates, and passes his time in the city (one symptom of the backwardness of the country is the shortage of doctors—see Chapter XII). In the words of Dubertret and Weulersse, ' there is an extraordinary inequality between town and country. The former gathers to itself power and wealth, whilst rural communities remain singularly disinherited. A vast gulf separates the peasant from the city dweller, and during the present century, this gulf has tended to widen as the result of increased progress in the towns. The peasant remains sunk in an archaic way of life—development is confined to the cities.*

Weulersse also points out that great racial and cultural differences are sometimes apparent between towns and their immediate hinterlands. As examples, he cites the towns of north-west Syria and the Hatay : Latakia the ' Capital of the Alawi region \ without any Alawi population, but inhabited by Christians and Sunni Moslems; Hama, an Arab town in a Badawin and Alawi countryside ; and Antakya, a Turkish settlement in an Alawi and Arab rural area.

In closing this outline of social grouping, it may be of interest to recall what was said in an earlier chapter concerning the relationship

of physical environment to human activities. Three divisions of the Middle East were suggested : foreland, mountain zone, and median region ; and it is possible in a very broad way to relate to these differing types of environment certain features of social grouping discussed in the present chapter.

The foreland stands out as the home of pastoral nomadism at its fullest development. Here, as we have seen, has arisen a special culture and way of life—hard, patriarchal, and intensely spiritual and occupied with the things of the mind, often particularist, narrow, and unprogressive, yet spreading outward from time to time with immense impact on neighbouring regions.

The mountaineers of the north stand somewhat apart. Practising a transhumance from summer to winter pastures that rivals in extent the migration of desert herders, their social organisation has many points of similarity with that of the Badawin Arabs, but because of a land connexion with inner Asia, marked racial differences have entered in. It is difficult—and dangerous—to discuss mental qualities in relation to the racial origin, but there are grounds for distinguishing certain special qualities amongst these mountain peoples. Less given to speculation and inquiry, the mountaineers have displayed a more solid talent for administration and military virtues—qualities that are more mundane and pedestrian, yet demand longer sustained activity. If Muhammad can be said to typify southern nomad, then Saladin, Cyrus, or Kemal Ataturk might equally represent the northern warrior-governor.

There remains a third group, that, in the main, of our Intermediate zone. A concern with material objects, and due appreciation of the benefits of intercourse and trade have contributed to a broadness, or even suppleness of mind that has often earned the scorn of more primitive and ingenuous nomads and mountaineers. In this area of wider opportunity and richer culture based on commerce and agriculture, contributions first made by outsiders have frequently been developed into intellectual or political forces large enough to affect world history. It is also fair to state that many other cultural developments of importance have spent themselves in a morass of sectarian rivalry, regional jealousy, or enervating luxury. The laws of Moses, promulgated in the wilderness, gave way to worship of the Golden Calf; but the polity elaborated by an orphan brought up amongst camel-drivers preserved much of the learning of the Ancient World at a time when the Dark Ages of Europe threatened its extinction.

CHAPTER VH

ASPECTS OF THE HISTORICAL GEOGRAPHY OF THE MIDDLE EAST

I. THE RISE OF EMPIRES IN RELATION TO THEIR GEOGRAPHICAL SETTING

IT is the opinion of most archaeologists that civilisation first developed in the Middle East, where, of all regions of the world, natural conditions offered the greatest assistance to man in his changeover from a life of nomadic wandering as a hunter to settled occupation of the soil. The regular rise of the three larger rivers, Nile, Euphrates, and Tigris; annual renewal of soil fertility by the deposition of a layer of silt; and the generally warm climate, favourable both to the growth of a rich plant-life, and to the activities of man himself, were all special inducements to the adoption of a way of life based on agriculture.

Until recently, many archaeologists took the view that civilised communities first arose in Egypt, though only a very short time before a similar development in Mesopotamia: a more recent opinion is now that the earliest advances may have taken place in Mesopotamia. Whichever view is followed, it is necessary to bear in mind that geographical conditions in both regions were not identical, and it can in fact be stated that in Mesopotamia environmental factors were not as wholly favourable as in the valley of the Nile. The Nile is a single stream, without tributaries in its lower course ; but the Tigris and Euphrates are both braided streams, and the former receives important affluents which bring down immense masses of silt that block the lower courses of both rivers, giving rise to swamps, lagoons, shifting banks and coastlines. Moreover, the floods of Mesopotamia are more variable, since they depend on rainfall that occurs within the Middle East area, and this, as we have seen, tends to be capricious and unreliable. Further, because of their direct relationship to winter rainfall (either from run-off, or the later melting of snow), Mesopotamian floods occur in spring ; not, as in Egypt, during the late summer. Flooding by the Tigris and Euphrates, which can be sudden and variable in character, follows hard upon the rainy season, giving a lorig dry period throughout more than half the year : in Egypt, floods as it were complement the rainy season by splitting the year

into four shorter seasons—one of slight rainfall, one of flood, and two of drought. Of the two regions, Egyptian conditions might be considered as more 'manageable', and would seem to demand less experience and resource.

At all events, whichever view obtains, it is clear that by about 3500-4000 B.C., both Egypt and Mesopotamia had a highly evolved social life, with organised civil and religious bodies. Copper and bronze were used, although on a limited scale; and trading contacts with other regions had begun. Many of these contacts were with Syria, which, lying between Egypt and Mesopotamia, and easy of access from the south and east, participated at an early date in the general advance of material and cultural development. Syria was endowed with a number of products that were lacking elsewhere: neither Egypt nor Mesopotamia could grow trees of any size, hence the abundant forests of the Syrian coastal fringe were exploited for timber, and for the oils prized by the Egyptians for use in embalming. Much trade was developed by sea; Byblos, which served as an outlet for the timber of the Lebanon Hills, can with reason claim to be one of the oldest ports of the Mediterranean, if not the oldest continuously inhabited site in the world.¹

Cultural development in the three regions; Egypt, Mesopotamia, and Syria, followed somewhat different courses. In Egypt a clearly marked unity was most characteristic; and this seems to have owed much to physical factors: the strongly developed rhythm of the seasons, an unfailing annual flood, and most of all, the nature of the river valley itself, which, sharply defined as a single trench, was isolated on three sides by desert, and on the fourth by the sea. Within this physical framework there grew up a stable and extremely traditional civilisation of consistently high level.

In Mesopotamia the unity deriving from a single river valley was not present, and, though potentially a rich area on a scale larger than in Egypt, physical changes within the region itself—alteration in river course, and the recession of the head of the Persian Gulf towards the south-east—had a disturbing effect. The space-relationships of the country, which was more open to outside influence from east, north, and west, had at times a further disruptive influence on cultural development, so that although civilisation in Mesopotamia reached a high level, at best fully comparable with, and possibly superior to that

¹ Another product of the Byblos region was papyrus, from which developed a commerce in manuscripts and 'books'. Hence the name Bible, the 'Great Books'.

of Egypt, there were on the other hand periods of regression and anarchy, with a certain discontinuity that stands in contrast to conditions in the Nile valley. It is significant that during earlier historic times, Syria, which by virtue of its position might have been expected to lie within the Mesopotamian orbit, was more closely under the influence of Egypt.

The richness of Syria attracted the attention of outsiders; but here natural conditions were against the development of a politically unified community. The coastal plain is narrow and broken, with the Lebanon and Ansarieh ranges as a real barrier to movement inland; in the hilly country, settlement is restricted to valley floors, or to the very small extent of level plateau; whilst further inland still, because of lower rainfall, favourable sites occur only in close proximity to springs, rivers, and lakes. Hence city-states came to be more characteristic of Syria. These were of small size, often dependent on intercourse and trade, and markedly jealous of their immediate neighbours, from whom they were usually separated by a slight topographical barrier. Such a collection of small-scale units could easily fall prey to piecemeal absorption by aggressive outsiders; hence one can see why Syria, though naturally rich, has so rarely existed as an independent political unit.

The early part of the second millennium B.C. was marked by a number of incursions by pastoral peoples from the north. The Hyksos or Shepherd Kings invaded Egypt from eastern Syria, whilst the Kassites entered lower Mesopotamia. Two other peoples, the Mitanni and the Hittites, became settled respectively in north-east Syria between the Tigris and the Euphrates, and in Anatolia. These pastoral communities, though originally of lower cultural development than the agriculturalists they had conquered, quickly absorbed existing ideas, and also made important new contributions to the life of the Middle East. To them are due the introduction of the horse and the chariot; and to the Hittites in particular, the invention of iron, which was first developed as a curiosity in about 1300 B.C., and later replaced bronze as the chief metal of everyday use.¹

During the same epoch further incursions brought the Aramaean peoples from the deserts of Arabia to the better watered regions of the Levant, and numerous small communities established themselves in various parts of Syria and Palestine, amongst them the Canaanites,

¹ For further details of this period, the student is referred to *Corridors of Time*, Vol. X,

⁴ *The Horse and the Sword*, by H. J. E. Peake and H. J. Fleure.

Israelites, Philistines, and Phoenicians. The power of the ancient kingdoms of Egypt and Mesopotamia declined—many petty states developed in the region of the Fertile Crescent, and the rise of Phoenician settlements is a feature at this period.

As the result of the extensive commercial relations developed by the Phoenicians,¹ Aramaic languages now began to spread over much of the Middle East, reaching as far as Iran. One factor in the spread was the Phoenician invention of the alphabet, which represented a considerable advance on the cumbrous hieroglyphics of Egypt and the cuneiform characters of Mesopotamia, which were best adapted to writing on clay tablets.

In 1200-1000 B.C. there came the rise of Assyria. Based on the fertile plains of the upper Tigris, the Assyrian state combined a measure of trade with a well-developed agricultural system that relied on rainfall rather than on irrigation—a new feature which illustrates the progress of agricultural technique. Copper and iron from Anatolia and the Zagros were exchanged for agricultural and animal produce of the adjacent riverine and steppe regions ; and an important transit trade linked Assyria with Syria and Persia. Because of their close relations with areas of production, the Assyrians were able to make much use of iron in military weapons, which by reason of a greater size and power were superior to those of their enemies.

In 539 B.C. the Mesopotamian lowland was conquered by Cyrus of Persia ; and within a short time a considerable empire extending from the Hindu Kush to the Aegean, and including Egypt, had been created. This organisation of the Middle East as a single unit, occurring for the first time, brought many changes in outlook and material development. Until the rise of Persia, little had taken place to modify the regional political units which had developed within the framework imposed by natural conditions. The ancient communities of Egypt and Mesopotamia had evolved an economic life based primarily on cultivation by irrigation, supplemented by some sheep rearing, and by a restricted amount of outside trade and commerce. Elsewhere in the Middle East, development had been largely on the Syrian pattern of city-states.

Following the Persian conquest, successful attempts were made to develop the Middle East as a single unit. Roads were constructed

¹ The chief Phoenician cities were Tyre, Sidon, and Arad (Ruad). Further inland Aram (Damascus) had a considerable trans-desert trade, but did not form part of the Phoenician confederation.

with a system of posts and resthouses, to link various parts of the Empire ; a centralised administration, with efficient civil servants, came into being ; and attention was paid to expanding economic life. One factor in the success of Persian rule was the widespread use of Aramaic, which became the official language of the Empire ; and another was the adoption of a metal coinage, first used a short time before by the Midas dynasty of Lydia (Asia Minor), the last monarch of which (Croesus), was defeated by the Persians in 546 B.C.

The change of space-relationships following the breakdown of older regional groupings had important consequences in Mesopotamia, which, formerly on the edge of the civilised world, now profited from a central position. Although sea communications were not developed in the Persian Gulf, a considerable number of land routes from Egypt Syria, Anatolia, Arabia, and Persia converged in the valley of the Euphrates-Tigris ; and Mesopotamia became a centre of exchange for the whole Empire. With settled political conditions, and the stimulus of efficient organisation, trade developed on a more extensive scale—as intercourse between districts increased, products from various parts of the Empire were more quickly and easily exchanged. A tax assessment of the period (see *Cambridge Ancient History*) gives some indication of the economic importance of Mesopotamia under Persian rule.

ANNUAL ASSESSMENT FOR TAX

		<i>Talents</i>
Satrapy of	Assyria and Babylonia	1,000
„	„ Egypt	.700
„	„ Cilicia	.360
„	„ Syria (including Palestine and Cyprus)	350

Further changes resulting from the Persian conquests were the incorporation of Asia Minor and Persia in the main stream of Middle Eastern culture. Development in Asia Minor was uneven : the advanced communities of the western plateau, and especially of the coastlands (e.g. Lydia), made important contributions to the general life of the Empire ; but towards the north and east, more backward peoples remained in isolation as nomads and barbarians. In Persia, a considerable Indo-Aryan racial element had developed special features of culture which were markedly different from those of the Semitic civilisations of Egypt, Mesopotamia, and Syria. Juxtaposition and later fusion of the two cultures—Indo-Aryan and Semitic—produced

important advances ; from the process of intermixture, recurring at intervals over many centuries, can be traced a number of outstanding developments, chief of which may be counted the rise of the Parthian Empire in opposition to the Romans; and some centuries later, the development of Shi'a heresies within the Moslem world.

Classical Period.—In 331 B.C. Alexander (the Great) of Macedon defeated the Persian monarch Darius at Arbela (Erbil), and annexed the entire Persian Empire, to which he added his own conquests in Europe, Turkestan, and India. Although Alexander himself died very shortly afterwards, Hellenic influence in the Middle East was



FIG. 21. Division of the Empire of Alexander the Great. Palestine first to Ptolemy, later to descendants of Seleucus.

maintained by a number of his generals, who established themselves as successors of Alexander in various parts of the region. To one such general, named Ptolemy, fell control of Egypt, with, at first, Syria and Palestine ; and the Ptolemaic dynasty, to which belonged Cleopatra, ruled Egypt until the Roman conquest of the country in 30 B.C. Another general, Seleucus, established a dynasty in Persia, Mesopotamia, and, at a later date, in Syria. Themselves of partly Indo-Iranian origin, the Macedonians found much in common with the defeated Persian aristocracy, with whom they intermarried and formed a Perso-Macedonian ruling class. A strong military tradition, with extensive use of the horse ; a talent for organisation ; and a bent for speculation and intellectual inquiry seem to have been characteristic of both peoples.

A further bond was the emphasis given by both Macedonians and Persians to town life. The Macedonians especially, as a small minority group, found that Hellenic influence could be extended far more easily amongst the townspeople than amongst large and scattered bodies of cultivators. Accordingly, emphasis was placed on the development of towns and cities: old centres were renamed and expanded, and new sites were carefully chosen.¹ In this way a very small racial minority was able to maintain a political supremacy, and to make a disproportionately large contribution to the cultural life of the Middle East. Within the towns, Hellenism was often dominant; in the countryside, older Semitic traditions persisted.²

Greek influence in the Middle East gradually declined as the original invaders became assimilated into the native populations. A gradual breakdown of the Ptolemaic and Seleucid kingdoms was accompanied by the rise of militant Judaism in Palestine under the Maccabees, and by the rise of native kingdoms in Armenia, and in Persia, where a Parthian dynasty established its rule in the second century B.C., finally defeating the Seleucids in 83 B.C. Another factor in the extinction of the successors of Alexander was the rise of Rome, which, following an entry into Asia Minor in 189 B.C., eventually absorbed by slow degrees during the next two centuries both the Ptolemaic kingdom and the remnant of Seleucid territory left outside the Parthian sphere.

The Romans were unable to make headway against the newly created Parthian state ; so that whereas the western portion of the Middle East fell under Roman influence, the east remained separate, as part of a native Persian (Parthian) kingdom. Thus there came into existence a frontier region : in the south, the empty deserts of Arabia were a sufficient barrier ; in the extreme north, the difficult hill country of Armenia, much of it over 7,000 feet in height, and gashed by immense canyons, fulfilled a similar function. Between the two, in the more open areas of the Syrian steppe, a military ' defence in depth ' was created by the Romans. Based to the north on the highland massifs near Nisibin, the defence line ran via the Jebel Sinjar across the desert to the uplands of the Hauran and Jebel Druse, being

¹ E.g. in Syria the already existing Haleb (Aleppo) and Carchemish were re-named Beroea and Doura ; whilst new towns were created : Alexandretta, Laodicea (Latakia), from the name of a sister of Seleucus, Antiochia, and Heliopolis (Baalbek).

² Cf. Pontius Pilate's inscription on the Cross of Christ: in Latin, the language of the conquerors, in Greek, the language of the native townsmen and officials, and in Aramaic, the Semitic language of the peasantry.

marked along its whole length by forts, signalling stations, and fortified towns. During the Roman period, these latter fulfilled the dual role of military bases in time of disturbance, and of trading centres in time of peace (Fig. 22).

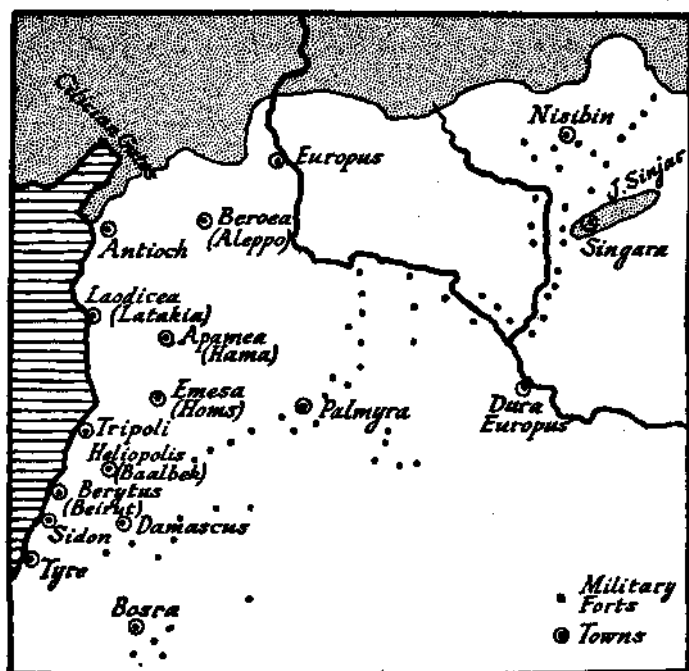


FIG. 22. The Roman Limes in Syria (after Rostovtzeff and Stein). Highland in north stippled.

Despite the power of Rome, the centres of the Parthian Empire, doubly screened by the Syrian desert and by the rampart of the Zagros Mountains, were too remote to be attacked in strength; conversely, the Parthians could never conquer the western provinces of Syria, which were sustained by a powerful Roman fleet.

Under Roman rule, western Anatolia, Syria, Palestine, and Egypt entered upon a period of prosperity which has probably never since been equalled. Away from the *Limes* tranquillity of conditions led to a great expansion in agriculture and trade. Irrigation was practised on a scale much greater than that prevailing to-day; and, in addition to supplying a numerous local population, the rich cornlands of Egypt and Syria had a constantly increasing market in Italy

itself. As Italian agriculture declined in the later Roman period, the greater became the demand for Middle Eastern wheat. Increase in material prosperity stimulated a demand for manufactured goods. A textile industry, first woollen and linen, then silk, had the advantage of abundant raw materials and natural dyes—saffron, umber, and purple from the murex shells of Tyre. Glass blowing and metal working also reached a high level; and at a number of centres on the coast, easily accessible woodlands provided material for shipbuilding.

The Middle East as a whole derived much profit from an expansion in world relations which took place under the Romans. Besides the two empires of Rome and Parthia, there were now equally highly developed civilisations in India and China; and trade contacts between Rome and the east began to assume importance. Silk was for long a Chinese monopoly, but an extensive demand by wealthy Romans led to a considerable transit traffic through Parthia and the Middle East. Other eastern products were jewels, spices, drugs, and sandalwood. Pliny estimated the value of annual importations from the east into the Roman Empire at 100 million sesterces; and, in view of the fact that this traffic was not balanced by a flow of Roman goods eastwards, modern authorities consider that between one-quarter and one-half of the precious metals of the Roman Empire ultimately drained to Asia in payment for Oriental luxuries.

Land and sea routes were both used, but land transport, although more costly, was preferred as safer. A northern route passed via the central Asian oases of Khokand, Bokhara, and Mejrj to Hamadan in Iran, where it was joined by another route from India via southern Iran. From Hamadan the route continued to Babylon, which was still a focus of communications, and then turned northwards by way of the middle Euphrates, whence a choice of routes skirting the Syrian desert led to Palmyra, Aleppo and Antioch, and Damascus. Access was then gained to the numerous Syrian ports. A more southerly route utilised the Indian Ocean and Red Sea as far as the Gulfs of Suez and Aqaba. From the latter point transshipment then took place by way of Petra to the south Syrian ports; from Suez, a route also led overland through Egypt to Alexandria, which rivalled Tyre and Sidon as an entrepot. The amazing prosperity of the Roman Middle East, with its dense population and high level of culture, is attested by the numerous remains which are still to be seen. Of these, the temple at Heliopolis is one of the most impressive. Situated at an altitude of 3,000 feet, on the low watershed between the Orontes and Leontes

(Litani) rivers, the temple was erected in A.D. 200-400, partly from stone quarried in Egypt, and rests on a foundation course that consists of hewn stone blocks each weighing 450 tons. Antioch, the metropolis of Roman Syria, is estimated to have had a population of three-quarters of a million, a number in excess of the combined populations of modern Aleppo, Beirut, and Damascus ; even so, the greater number of Syrians lived in the country rather than in the towns.

Further to the east, the Parthians also derived much advantage from trade routes. It is customary in the west to regard the Roman Empire as surrounded by barbarians : as concerns Parthia, this was by no means the case, since both states dealt politically on equal terms, and both appreciated the usefulness of commercial activities. The Parthians maintained active trading relations with China, India, Arabia, and Siberia,¹ in addition to those with Rome ; but they were particularly anxious to keep a monopoly of trade in their own region—foreign merchants were not welcomed in Parthia itself, and all dealings were strictly supervised. The Romans have left an extensive literature, but the Parthians have left almost no written records, and much of our impression of them is thus derived from extraneous and not always impartial contemporary sources. Nevertheless, it is clear that the Parthians had a relatively high level of cultural development, in which, however, the Hellenic influence of Seleucid times gradually gave way to an increasingly native and Oriental outlook.

In A.D. 224 a dynasty known as the Sassanids gained power in Parthia, and though most of the existing Parthian way of life continued, the later Iranian Empire showed itself increasingly Oriental in its internal life, and in external affairs more aggressive in the west, against the slowly weakening power of Rome. A long period of intermittent fighting between Rome and Parthia, with border skirmishes and occasional major expeditions, continued until the downfall of both Empires in the seventh century A.D. The Roman Empire had at some time previously fallen into an eastern and a western portion, and of these, the former, now spoken of as the Byzantine Empire,² took up the Iranian challenge. The Middle East from the Black Sea to the deserts of Arabia became a battleground, and the inconclusive results of this warfare, prolonged over many years, led to the ultimate

¹ Siberian gold is known to have reached Parthia by way of Samarkhand.

² The effective date of the creation of the Byzantine Empire is usually taken as A.D. 373.

exhaustion of both sides. The resulting material devastation, and crippling taxation of the native population of the Middle East, were important contributing factors in the rise of Islam during the seventh century A.D.

Arab Period.—The Arab conquest of the Middle East between 630-640 A.D. brought an active, virile, but rough and uncultured desert community into contact with the rich and highly evolved civilisations of Rome and Iran. The early followers of Muhammad were largely desert Badawin—'plain men living in tents \ and without any tradition except that of a hard, patriarchal society existing as pastoralists or caravan traders.

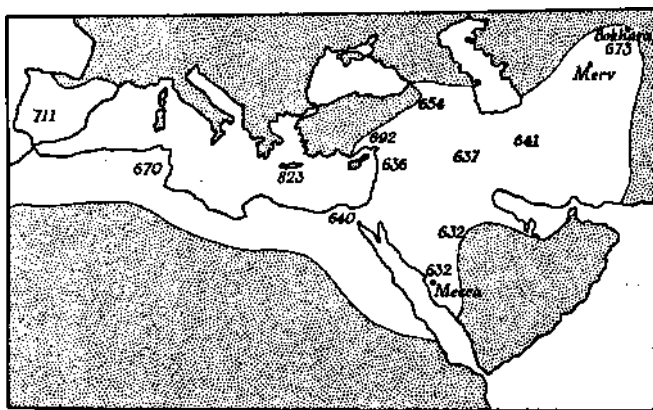


FIG. 23. Islamic Conquests, with dates of capture.

The rapidity with which these semi-nomads were absorbed into existing life in the Middle East, and the extraordinary cultural development that resulted from the fusion of the two groups must be considered one of the outstanding events in the development of human society. Politically the Islamic state at first enjoyed unbroken success. With the capture of Mecca in 630 A.D. as a beginning, there followed in 636 the seizure of Syria, of Egypt in 641, and of Libya in 642. Within a century, the whole of North Africa and most of Spain had become Moslem, and France and Italy were threatened. In the east, Islam had reached the oases of Turkestan, and was stretching towards India and China. Only in the north was expansion arrested, and that only temporarily, by the reduced but revived Byzantine Empire.

Materially, the impressive level of achievement of the Roman era

was maintained. Egypt and Syria retained a high agricultural productivity ; taxation was lighter than in Byzantine times; and a degree of religious toleration allowed collaboration between various sects, with a fruitful interchange of ideas.¹ In Mesopotamia, the development of irrigation reached its highest point with the construction of numerous canals, many of them navigable, linking the Euphrates and Tigris. We may recall the statement in an earlier chapter (p. 54), that the modern irrigation problems of Iraq would be largely solved by the reconstruction of the early Arab system of canals.

An important number of manufactures—metal-work, leather, and textiles²—gave additional prosperity, and ancient trade-routes between Europe and the Far East continued in full use. Intellectually, at a period when learning was practically extinguished in Europe, the Arabs took over and expanded classical philosophy, particularly in the fields of medicine and science, adding a considerable body of new thought, partly developed by themselves, and partly derived from Persian and even Hindu sources.³ It may therefore be said that almost until the Renaissance, the main stream of traditional classical culture deriving from the Ancient World was to be found in Arab lands rather than in Europe ; and Arab commentaries and expositions on ancient authors were used as text-books in European universities until the seventeenth and eighteenth centuries.

The Caliphate, or political leadership of Islam, was on the death of Muhammad first established in the family of the Omeyyads, who reigned from Damascus. After a century, a rival family, the Abbasids, supplanted the Omeyyads ; and the political centre of Islam shifted to Baghdad. To this period, during which material prosperity in Mesopotamia probably reached its greatest peak, belong the Caliph Haroun al Rashid (786-809) and the Barmekids, hereditary Grand Viziers.

¹ A number of high officials of the early Arab state were Christians.

² The names *damask*, *muslin* (Mosul), and *tabby* (Arabic *attabi*, originally cloth with stripes in various colours), indicate the extent of Arab textile production.

³ Our debt to the Arabs is indicated by the words alchemy (from which chemistry), algebra, alcohol, alkali, admiral, julep, and soda. A number of chemical substances such as borax, sal ammoniac, nitre, and sulphuric acid were brought into use by the Arabs, who also introduced paper from China, where it was first invented (Arabic *rizma*, a bundle, hence *ream*). Two other contributions were the present system of numerals, a great advance on the cumbersome Roman figures, and the use of the zero sign.

In view of the extent of Arab dominions, and the necessity for pilgrimage, great attention centred on geographical studies, and to the Arabs must be ascribed the regional concept in geography.

Later, towards the end of the ninth century, the political unity of Islam broke down, and a number of adventurers seized various parts of the Middle East as independent kingdoms. A succession of native dynasties arose in Iran ; and thence onwards, the country pursued an increasingly independent political life, interrupted only by a temporary conquest which united Iran to Mesopotamia between the years 1055-1220. The remainder of the Middle East was partitioned between the Fatimids, an Egyptian dynasty, and the Hamdanids of Syria, with central and southern Arabia as virtually independent tribal areas. In addition to political anarchy, the growth of Moslem sects had introduced a further element of discord and disunity—the great cleavage between Sunni and Shi'a had begun, and Christian and Jewish minorities were looked on with increasing disfavour. Ever since the original rise of Islam the Byzantines had succeeded in holding Asia Minor ; and the existence of this advanced base of Christianity greatly favoured the operations of the first European Crusaders, who in 1097 ^{A.D.} landed in Asia Minor, and proceeded to an invasion of Syria.

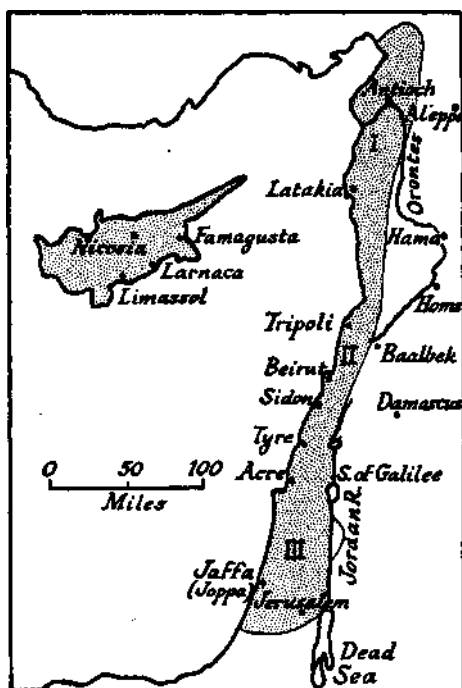
Crusader Period.—Within a short time, the coastal area of the Levant, from Cilicia to central Palestine, had fallen under Crusader domination. Feudal principalities were established on the European model, and Jerusalem was held from 1099 until its recapture by Saladin in 1187. The Crusaders did not, however, penetrate far inland. Except for somewhat more extensive, but short-lived kingdoms in Cilicia (kingdom of Armenia) and Judaea (kingdom of Jerusalem), their influence ceased at the crest of the mountain ranges backing the coast, and the important cities of Aleppo, Hama, and Damascus remained in Moslem hands. There is a curious similarity between Crusader occupation and the Phoenician kingdoms of the second millennium B.C. : both were small enclaves, often at odds amongst themselves, and both suffered the same fate of gradual absorption by outside powers.¹

The Crusaders were not wholly inspired by religious motives. Trading activities had a certain attraction, especially to the Genoese and Venetians, who supplied sea transport for Crusading armies in return for substantial commercial concessions. Throughout most of the hundred years of occupation by the Crusaders, a considerable volume of trade in precious stones, spices, silks and other luxuries was

¹ Had the Crusaders been able to hold the cities of the desert border, they might have **been able** to repeat the Roman strategy of using the desert as an outer protection.

carried on with the Moslem states, part being a transit traffic from China and India. It is also interesting to note that, on balance, the East had more to offer than the West in the way of material and cultural amenities. The Crusaders learned much from Islam—an indication of the advances made in the Middle East during the period of the Dark Ages in Europe.

During the thirteenth century Arab power revived, and the Crusaders were gradually driven from Syria. By 1299 Acre, the last Christian stronghold, had been taken. A remnant of Crusader refugees fled from the mainland of the Levant, and established themselves in the island of Cyprus, where European control, first under a Crusader dynasty named Lusignan, and later under the rule of the Republic of Venice, lasted until 1571. The Lusignan period was one of great brilliance in the



Crusader States in the Levant
 I. Principality of Antioch. II. County of Tripoli.
 III. Kingdom of Jerusalem

history of Cyprus, for the island became an entrepôt between Europe and the East. Trading

posts on the mainland of Asia, first developed under the Crusaders, continued to function after the Moslem re-conquest; and European traders, chiefly Italian and French, had depots at Latakia, Tripoli, Beirut and Alexandria. Much commerce passed through Cyprus, which, secure from attack because of the lack of a seafaring tradition amongst the earlier Moslems—a situation that altered at a later date—took its place as a natural centre of the eastern Mediterranean. The wealth of individual merchants of Famagusta, Limassol, and Nicosia is said to have exceeded that of many European monarchs; and the

extensive Gothic buildings still existing in Cyprus somewhat incongruously among classical Greek and later Islamic architecture testify to the prosperous condition of the island under the Lusignans. It was not until the sixteenth century when a new power, the Ottoman Turks, had been sufficiently long in contact with the sea to have developed a maritime tradition, that invasion was attempted, and the island passed to Muhammadan control.

From the Crusader period onwards, repeated incursions of Mongols from the steppes of central Asia caused much destruction and devastation from which certain regions of the Middle East have never really recovered. The brunt of Mongol attacks fell on Iran, where between 1220 and 1227 the * hordes' of Jengiz Khan sacked and almost completely destroyed most of the cities, massacring the inhabitants. Many of the irrigation works maintained for centuries now fell into disrepair, and vast stretches returned to steppe or desert. By 1258 the terror had reached Mesopotamia. Baghdad was destroyed, and the Abbasid Caliphate extinguished.

A century later, fresh Mongol invasions occurred. The armies of Timurlane reached Syria, where Aleppo, Hama, and Damascus were burned and looted; whilst in Iran, the Nestorian Christian community, which had played a great part in the intellectual life of the country, was reduced to a tiny minority. Mongol invasions were, however, arrested in Asia Minor, where a new power, the Ottoman Turks, had risen to importance.

Ottoman Period 1517-1923.—In the thirteenth century A.D. a small group of Mongols known as the Ottoman or Osmanli Turks invaded Asia Minor, and received a grant of territory in north-west Anatolia from a somewhat uneasy Sultan.¹ By 1400, the Ottomans had extended their domains to include central and many parts of western Anatolia, together with a considerable area of Balkan Europe. In 1453, after a number of previous attempts, the great city of Constantinople was taken, and the Byzantine Empire, of which it had been the capital, finally destroyed. Thence onwards, the expansion of the Ottoman state was rapid. By 1566 the entire north coast of Africa as far as Algiers had been occupied, together with Egypt, Syria, Palestine, Anatolia, and Iraq. In addition, the whole of south-east Europe between Croatia and the lower Danube fell into Ottoman hands, and Austria found herself menaced. A number of campaigns had led to a

¹ One may recall grants of land, under somewhat similar circumstances, to the followers of the Saxons Hengist and Horsa, and also to Rollo, first Duke of Normandy.

stalemate in the east, where a 'debatable ground' in the region of eastern Armenia, the Caucasus and Zagros Mountains separated the Ottoman state from Iran, which was able to retain its independence.

The early expansion of Ottoman power was accompanied by a process of administrative reorganisation, as the result of which there came into existence a form of government that lasted without serious change from the fifteenth to the twentieth centuries. Certain features of Turkish rule are extremely interesting as showing to a

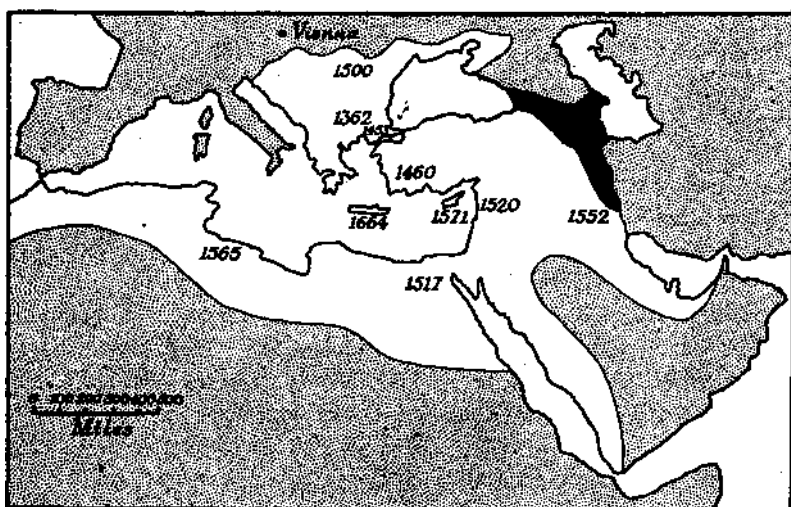


FIG. 25. The Ottoman Empire, with dates of conquest. Area in black disputed with Persia.

marked degree the influence of the social background of the early Ottoman tribesmen, who became the ruling class of the new Empire.

The Ottomans had entered Anatolia as pastoral nomads from the steppes of Asia; and it has been said of them that they brought to the task of administering their Empire much of the technique that had served them in the handling of animals.¹ In the first place, as a herdsman keeps separate his sheep and goats, the Ottomans made no attempt to develop a single, unified state, but were rather content to allow existing differences of race, religion, and outlook to continue unchecked. At first, this tolerance of division amongst peoples of the Ottoman Empire was probably mere indifference; but at a later period, it became an important basis of policy: 'divide and rule' was

¹ J. L. Myres, *Mediterranean Civilisation*; and A. J. Toynbee, *A Study of History*, Vol. III.

the principle by which the weaker Ottoman Sultans were able to maintain their rule over a restive but heterogeneous population. Moslem was turned against Christian, Shi'a against Sunni, Kurd against Armenian, and Othodox Greek against Roman Catholic. Sectarian feeling was provoked and increased by the creation of the Millet system (p. 103) ; and after the seventeenth century, the grant of Capitulations to various non-Turkish nationals (p. 144) was a further recognition of the separate status of certain communities within the Empire. Provided that the subjects of the Sultan showed themselves amenable to rule, and willing to pay the taxes demanded, the state showed little further concern with the well-being of its peoples.

A shepherd employs dogs to control his flocks : similarly the Ottomans created a special corps of picked subjects to police the Empire. These men, known as Janissaries, were brought up from earliest youth in military barracks, under the strictest discipline. Bought as slaves from neighbouring states, or obtained as tribute—usually from Christian families—within the Empire, the Janissaries were separated from their parents, whom they never knew, and hence grew up without family ties, or local sympathies. Obedient and ruthless, and fanatically Moslem by reason of their early training, the Janissaries were the instrument by which the Turkish government maintained a hold upon its mixed population.

As a purely pastoral tribe, the Ottomans had had no tradition of industry and commerce, and in their Empire, both were despised or ignored, and left to Armenians, Greeks, Jews, or foreigners. Trade activities were tolerated, but no positive encouragement was afforded by the government; and from time to time, rapacious and arbitrary exactions were levied on commercial communities. Much business was therefore carried on half secretly, as far as possible without attracting attention, in the face of indifference, discouragement, or worse, from official quarters. Even the houses of many merchants were miniature fortresses, capable of withstanding attack. This long tradition of secrecy and dissimulation in business has had a most harmful effect. Even in some modern Middle Eastern states, methods inherited from the not too remote past still persist. Accounting systems are rare, banks are mistrusted, and tend to be inefficient, 'presents' are frequent accompaniments to commercial transactions, and fixed prices, even in retail shops, are by no means universal.¹ Under such conditions, business probity is not at times

¹ Hagglng over the price of goods in retail shops is still accepted as customary, and the

a conspicuous feature ; and a problem of many modern governments is to apply taxation to traders, often the wealthier section of the community, but also the more adept at concealing their resources.¹

Another feature of the Ottomans deriving from their origin as nomads has been a lack of material amenities in everyday life. It has been said of a Turkish household that as regards furnishings and material comforts, there is frequently the impression that the owner has only recently arrived, and intends to move off the next day—furniture is scanty and utilitarian, and the house itself incompletely adapted for habitation. The palace of the Sultan in Constantinople impressed one observer merely as a ' warren of undistinguished apartments

Finally, it may be noted that the Ottomans achieved power after a long series of wars mainly against Christians. Unlike the original followers of Muhammad, who practised some toleration of Christians and Jews, the Turks were fanatical Moslems, and destruction of Infidels became a highly meritorious action. Intolerance and fanaticism led to a narrowing of outlook among Moslems themselves : Christian and ancient Greek philosophy which had been drawn on by early Arab thinkers, were rejected ; and Islam became a closed and rigid system which ceased to develop further. How far the present weakness of Islam *vis-a-vis* the West can be traced to a narrowing of outlook as the result of increasing intolerance is a matter of some interest.[^]

The discovery in 1498 by the Portuguese of the Cape route to India had a profound effect in the Middle East. A transit traffic between Europe and Asia, which from time immemorial had enriched the countries of the Middle East, was now diverted to the sea ; and despite efforts by the Ottoman Sultan to intervene against Portuguese traders in the Indian Ocean, the flow of goods through Iran, Syria, and Egypt entirely ceased. Establishment in 1514 of a Portuguese fort at Ormuz at the head of the Persian Gulf excluded the Ottomans from any possibility of interference with Portuguese communications with India ; as a result, the Middle East entered upon a period of decline. It was not until the cutting of the Suez Canal in 1869, and the development of motor and air transport later still that the region

shopkeeper often tends to despise anyone who pays the first price asked. Unless the sign *Prix Fixe* is displayed prominently in a shop, the customer can assume that bargaining is called for.

¹ In 1945, the merchants of the Lebanese state compounded with the government for a fixed sum of money to be paid by the general merchant body in lieu of all direct taxation of individual traders—an indication of the weakness of the government.

recovered some of its ancient importance. Between the sixteenth and late nineteenth centuries the Middle East was increasingly a backwater, remote from the main commercial currents of the world.

In the political sphere, the Ottoman Empire reached its maximum of power during the seventeenth century, when Austria was threatened and Vienna besieged. From this high-water mark, with a turning-point at the repulse of the Ottomans outside Vienna in 1683, the Empire entered on a period of slow decline. One reason for the decline was pressure by newly developing states such as Russia and Austro-Hungary, but the principal factor was unrest amongst non-Turkish subjects of the Empire, especially amongst Christian communities. A symptom of the growing weakness of the Ottomans was the rise of autonomy in outlying provinces, where the governors, at one time mere officials appointed by the Sultan from Constantinople, tended to follow an increasingly independent policy, and ultimately became hereditary rulers. The Sultan could do no more than issue a formal confirmation on the succession of a new provincial ruler. Such a development occurred in Algiers, Tunis, Egypt, and the centre and south of Arabia, all of which by the nineteenth century had evolved into more or less independent states.¹

Commercial decline in the Asiatic and African provinces of the Empire, together with the rise of political autonomy in certain regions, caused the Ottoman rulers to devote greatest attention and interest to the European part of their dominions. By the later nineteenth century, however, the rise of national feeling amongst Balkan peoples, and the aggressive action of outside powers was rapidly reducing Ottoman territory in Europe ; and the Sultan felt it necessary to revise the system that had been followed in non-European districts. Accordingly, a 'forward' policy, designed to re-assert Turkish supremacy, was undertaken in the Middle Eastern provinces. Its exponent, Sultan Abdul Hamid II, was aided by the recent construction of the Suez Canal, which allowed the easier movements of troops from Turkey southwards. Garrisons of Ottoman soldiers were established in the Hedjaz (1869), the Yemen (1872), and Hasa (1871).

Further steps in the strengthening of Turkish control in the Middle East were taken by the construction of railway routes that were designed to bring outlying provinces into closer contact with Constantinople. Lines were built with the aid of foreign capital (chiefly

¹ Egypt, although in effect completely independent during most of the nineteenth century, remained technically a part of the Ottoman Empire until 1914.

German) from Anatolia south-eastwards to Baghdad via Aleppo, and southwards from Aleppo through Damascus and Ma'an as far as Medina. The latter railway, said to have been built well away from the coast in order to be out of range of the British fleet, proved more of a liability than an asset during the war of 1914.

The efforts of Abdul Hamid delayed but did not prevent the break-up of Ottoman power. Nationalist feeling continued to develop, and although at first restricted to the Christian peoples of the Balkans, this later became a disruptive factor amongst the Islamic populations of the Ottoman state. Arab as distinct from Turkish national feeling was fostered by the rise of semi-independent tribal leaders in Arabia, and by the organisation of secret political societies of anti-Turkish complexion, chiefly in Syria. By the twentieth century, nationalism had begun to affect the Turkish people themselves. In 1908 a revolution occurred, as the result of which Abdul Hamid was deposed, and a more strongly nationalist impulse given to the policy of the Empire. Six years later Turkey entered the first Great War on the side of Germany ; and following her defeat in 1918, the complete extinction of Turkish power seemed at hand. An unlooked for revival under Mustapha Kemal and his Nationalist party altered the situation however; and a new, purely Turkish state came into being. For a short time the Ottoman Sultanate continued, although without effective power ; but in 1923 Turkey was declared a Republic. A year later the religious title of Caliph, which had been borne by the Sultan, was also extinguished, and since that date Turkey has functioned as a nationalist, secular state.

CHAPTER VIII

ASPECTS OF THE HISTORICAL GEOGRAPHY OF THE MIDDLE EAST

II. THE POLITICAL BACKGROUND

A.D. 1800 TO THE PRESENT DAY

Western Imperialism.—One element in the long-continued decline of Ottoman power was the control gained by foreigners over much of the economic life of the Turkish state. As the result of Ottoman indifference to commercial development, the way had been largely left clear for activities by outsiders. Even in the sixteenth century, when Turkish power was at its height, commercial treaties were negotiated with France, by which French merchants enjoyed special privileges within Turkish dominions. During subsequent years, other European nations followed the French lead, with the result that by the end of the nineteenth century a considerable body of rights, concessions and privileges, known collectively as Capitulations, had been granted to foreign traders. Capitulations gave to nationals of Austro-Hungary, France, Germany, Great Britain, Italy, and Russia virtual exemption from most of the internal taxation of the Turkish state, together with immunity from police se[^]feh of foreign-owned premises. Foreigners were also immune from L [^]i in a Turkish court of law, special tribunals being appointed for each nationality.

As originally granted, Capitulations were designed to secure outside commercial assistance on terms favourable both to the Ottomans and to the foreigners concerned; but in their later phase Capitulations led to much corruption within Turkey, and, equally seriously, to undisguised commercial penetration by outsiders. Concessionaires gained control of resources which were then exploited without regard to the interests of the country ; and by lending money at usurious rates foreigners gained a stranglehold on much of the economic life of the whole Ottoman Empire—e.g. most gas, electricity, and water companies, where these existed, together with the greater part of the railway system, were foreign owned ; and the fact that all mineral resources of the Empire were regarded as the personal property of the Sultan, to be disposed of as he wished, led to

a form of exploitation that benefited only a few foreign commercial interests.¹ Profits from economic activity were drained away from the country, and, at the same time, the Turkish state was confronted with numerous non-Turkish communities over which it had no legal jurisdiction. In effect, further * states within a state * had been created, and thus Capitulations were a kind of economic Millet.

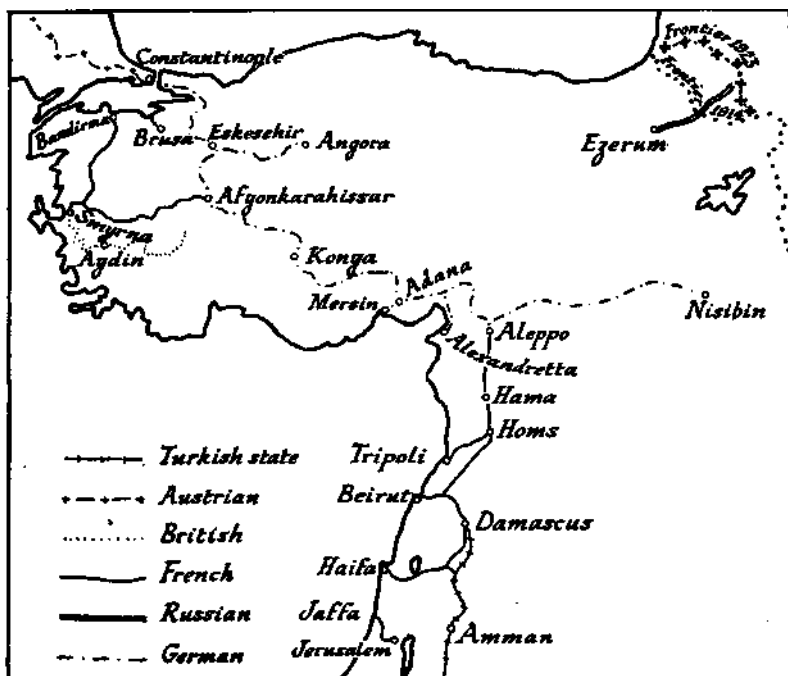


FIG. 26. Railway Concessions in the Ottoman Empire. Names of towns as before 1923.

Further emphasising the economic dominance of foreign powers, the Ottoman government had been forced to agree that its national debt, amounting to some £150 million (\$750,000,000) should be administered by an international committee, the 'Council of Administration of the Ottoman Public Debt', which, presided over alternately by a Frenchman and an Englishman, was composed of

¹ Always chronically in debt, Sultan Abdul Hamid raised money for immediate needs by the sale of mineral concessions. Once sold, however, the concessions brought no further profit to the Turkish state; and by the opening of the twentieth century the availability of new concessions was running short, and Turkey had in effect almost ceased to derive advantage from the existence of mineral wealth within her boundaries.

nationals from Austro-Hungary, Germany, Holland, Italy, and Turkey, together with a representative of the Imperial Ottoman Bank which was itself largely foreign owned. The Council repaid interest and capital from the ordinary revenues of the Turkish state, and hence had a certain control of taxation within Ottoman dominions.¹

Although foreign ownership was widespread in most fields of economic activity, it was particularly prominent in railway development. We have noted some of the internal political circumstances that impelled Sultan Abdul Hamid to press on with railway construction, and the great nations of Europe saw in the extension of a rail network a means of expanding their own economic and political influence in the Middle East. Best known was the Berlin-Baghdad scheme, sponsored by Germany as an important element in the *Drang nach Osten* policy of the Imperial government; but French interests were active in Syria, and a British line between Baghdad and Basra was constructed in the early twentieth century.

Economic penetration of the Ottoman Empire was accompanied by equally active political pressure. The remark of the Czar in 1844 * We have a sick man on our hands. It would be a grave misfortune if we were not to provide beforehand for the contingency of his death ' could be taken as a summary of the attitude of most of the powers of Europe ; but actual break-up of Turkish domains was delayed because of mutual jealousies among these interested powers : at times various European states were prepared to acquiesce in a continuance of Turkish power and postpone their own designs, rather than see a rival gain advantages. So in 1854 Britain and France went to war to thwart Russian schemes of expansion at Turkey's expense in the Black Sea and eastern Anatolia, and the former again threatened war in 1878—a policy that was reversed in 1914 ; whilst the role of protector of Turkish interests, undertaken first by the British and later by Germany, could not be called an entirely disinterested one.²

In Ottoman affairs, the nineteenth century was a period of accelerated decline as the result both of internal weakness and of outside pressure. The more outlying provinces of the Empire, those of north-west Africa, achieved virtual independence, only to fall later under

¹ Chief creditors were : France (60 per cent, of the total debt), Germany (20 per cent.), Britain (15 per cent.). Staff of the Council of Administration numbered in 1912 approximately 9,000 persons.

* Witness the cession of Cyprus to Britain in 1878 ⁴ as a base for the defence of the Ottoman Empire', and the grant of concessions for the ' Berlin-Baghdad' railway to Germany.

French, Spanish, and Italian dominance ; and by the opening of the nineteenth century even the position of Egypt as an Ottoman province had become increasingly doubtful.

EGYPT

During this period an Albanian adventurer named Mehemet Ali rose to power in Egypt, and succeeded in maintaining his position despite efforts by the Ottomans to dislodge him. At one time it seemed as though Mehemet Ali might successfully overturn the Ottomans in Syria and Crete, and establish an Egyptian Empire ; but European intervention, with Austria and Britain supporting the Turks, and France supporting Mehemet Ali, led to the defeat of Mehemet Ali's wider aspirations, although he remained as ruler of Egypt, where his dynasty still reigns.

The rise of Egypt under Mehemet Ali owed something to French influence and support. The Egyptian campaigns of Napoleon in 1798 had stimulated European, and particularly French interest in the country—it is not always remembered that Napoleon included a number of archaeologists and scientists in his invading army, or that the deciphering of ancient Egyptian hieroglyphics may be said to date from the discovery of the Rosetta Stone during French occupation—in effect/four centuries of isolation as a remote backwater were coming to an end. Mehemet Ali, an exact contemporary of Napoleon (both were born in 1769), had great admiration for the conqueror of Europe, and imitated his methods, often with success. Traces of French influence came therefore to be a feature in the state of Mehemet Ali and his successors; and it is significant that at the present day, French language and culture still persist among the educated classes of Egypt. The government employs French in preference to English when a language other than Arabic is desired (e.g. in decrees, and in time-tables of the Egyptian State Railway) ; and the publication of several daily newspapers in the French language is an indication of the strong Francophil tendencies of certain groups of the population.

A further link between Egypt and France was the construction by de Lesseps in 1869 of the Suez Canal, a project that had been actively opposed by Britain. It seemed as though Egypt was slowly moving within the French orbit, but in the words of H. A. L. Fisher, * it was England that stumbled into the inheritance which France had marked

for her own '. In 1874 a successor of Mehemet Ali, the Khedive Ismail, who had been allotted a large number of foundation shares in the Suez Canal Company, found himself in difficult financial straits, and decided to sell his holding in the Canal Company. At the instigation of Disraeli, then Prime Minister, the British government quickly came forward as a buyer, and by the purchase of the Khedive's shares for £4,000,000, found itself the majority shareholder in the Suez Canal Company, and the possessor of an important stake in Egyptian affairs. This sale by the Khedive did little to ameliorate his financial position, and within a very few years, as the result of continued extravagance, Ismail was once more heavily in debt, chiefly to British and French bond-holders.

The British government ultimately determined to take action in order to secure repayment of its nationals who had lent money in Egypt, and France, encouraged by Bismarck, who was anxious that France should find colonial commitments,¹ joined with Britain in securing the deposition of Ismail, and the re-organisation of Egyptian finances. The latter proved to be a longer and more difficult task than had been anticipated, and France subsequently withdrew. As a result, control of Egyptian affairs fell entirely to Great Britain. This task was unwillingly undertaken in 1881 by the Gladstone administration, which, at first genuinely anxious to be rid of Imperialist commitments, found itself obliged first to undertake control of financial matters within Egypt, and later to intervene in the question of the Sudan.²

Before 1800, the Sudan had stood in relation to Egypt somewhat in the same position as Arabia in relation to Turkey—i.e. a vague suzerainty existed, though in fact various tribal chiefs were more or less completely independent. The position had, however, been altered by Mehemet Ah, who undertook a re-conquest of the Sudan,

¹ As a distraction from a possible war of revenge over Alsace-Lorraine.

² An excellent example of what is often called abroad British duplicity and hypocrisy. There is no doubt that in their own minds the Gladstonian Liberals would have been pleased to withdraw from Egypt, but having taken the first step, Britain was drawn further and further into Egyptian affairs, and despite its inner convictions, the Liberal cabinet found itself committed to an active policy in Egypt and the Sudan. In this way the followers of Gladstone, having defeated Disraeli at the polls on the issue of colonial expansion, found themselves driven to adopt the policy of imperialism which they themselves had denounced. Foreign observers, unable to follow this intricate evolution in political affairs, generally preferred to explain events in Egypt as premeditated imperialism cloaked in its early stages by specious protestations of disinterestedness—a further contribution to the legend of perfidious Albion.

and was later able to use Sudanese troops in his campaigns against the Ottomans. Garrisons of Egyptian troops were maintained in the Sudan both by Mehemet AH and his descendant Ismail, so that when British intervention in Egyptian affairs began, these garrisons, precariously maintained by a now weakened government among a hostile population, had become a special preoccupation.

In 1881 an outbreak of religious fanaticism occurred in the Sudan, where an obscure Muhammadan from Dongola proclaimed himself the Mahdi (p. 108) and announced as his object the conquest of the world. A body of Egyptian troops commanded by an Englishman was destroyed, and the British Government determined to evacuate the region as quickly as possible.

General Gordon was accordingly sent to the Sudan with explicit instructions to withdraw all Egyptian garrison troops, but the military forces necessary to cover this withdrawal were not supplied, and moreover, Gordon did not make the fullest use of the time at his disposal. Within a few months the situation had deteriorated further, and Gordon was murdered by followers of the Mahdi. A wave of popular feeling swept Britain, where Gordon came to be regarded as a victim of governmental fumbling and ineptitude, and the Liberal cabinet of Gladstone fell. Thence onwards, British policy was firmly directed towards complete re-occupation and pacification of the Sudan. After thirteen years of oppressive tribal rule, the power of the relative Sudanese dervishes was finally broken by Kitchener at Omdurman (1898), and joint rule by Britain and Egypt (a Condominium) established.¹

Rule by condominium has in effect given the larger share of influence in the Sudan to Britain, but it is necessary to note that Egypt's special position as legal co-ruler is still recognised. With the attainment of independence by Egypt in the twentieth century, the question of the status of the Sudan has become increasingly prominent. In Egyptian eyes the Sudan is an integral part of national territory: besides the political suzerainty established before British occupation of Egypt, there is also a highly important economic factor—control of the Sudan confers control of the Nile floods, a matter of vital moment to all Egyptians. The British viewpoint is that the Sudan is racially, culturally and economically distinct from Egypt, and political control

¹ Though in fact the re-conquest had been earned out by British troops, it will be remembered that the Sudan was technically an Egyptian province, and that Britain was merely acting legally on behalf of Egypt in intervening in Sudanese affairs.

by the latter country is in effect foreign domination indistinguishable from, say, British occupation of Egypt proper. If British withdrawal from Egypt is demanded by Egyptian nationalists, then Egypt herself cannot claim continued occupation of the Sudan—what is imperialist sauce for the goose must also be sauce for the gander—and the Sudanese right to self-determination must also be respected. Unfortunately, cleavage of opinion over the future of the Sudan has provoked much bitterness between Britain and Egypt, and can at the present time be regarded as the chief obstacle in the way of amicable relations between the two countries.¹

In 1914, on the declaration of war by Turkey, Egypt, which had remained nominally under Ottoman suzerainty, was declared independent, though in fact internal control remained largely in British hands, and British Forces were stationed in the country.² At the end of the war, Egyptian agitation developed, with the aim of securing effective independence, and in 1924 a treaty was signed by which Britain handed over control of the bulk of her affairs to Egypt herself, retaining the right to maintain garrisons of British troops in Egypt for the defence of the Suez Canal. Changes in the political situation during the next decade led to a further treaty in 1936. By this time, the tide of nationalist feeling in Egypt was running more strongly, and some revulsion against overseas commitments was apparent in Britain. But the rise of Germany and Italy—the latter with an active policy in the Mediterranean and north-east Africa—gave some pause to ardent nationalists in Egypt, so that the 1936 treaty, though conceding many points to the latter country (e.g. the abolition of Mixed Courts, in which law cases concerning non-Egyptian nationals were tried), also confirmed the continued presence of British garrisons. Later changes in the political situation—the eclipse of Italy, the enhanced wealth of Egypt following the war of 1939, together with a decline in British influence—have provoked a denunciation by the Egyptians of the 1936 treaty. During 1947, British troops were withdrawn from Cairo and Alexandria to the vicinity of the Canal zone.

¹ In 1947 Britain and Egypt failed to reach agreement over a comprehensive treaty covering general relations between the two countries—the point at issue being the status of the Sudan. Ultimately the dispute was referred to the United Nations Organisation.

² Cyprus, also technically Ottoman territory, passed at the same time under direct British rule as a Crown Colony.

ASIA MINOR AND THE LEVANT

Throughout the nineteenth century Asia Minor and the Levant—'heartland' of the Ottoman Empire—remained outside foreign political control. As we have seen, attempts at political domination were largely thwarted by international rivalries, and by the adroitness with which the Sultans played off one predatory foreign power against another. Penetration of these regions was limited to the economic and cultural spheres, and in the latter instance sectarian differences provided the main opening for intervention: Russia remained in close contact with Orthodox Christian minorities, France championed the Uniates, and Britain supported Muhammadanism, sometimes orthodox, sometimes heretical, as in the case of the Druses during the 1840's. Jerusalem came naturally to be a focus of religious rivalry.¹

In 1860 events took a sharper turn with the massacre of a number of Lebanese Christians by the Druses, under conditions of apathy or actual encouragement by the Turkish authorities. These Lebanese Christians, chiefly Maronites, inhabited the mountainous district immediately to the north-east of Beirut, whilst the Druses also lived alongside the Maronites in the mountains a little to the south of Beirut.

The massacres reached a scale sufficient to attract general attention in Europe, and to provoke the joint intervention of a number of European powers. A naval demonstration by the combined fleets of Austria, Britain and France was followed by the landing of French troops at Beirut. At this, the Sultan took alarm; action was begun to end the disorders, and to punish supine or partisan Ottoman officials in the Lebanon. As a gesture to the concert of European powers the Sultan was forced to agree to a special statute by which the Christians of the Mount Lebanon were accorded a degree of autonomy from Ottoman rule, and exempted from conscription into the Turkish army. The 'Organic State of Mount Lebanon' was to be ruled by a Christian Governor nominated by the great powers of Europe, and confirmed in office by the Sultan. The governor also had the right of direct access to the Imperial authorities in Constantinople, and was hence outside the control of the governor (Vali) of Syria.

¹ The authors of *1066 And All That* have epitomised the situation in the words 'The French thought that the Holy Places ought to be guarded by Latin monks, while the Turks thought that they ought to be guarded by Greek monks. England quite rightly declared war on Russia, who immediately occupied Rumania. The war was consequently fought near Persia/

Here was a further declension of Ottoman power, since a committee of European nations now had the right of intervening in the internal affairs of a portion of the Turkish Empire. It should also be noted, however, that the territory of Mount Lebanon, being limited to the higher parts of the northern Lebanon range, was cut off from the sea, and contained no important towns. Baabda, a village on the out-

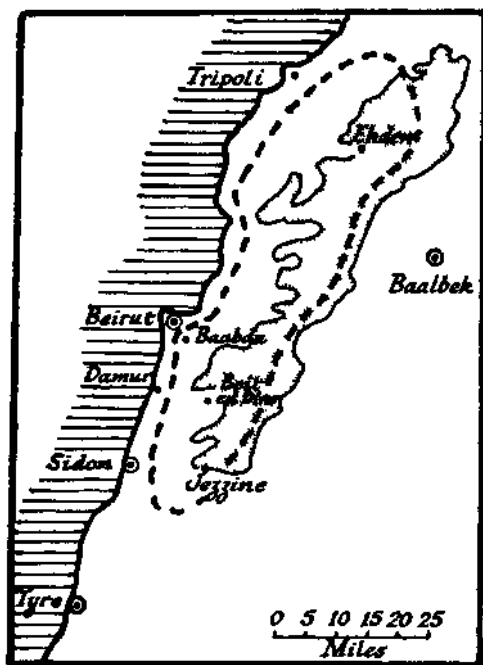


FIG. 27. The Maronite Homeland.
Highland over 5,000 ft. stippled.

skirts of Beirut, served as a winter capital, and Beit-ed-Din, a mountain settlement, seat of the former Emirs of the Lebanon, fulfilled a similar function in summer.

Reference has previously been made to the growth of Arab as distinct from Turkish nationalism during the last century; and by 1914 a number of secret societies designed to advance Arab nationalist aims were in existence, chiefly in Damascus and Beirut. When war broke out between Turkey and the Western Powers, these societies attracted the attention of

Britain, and encouragement of Arab nationalism both in Syria (i.e. Syria in 1914, which included Palestine and Transjordan) and Arabia proper came to be appreciated as a useful political weapon in the struggle against Turkey. A small group within the Allied armies in the Middle East was allotted the task of fostering Arab revolt against Ottoman overlords by means of monetary subsidies and small-scale military assistance, and best known of this group was T. E. Lawrence, whose outstanding qualities largely contributed to the success of the Arab rising.

It was, however, quite apparent that the development of Arab nationalism was far from being the sole Allied war aim in the Middle

East. With Britain, France, and Russia now finally committed to attempting a complete break-up of Ottoman power after decades of hesitation, suspicion, and mutual jealousy, it became essential to make political provision for the future of the Middle East. A further complicating factor was the position of Italy, who although party to a treaty (the Triple Alliance) that ranged her on the side of Germany and Austria, showed no enthusiasm for the cause of her allies. It therefore became an object of Franco-British policy to detach Italy from the Triple Alliance. For some time previously, Italy had joined in the struggle for overseas colonial territory. Repulsed during the 1880's in Tunis, and in 1896 in Abyssinia, she was more successful in Libya, where, during Turkish preoccupations in the Balkan wars of 1910-12, a hold was gained on the northern coastlands of Tripolitania and Cyrenaica.¹ Moreover, Italy had also at the same time seized the Dodecanese Islands of the Aegean, and came to possess important economic advantages in Asia Minor, notably a concession for railways in the Adana region, and a large interest in the coal basin of Eregli-Zonguldak.

Both the Allied and Central Powers made efforts to win Italy to their side by the promise of territory in Europe and Asia ; and as in the long run the former group could offer most,² Italy finally entered the war in 1915 as an ally of Britain and France. Part of the price were substantial concessions in Asia Minor and the Levant; and a number of secret agreements were drawn up to delimit the spheres of influence of Allied powers. As the war proceeded, it later became important to secure Greek adhesion to the Allied cause—accordingly, Greece was offered an interest in the Smyrna district of Asia Minor, which held a large Greek-speaking population. The Dodecanese islands, also Greek-speaking, and strongly Hellenic in culture, remained outside this offer, and Italian control remained until the peace treaty of 1947.

In 1916, an agreement (the Sykes-Picot Treaty) was drawn up between Britain, France, and Russia, by which each country was to receive various territories either in full possession, or as spheres of influence in a reduced Turkish state. Under this treaty, Britain at last

¹ The Sanussi of Cyrenaica, supplied during 1912-14 with clandestine arms by the Turkish government, were able to hold up further Italian advances towards the interior until 1918. The occupation of Libya could not be said to be fully effective until 1932.

² Germany was in the unfortunate position that her two principal allies, Austria and Turkey, were precisely those countries from which Italy was most interested in obtaining territory. Hence German bargaining powers were sharply limited.

brought herself to acquiesce in Russian expansion into eastern Asia Minor, and in the Russian control of the Bosphorus and Dardanelles ; France was to fulfil an ancient ambition by acquiring Syria and a large region of southern Anatolia ; whilst Britain obtained control of Mesopotamia and part of Palestine. The Sykes-Picot agreement

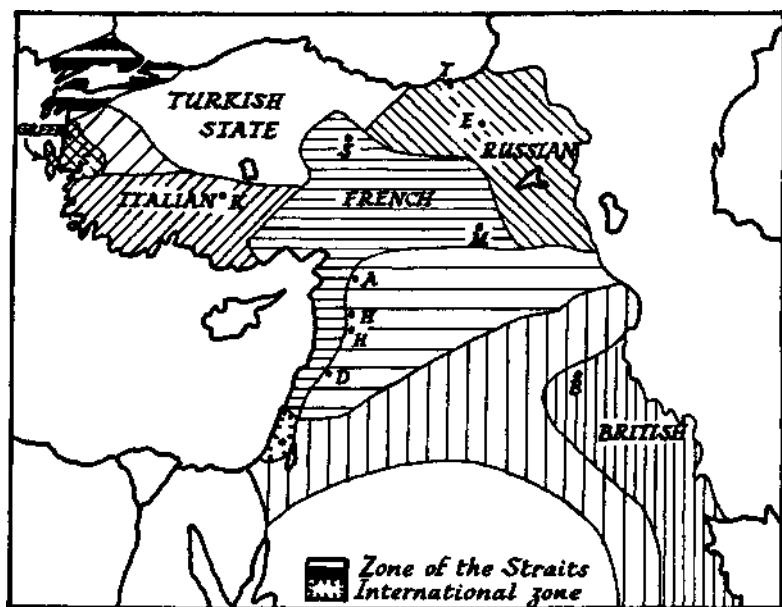


FIG. 28. Proposals for Partitioning the Ottoman Empire, 1914-20. Zone of the Straits as proposed in 1920. Close shading—absolute control by country named. Open shading—sphere of influence for country named.

remained a dead letter, however, since Czarist Russia collapsed in the following year, before Turkey was defeated, and the treaty is interesting only as reflecting the balance of power as it existed in 1914-16 between the three countries.

With the defeat of the Ottomans in 1918, it seemed as though the end of Turkey as a state was at hand. Despite Russian preoccupations, which prevented her claiming her allotted share in the division of the country, British, French, Italian, and Greek influence was paramount, and the Treaty of Sevres, proposed as a political re-settlement of Asia Minor in 1920, would have resulted in a virtual extinction of Turkish power. In effect, the position of Britain, France, Italy, and Greece as previously defined in 1914-16 was to continue unaltered ; new elements were that the zone of the -Straits, formerly allocated to

Russia, were to pass under international control, and American interest in Armenian problems led to a proposal that an independent state of Armenia, with boundaries defined by President Wilson, should be created in the former Russian zone of eastern Anatolia. The Treaty of Sevres can be regarded as the high-water mark of European intervention in the Middle East—had it been implemented, practically the whole of the Middle East region, except for Iran and inner Arabia, would have fallen under foreign domination or influence.¹

Faced with the possibility of near extinction as a political unit, the Turks rallied, and, owing partly to division between the Allies (especially as affecting Britain and France), partly to general war-weariness, and partly to their own courage, sustained by desperation, an unlooked-for revival of Turkish power occurred under the leadership of Mustapha Kemal Pasha. After some months of fighting, the French withdrew claims to the part of Anatolia allotted to them under the Treaty of Sevres, though certain commercial privileges giving France a leading position in these provinces were retained. A year later the Greek-held city of Smyrna was taken by storm, and a large Greek population, numbering over half a million, fled to Greece or was forcibly expelled—many being literally driven into the sea, or massacred. The total of Greek deaths is estimated at one million. In this manner a great measure of ethnic and political unity was achieved in western Asia Minor, though at a heavy price both in human suffering and in economic disruption. The former Greek population was highly skilled, and formed the greater part of the artisan and trading classes in Turkey—communities that the new state, deeply involved in reconstruction problems, could ill afford to lose.

In the east, the Armenian question had been to some extent resolved by massacre of large numbers of Armenians by the Kurds; and outside military support from one of the great nations would have been necessary in order to erect a separate Armenian state. This support was not forthcoming; and to date the nearest solution of Armenian problems—though hardly one which is satisfactory to all Armenians—has been the creation of an Armenian Soviet Republic within the Soviet Union. Hence, untouched on the east and victorious in the west, the new Turkish state was able to negotiate a

¹ Some exception to this generalisation might have been made had an independent state of Armenia come into existence, but it is doubtful whether in the end even an Armenian state could have escaped falling under the influence of a larger nation such as Russia, Britain, France, or even the U.S.A.

more advantageous peace settlement, the Treaty of Lausanne (1923), by which control of Asia Minor and the adjacent area of European Turkey remained firmly in Turkish hands. Since that time Turkey has developed further in internal strength, as the result of fundamental social and economic reforms undertaken by Kemal Pasha. Though, however, the problems affecting Turkey during the last twenty-five years have mostly been those of internal development, difficulties in foreign relations have persisted. Russia, Britain, and for a time Germany and Italy have shown, by their interest in Turkish affairs, that the importance of the latter country in Mediterranean politics still remains, and since 1945 the traditional British role of opposer to Russian expansion at Turkish expense has increasingly fallen to the United States.¹

The Levant.—In enlisting Arab help (as an 'irregular right wing' on the flank of the Turkish army) against the Ottomans during 1914-18, the promise was made by the British that Arabs should achieve independence and sovereignty in Arab lands captured from the Turks. A reservation was, however, made in the case of Palestine, concerning which promises had also been made to the Jews. Following the entry of the Arabs into Damascus in 1918, the Arab leader Feisul took over, with British acquiescence, control of government in Syria. France had long entertained the ambition to rule in Damascus and Aleppo, and, not being a party to the negotiations between Britain and the Arab leaders, considered herself free to follow another policy in Syria.

During the peace conference of 1919, there was much discussion, at times acrimonious, concerning the final division of responsibility in the Levant.² Britain had binding engagements towards both Arabs and Jews, and was herself interested in Mesopotamia and the oilfields of the vilayet of Mosul. France was at the same time passionately determined to 'fulfil her destiny' in Syria, and, in 1920, after some months of uneasy joint occupation of the Levant by British and French troops, during which time France became increasingly mistrustful of the presence of Feisul's government in Damascus, the French determined to bring Syria more effectively under French control. Following

¹ In 1948 the sum of \$50,000,000 was voted by the American Congress for 'military aid' to Turkey and Greece.

² It is significant to note that a Peace Conference Commission, composed solely of American members because of the non-participation of the French and the withdrawal of British delegates, reported that local feeling in Palestine and Syria was for the grouping of both regions as a single political unit.

the proclamation by Arab nationalists of Feisul as king of an independent Syria, the French undertook a military campaign to expel him, and with the defeat of his army outside Damascus, Feisul was forced to leave the country. Thence onwards, Syria was administered under mandate, as a federation of territorial units. This scheme, by which six theoretically autonomous political units were created, proved unworkable after a few years, and was later modified.

The ruling of Syria proved an onerous task, and relations between France and the local population were rarely harmonious. One major rebellion took place in 1925, when French hold over Syria was severely shaken for some months. During the next fifteen years Syrian exasperation mounted as first Egypt and then Iraq shook off British tutelage, the former by the treaty of 1924, the latter by the ending of the British mandate in 1932. A treaty reducing French influence in Syrian affairs had, however, been negotiated during 1938 ; but this was rejected by the French Chamber of Deputies in Paris, and the war of 1939 began with Syria firmly held as a part of French overseas possessions. In 1941, with the occupation of metropolitan France, Syria came to be used as a German base for operations in the Middle East. When this trend became apparent, British and Free French forces invaded Syria, and after some months of fighting occupied the country. It was stated at the time of entry of British and Free French troops that Syrian and Lebanese independence would be recognised,¹ but for some time, partly because of the exigencies of war, no action was taken to make this independence effective. In 1944, when the tide of war had receded from the Middle East, differences between Free French and Syrians once more became acute ; and in the following year open military clashes occurred. The French undertook a bombardment of Damascus, in order to reduce the main centre of Syrian nationalism ; at the same time French garrisons in some other towns of Syria were made prisoner by the Arabs. A large-scale rising, involving the whole of Syria and the Lebanon, seemed imminent ; and in view of the importance of Syria as a part of the corridor linking Europe to the war areas of the Far East, the British Government decided to intervene.

British forces in Syria were increased, and energetic steps taken to end the military clashes in Damascus and elsewhere. Within a

¹ Declaration by General Catroux, commander of the Free French forces, at Damascus, September, 1941. It should be noted that on occupying Syria, the Free French authorities assumed full control of the country, as the legal rulers recognised by Britain.

year, both French and British forces had been withdrawn from Syria, and complete independence was at last attained, with a formal ending of the Mandate and the creation of sovereign republics of Syria and the Lebanon.

Palestine.—At the same time that France received a Mandate for Syria, Britain was also allotted a similar Mandate for Palestine and the region lying east of the Jordan river. In the former area Britain was committed to what has since proved the impossible task of creating a 'National Home for the Jews', without prejudicing the rights of Arabs living there; in the latter, a purely Arab area, the Emir Abdullah, a younger brother of the Emir Feisul, was proclaimed ruler of a state of Transjordan, under British Mandate. Though small and poor, the country of Transjordan has proved one of the more stable political units of the Middle East, and after some twenty-five years as mandated territory, during which a slow but consistent development has taken place, the full independence of Transjordan was recognised in 1946.¹

In Palestine, on the contrary, unrest and disturbance have been conspicuous features. Large-scale immigrations of Jews gave some apprehension amongst the Arab majority that Palestine would eventually become a predominantly Jewish area; and ground was later given for this apprehension as the earlier Jewish call for 'refuge' and 'a home' in Palestine turned after 1940 into more insistent demands for a sovereign Jewish state. Although during the first decade of the Mandate conditions were relatively quiet, and considerable economic development took place, Arab mistrust later culminated in widespread riots with the object of securing a reduction of Jewish immigration, which, following the persecution of Hitler, had shown a marked increase after 1933.

This disorder and rioting achieved a certain success in that a limit (75,000 persons within five years) was placed on Jewish immigration, but the lesson that the Mandatory power was amenable to influence by rebellion and armed revolt was not lost on the minority group in Palestine.² During the war of 1939 arms and ammunition were accumulated by both Arabs and Jews, and with the end of warfare in 1945 the extremist section of the Zionists opened a campaign of

¹ Close political relations with Britain are maintained, under a Treaty of Friendship negotiated in 1946.

² 'The Jews in Palestine are convinced that Arab violence paid.' Report of the Anglo-American Committee of Inquiry, 1946.

terrorism and intimidation to effect a return to unrestricted Jewish immigration, as the first step to the final objective of a Jewish Palestine.¹

In 1947 the question of settlement in Palestine was referred to the United Nations Organisation, and a Commission—the nineteenth in twenty-five years—once more surveyed conditions in the country. The report of the Commission was in favour of partitioning the country between Arabs and Jews : Jerusalem, because of its sacred character to Moslems, Christians, and Jews alike, was to be placed under international control, but the remainder of the country was to be divided into six regions, three Arab, and three Jewish.² In August 1948, the last British forces were withdrawn from Palestine, the Mandate having ended officially in the May previously. Palestine became a battle-ground between Jews and Arabs, and, at the time of writing, the outcome of future sovereignty is impossible to foresee.

Iraq.—Though strictly speaking the region cannot be considered as part of the Levant, it is convenient at this stage to discuss the political evolution of Iraq, since, like the Levant states, the present political unit came into existence after the Versailles settlement of 1919. It was to a great extent inevitable that control of the lower valleys of the Tigris and Euphrates should fall to Britain. River navigation and rail communications had for long been in British hands ; the development of oil in Iran had enhanced the value of the river ports of the Shatt el Arab ; and British influence was paramount in the Persian Gulf.

Britain was first allotted a Class C Mandate for Iraq south of latitude 3° N.³, and shortly afterwards, the Emir Feisul was elected king by almost unanimous plebiscite. Thus Britain could claim that promises made to Arab nationalists were to a great extent fulfilled—

¹ This movement in favour of unrestricted immigration from Europe into Palestine had a certain amount of support from France, Russia, and the U.S.A. In all three countries motives were mixed—there was a humanitarian desire to help the distressed Jews of Central Europe, freed from persecution in Hitlerite Germany ; but there was also some tinge of political animus against Great Britain, as the result of which none of the three countries was wholly averse to witnessing an increase in Britain's difficulties. France, in particular, had reason to recall the events of 1945 in Syria, and the part Britain had played in bringing about the end of the French mandate.

² A minority report of the Commission recommended a single federal state in Palestine, with certain areas set aside as Jewish, into which unrestricted immigration would be allowed.

³ A Class C Mandate—under which Syria and the Lebanon, Palestine, Transjordan, and Iraq were all held—envisaged a limited term of rule by the Mandatory, following which independence would be granted.

states ruled by the leaders of the revolt, Feisul and Abdullah, had come into existence, though subordinate for a limited term of years to a Mandatory power.

Some difficulty was experienced in regard to frontiers. In the south-west, the population is almost entirely nomadic, so that tribes spend part of the year in territory claimed by Iraq, and the other part in territory claimed by Ibn Saud, ruler of Arabia. Eventually, a number of agreements were arrived at regulating boundaries in Iraq, Transjordan, Palestine, and Saudi Arabia, by which certain tribes were allocated to each country, and the passing of caravans and merchants controlled. An interesting feature, related to the seasonal movement of tribes, was the creation of a lozenge-shaped neutral zone on the borders of Iraq and Saudi Arabia. On the north, a frontier was not fully defined until 1926, when the Mosul vilayet was finally awarded to Iraq.

Though the British Mandate ended in 1932, and a treaty negotiated by which Iraq took over full powers of government,¹ the political evolution of the country can hardly be said to have been of the happiest. The death in 1933 of King Feisul, a sagacious and far-seeing ruler, was a great loss to his country, since his attempts to develop a broad unity of sects and parties with a high standard of probity and disinterestedness were not continued to the same degree after his death. A massacre of Assyrian Christians by Kurds, allowed to pass unpunished by a Moslem cabinet, gave point to an opinion expressed abroad that Britain had relinquished her Mandate too soon; and since 1934, Iraqi politics have tended to be controlled by what has been described as a Sunni clique of landowners, officials and townsmen, governing a rural population of Shi'ites, for whom they have little sympathy or conscious bond.² A disturbing feature has been the importance of a militarist group within the cabinet, and it was this group that in 1941 attempted a pro-German coup against British forces in Habbaniya, leading to a short seige. Following energetic British intervention, the militarists were at least for a time dispersed and subdued. With such a political background, however, prospects for the future development of Iraq as an enlightened and prosperous state cannot be said to be wholly favourable.

¹ Britain retained the right to maintain certain airfields in Iraq.

* Within the last twenty-five years, Iraq has had some thirty cabinets, drawn from about sixty politicians.

IRAN

Events in Iran have been influenced by the internal decline of the country from the position of great strength in the eighteenth century, when northern India was held as a Persian dependency ; and by the accompanying rise of Russia as an imperial power. By the end of the eighteenth century a Russian advance south-eastwards had absorbed the Tartar tribes of the lower Volga region, and had begun to extend along the western shores of the Caspian Sea, directly threatening Iran. In the first years of the nineteenth century Iranian-owned territory was reached with the occupation of Georgia, and further Russian gains at the expense of Iran seemed likely.

During this time, however, the Emperor Napoleon had developed a number of schemes of conquest in the Middle East and India ; and as Russia was at this period hostile to France (1804-07) a treaty was negotiated with the Shah of Iran by which a French military mission undertook the training and re-equipping of the Iranian army (Treaty of Finkenstein, 1807). This reorganisation under French direction did little to save Iran, however, since in two wars with Russia during 1804-13 and 1825-28 the Iranians suffered a series of disastrous defeats which marked the end of effective Iranian military power in Asia.

French interest in Iranian affairs provoked counter-measures from Britain, and when in 1807, after the Treaty of Tilsit, French policy veered round to friendship with Russia, French influence in Iran declined. In 1814 a defensive alliance was concluded between Britain and Iran, by which Iran was to assist at need in the defence of Afghanistan, in return for a money subsidy.¹

Despite this alliance, Iran lost much territory between 1804 and 1828. As we have seen, the ruler of Georgia, formerly a client of the Shah, was forced to accept Russian suzerainty in 1800, and Iranian attempts to recover Georgia led to the loss of further territory. By the Treaty of Turcomanchai, which closed the war in 1828, Iran was forced to agree not only to the loss of Georgia, but also of the districts of Erivan and Lenkoran ; to the payment of an indemnity to Russia ; and to the grant of capitulatory rights within Iran to Russian citizens.² It was this treaty that brought into existence

¹ It should be noted that this treaty was directed against France, who had recently threatened India. Nothing was stipulated regarding Russia, with which Britain was at the time an ally, in the war against Napoleon.

² Capitulations had previously been granted to British nationals during the seventeenth century.

the present Russo-Iranian frontier between the Black Sea and the Caspian; and thence onwards, Iran was never again able to face Russia on politically equal terms.

Thus reduced in influence, and unable to resist either Russian or British inroads on her sovereignty, Iranian diplomacy has aimed at

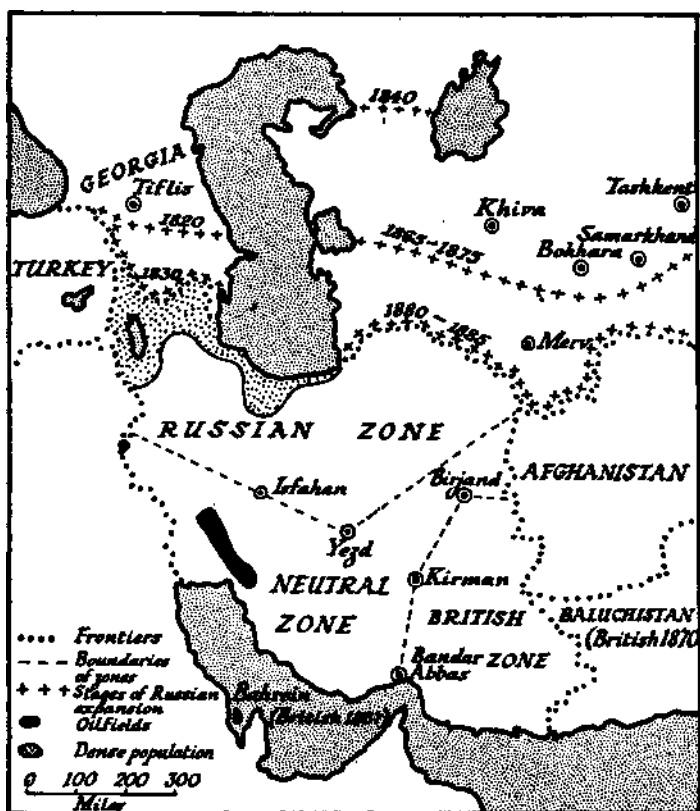


FIG. 29. Russian Expansion, and Spheres of Influence in Iran (1907).

playing off one country against the other. Unable, since the Treaty of Turcomanchai, to counter either power directly, the most that Iranians have hoped to achieve is a stalemate between the two. This situation has been the fundamental feature in Iranian affairs down to the present day, and although one side has at times gained a temporary advantage, the balance has in the main been preserved, and still continues its uneasy existence.¹

¹ A recent feature is the participation of the U.S.A. in Iranian politics as an opponent of Russia.

With the western shores of the Caspian occupied, the Russians were free to turn their attention to the east; and, after 1840, a series of aggressive expeditions brought Turcoman and Uzbeg tribesmen living in the Aral region under Russian rule. In 1864 Tashkent was taken, in 1868 Samarkhand, in 1873 Khiva, and in 1876 Khokhand. The final state was reached between 1880 and 1893, when the northern slopes of the Kopet Dag ranges were occupied, and Merv, loosely held by Iran, passed to Russian control. A series of boundary commissions fixed the final Russo-Iranian frontier east of the Caspian Sea, as the result of which the fertile lower slopes of the Kopet Dag were allotted as part of the Russian Empire, to the disadvantage of Iran.

During the same period, the Iranian frontier with Afghanistan was demarcated by a number of British officials ; but Iran remained dissatisfied, and the question was finally settled by a Turkish arbitrator during 1934-35. On the west, the ancient indefinite frontier zone between the Ottoman and Iranian states was precisely delimited by an Anglo-Russian commission, following which a small area now developed as the Naft Khaneh oilfield passed under Turkish (later Iraqi) ownership. A curious feature was the allocation of the entire Shatt el Arab to Turkey (Iraq), with the frontier on the eastern bank, to the detriment of Iran, and not down the centre of the waterway, as is more usual. Iran is thus without control of port facilities in the river delta region of Iraq, and has been forced to develop her own terminals on the shores of the Persian Gulf.

With Iran closely enveloped on the north, attention subsequently shifted to the Persian Gulf, where at first Iran found herself strong enough to maintain or even extend her hold over a number of islands (Qishm, Hormuz, Larak and Henjam). Here in the south, though, the influence of sea-power based on India gave to Britain a specially advantageous position; and on the southern shores of the Gulf a number of Arab sheikdoms (Bahrein, Kuwait, Muscat), were induced to accept British protection. One reason for British interest in the Gulf was the prevalence of slave-trading, with victims seized from East Africa and Baluchistan. Other prominent activities were gun-running and piracy ; and it was largely owing to British efforts that all three practices were more or less suppressed.

In the last few years of the nineteenth century, Russian eyes were turned towards the Persian Gulf as a possible site for a warm-water port. This provoked strong reaction from Britain, and Russia was

directly warned that attempts to establish her influence in the Gulf would be forcibly resisted (Curzon Declaration of 1902).

Within Iran itself, however, the situation was very different, being by far the more favourable for Russia, which directly enveloped Iran on three sides. It therefore seemed credible to assume at the beginning of the twentieth century that the whole country would ultimately fall under Russian influence—Russian traders were most numerous in the region, the rich Caspian provinces, with valuable sturgeon fisheries, were tending to become economic dependencies of Russia, and, as a symptom of the control exercised by Russia, we may note the fact that Russian opposition successfully prevented Baron de Reuter from obtaining a mining concession in Iran (p. 235). The long-continued expansion of Russian power was, however, checked by the Russo-Japanese War of 1904, which revealed unsuspected Russian weakness ; and in 1907 a compromise was arrived at over Iran by which the country was partitioned into three zones, one Russian, one British, and one neutral¹ (Fig. 29). Russia held exclusive rights concerning economic matters within her own zone, as did the British in the south, and both nations were free to seek concessions and influence in the neutral centre zone.

As at first drawn up, the Treaty of 1907 seemed to give by far the greater advantage to Russia, since the Russian zone included most of the towns and the fertile land of Iran. But the subsequent discovery of oilfields in the neutral zone, and their development by British capital with the British government as a large shareholder made the entire neutral area in *effect* a British preserve, thus restoring the balance. Once again, Britain and Russia were able to confront each other in Iran on equal terms.

With the outbreak of war in 1914, Iran, though ostensibly neutral, found herself immediately involved, as both warring sides fought across her territory. A Russian attack on north-eastern Turkey, partly over Iranian soil, provoked a counter-attack by the Turks in the district of Lake Urmia ; whilst further south, Turkish armies attempted to penetrate from Mesopotamia through the Zagros Mountains by way of Kermanshah. From the start British forces had occupied the head of the Persian Gulf in order to protect the oilfields of south-west Iran ; and Turkish and German agents attempted to embarrass the British by fomenting guerilla warfare and attacks on the oilfields

¹ Another reason for the conclusion of the 1907 Treaty was the rise of an aggressive Germany—a potential enemy both of Russia and of Great Britain.

by nomadic tribes living in the Zagros. These attempts were on a considerable scale * and gave anxiety on many occasions.

British intervention in Iran increased after the Russian collapse in 1917, and a British force was sent to north-west Iran to resist German and Turkish pressure in the Caucasus district. This force, under General Dunsterville,² was supported at first by scattered White Russian units, so that the British became increasingly at odds with the newly-formed Bolshevik armies, and events finally reached the stage of active warfare between Britain and Soviet Russia.

This friction gave favourable conditions for a revival of Iranian strength, and from 1919 onwards a marked improvement began. The revival, like that in Turkey, was fostered by an ex-army officer, Riza Khan, who by means of a *coup d'état* in 1921 marched on Teheran and seized power from the hands of a feeble and bankrupt Shah. A treaty, remarkably favourable to Iran, was negotiated with the Russians, who relinquished all their commercial and economic rights in Iran, with the exception of control of the Caspian fisheries. Strengthened in this way, Riza Khan was able first to undertake a reduction of British influence, and later, a pacification of the tribal areas, which had for long been almost independent of Teheran. Kurds, Lurs, Qashqai, Bakhtiari and Khuzistan tribesmen were in turn subdued by military force ; and thus, master of Iran, Riza Khan was able to secure the deposition of the reigning Shah, and to assume the title himself (1925).³ One will note the close similarity between events in Iran and the policy of Kemal Pasha, whose activities in Turkey were an example and stimulus to his fellow autocrat in Iran.

After 1925, Riza Shah embarked on a policy of extensive modernisation. Besides enforcing the wearing of European dress, and the emancipation of women, attention was paid to expanding economic life by the development of modern industry. Perhaps most important of all, since the greatest number of people were involved, numerous nomadic tribesmen were forcibly settled and compelled to adopt cultivation as a livelihood. There was in this an underlying political motive—as a sedentary population, the tribesmen would be less independent and troublesome.

At the outset of his reign, Riza Shah achieved many beneficial

¹ It is interesting to note that whereas in 1914-18 German agents took on the guise of * archaeologists *, in 1939-42 they were ' tourists *—a possible sidelight on social changes in Europe during the intervening years.

² Kipling's *Stalky*.

³ Riza Khan took the title of Riza Shah Pahlevi—an emphasis on the purely native origin of the new ruler. (Pahlevi means Iranian.)

results: stagnant life in Iran revived, and a certain amount of prosperity returned. It seemed that the country might successfully follow the example of Turkey in surviving the upheavals of the early twentieth century, and in adapting herself to modern conditions. But Riza Shah became increasingly tyrannical, and his heavy financial exactions were less and less devoted to benefiting the affairs of state—instead, an increasing share of the national wealth was diverted to his private usage. By the outbreak of war in 1939, he had lost much of his early hold on the Iranian people, and when in 1941 he refused to expel German agents at the request of Britain and Russia, he overestimated the strength of his own position. Under stress of events in Europe, Anglo-Russian differences were temporarily forgotten, and for Iran it was no longer possible to follow the traditional plan of playing off the two rivals one against the other. A joint Anglo-Russian invasion followed, and the Shah was deposed, to be succeeded as ruler by his son.

During the war years, 1941-45, Iran became an important supply base for the Middle East, particularly as regards the transference of materials to Russia. Roads and railways were built on a relatively lavish scale to link the Persian Gulf and Russia ; but this economic advantage was offset by a considerable volume of inflation, as the result of which prices rose by 1,000 or 1,500 per cent. With the end of the war, Iran found herself once again subjected to pressure from outside. In addition to the long-standing rivalry of Russia and Britain, intensified if anything as the result of a temporary lull during 1941-45, America has begun to show a close interest in Middle Eastern affairs, particularly from the strategic aspect, as a counter to Russian influence, and also as regards the ownership of oil concessions (Chapter XI). Recent unrest and outbursts in tribal areas in Iran (especially Iranian Azerbaijan), coupled with demands for regional autonomy, and the creation of a vigorous and vocal political party, the Tudeh, with pronounced communistic views, have had the sympathy, if not a certain measure of active support, of the Soviet Union. By supporting dissident elements within the Iranian state, Russia is in a strong position for economic and political bargaining, and it was against a background of unrest within Iran that Russia was able to negotiate a comprehensive oil concession covering the northern part of the country.¹

¹ Though negotiated, the Iranian Prime Minister was able to defer actual operation of the concession by a series of subterfuges and politic delays.

The situation is not improved by the decline in internal strength which has followed the abdication of Riza Shah. Governmental power is weak, internal economic conditions have deteriorated because of inflation during the war years, and with the strong hand of Riza Shah removed, there has been a recrudescence of tribal independence. A slight, but significant feature is that some Iranian women have resumed the veil when appearing *in public*. How far, in the face of internal weakness, Iran will be able to maintain political independence, subject as she still is, to competing imperialisms, time alone will show.

ARABIA

The peninsula of Arabia long remained, as the result of isolation and poverty in natural resources, for the greater part outside the main sphere of imperialist influence. It was only on the coast that European occupation occurred—Britain, anxious to secure bases for her sea routes to India, obtained control of the Aden district in 1839. Further British expansion in Arabia followed, with the double aim of ending slave-raiding and also as a counterpoise to Russian designs in Iran. With the southern shores of the Persian Gulf in British hands, Russian influence in the north could be checked, and the route to India safeguarded. Hence a number of treaties were negotiated with the Sheikhs of coastal territories in Arabia, by which British protection was accepted, but internal affairs were left to the jurisdiction of native rulers. This was a policy *par excellence* of 'marginal control', and the precise degree to which British influence extended inland was never fully defined.

In the interior, Turkish hold on the tribes was shadowy and precarious even after the Ottoman revival under Abdul Hamid II. Away from the garrison towns of Mecca, Medina, and Sa'ana tribal government and intertribal rivalry and warfare persisted. Most important of the non-Turkish rulers in Arabia at the beginning of the twentieth century was King Hussein, Sherif of Mecca, Hereditary Guardian of the Holy Places of Islam, and direct descendant of the Prophet Muhammad. In 1914, Hussein was persuaded to take up the cause of Arab nationalism, and though Hussein himself had no active share in the fighting, his son Feisul assumed command of the Arab army that conducted irregular operations against the Turks in Arabia

and Syria ; and it was to this army that T. E. Lawrence was attached during the campaigns of 1914-18.

The early years of the twentieth century also saw the rise of a second Arab leader in Arabia. This was Abdul-Aziz ibn Saud, formerly an indigent and dispossessed chieftain of the uninfluential Wahhabi sect, who were regarded with suspicion and some derision as ultra-reactionary upholders of a primitive form of Islam. The energy and skill of Ibn Saud brought him and his followers, as time went on, to a commanding position in Arabian affairs ; and, after the war of 1914, the Wahhabi were able to dispute with the Sherif Hussein the leadership of Arabia. In 1925, Ibn Saud defeated the Sherif, who retired to Cyprus ; and for the first time in many centuries the interior of Arabia was united under a single ruler. It is noteworthy that the association of King Ibn Saud with the British has been less close than in the case of the Sherif Hussein. Although Ibn Saud accepted British subsidies during 1914-18 to fight against the Ottomans, he has at times forcibly opposed British policy in Arabia ; and in the Sherifian-Wahhabi war of 1925 he overthrew a ruler who had strong claims on British support. Generally speaking, King Ibn Saud has pursued a strictly Arab policy, and the British, as the foreign power most deeply interested in Arabian affairs have at times been regarded with some suspicion.¹

Apart from Aden and other British protectorates in the coastlands of southern and eastern Arabia, and the Saudi kingdom with its capital at Riadh, the only other separate political unit in the Arabian peninsula is the Imamate of the Yemen. Difficulty of access—the greater part of the country is well over 5,000 feet in height—and scantiness of resources have aided the Yemen in maintaining an aloofness from the currents of foreign penetration that have been so active elsewhere in the Middle East. During the decade before the war of 1939, an attempt was made by Italy to develop interests in the country in opposition to British influence in Aden and the Red Sea ; and for a time, it seemed possible that following on the occupation of Abyssinia and Eritrea, the next stage in Italian expansion might lie in the Yemen. In 1943, however, Italian influence in Arabia came to an end.

¹ How far Ibn Saud was impelled by these considerations to grant oil concessions during the 1930's to American rather than to British interests is a matter of some doubt. It has been said that Ibn Saud may have opted for the country situated furthest away from Arabia ; but on the other hand, it may also seem that the British had an opportunity which they declined to take (Twitchell).

PRESENT POLITICAL GROUPING

It has largely been inevitable that the present national frontiers, drawn in lands where sectarian and social divisions are strong, and where political consciousness is merely in the first stage of development, should in some instances give incomplete realisation to the political needs and aspirations of Middle Eastern peoples. Although it is probably impossible to devise frontiers which would be even moderately satisfactory in this respect, present boundaries offer a number of outstanding difficulties. Palestine is a problem on its own, but in addition three other communities—the Kurds, the Armenians, and the Assyrian Christians—find themselves without a political future, and present special problems to the national governments of the various states in which they live.

The Kurds are a semi-nomadic pastoral people, living in the highlands of eastern Anatolia and the north-western Zagros. Transhumance between summer pastures on the higher mountain slopes, and winter quarters in the valleys and lowlands (sometimes involving movement between widely separated districts), has brought the Kurds into conflict with the four national governments, because their homeland is now divided among Turkey, Syria, Iran, and Iraq. It has been said of this people that they have claims to racial purity and to continuity of culture that are stronger than those of any European nation, since the Kurds have been settled in their present home since about 2400 B.C. ; but the term * culture' must be taken in a limited sense, for the Kurds are renowned as a fierce and predatory people, and their social organisation has not progressed beyond the level of tribal grouping. Their occupation of eastern Anatolia and the northern Zagros has given them command of a number of important trade-routes, from which they have derived considerable revenue by means of heavy exactions on trading caravans. The Kurds have the reputation of being pre-eminently a people that it is unsafe to trifle with, and their tendency to shoot on sight at moving objects has kept outside interference to a minimum.¹ Even the Ottoman Turks could do little to subjugate them, and they remained free from Turkish taxation and military conscription.

The Kurds were, however, employed by the Turks as agents in persecuting Christian minorities—chiefly the Armenians. The Kurds

¹ This is the verdict of a succession of travellers in the region, from Alexander the Great and Xenophon to Marco Polo and the Peace Treaty Commission of 1919.

claim the right of wintering in the Christian villages of Armenia, and, as fanatical Moslems, they indulged on occasion in massacres of their unwilling Christian hosts—this often with the connivance or tacit approval of the Turks, who were not reluctant to see the Christian communities of Asia Minor decrease in numbers.

For obvious reasons, detailed figures as to the number of the Kurds are not available,¹ but estimates, some of them much out of date, give a total of some 3 millions, distributed as follows :

Turkey	1,250,000
Iraq (1924)	494,000
Iran	700,060
Baluchistan	350,000
Transcaucasian Russia (1911)	125,000
Syria	100,000
Afghanistan	20,000

The Kurds cannot be said to have any advanced political feeling, and, even less than the Badawin Arabs, have rarely been able to combine for long in a stable, large-scale political organisation. Individualism and local tribal feeling are the chief characteristics. Kurdish political activity has been negative : that is, strongly against any other group that has tried to rule them, and their predilection tends to be anti-governmental, whatever the composition of the latter may be, rather than for pro-Kurdish aims. Since 1923 there have been ten serious revolts by the Kurds against various national governments—two against Turkey, four in Iran, and four in Iraq. One of these, in 1947, made use of weapons looted from Iranian military depots. Such revolts lend themselves to intervention by outside powers; and an American view² is that a Kurdish revolt against Iran in 1942 had tacit support from Russia, with the aim of embarrassing the Iranian government. Little was finally achieved, however : one factor may have been the importance at the time of American lease-lend supplies to Russia, as the result of which the U.S. was able to exert some moderating influence on Russian policy.

Since 1927, a Kurdish independence movement, the ' Khoibun', has been in existence, but its activities have hitherto had little success, the main obstacle being jealousy, division, and lack of co-operation among the Kurds themselves. An attempt was made to enlist

¹ In modern Turkish statistics the Kurds are described as ' Mountain Turks '.

² That of Professor W. L. Westermann.

Armenian and Assyrian support for the movement, but such a move, in view of the past record of the Kurds, was bound to fail.¹

The Armenians formed a majority in certain parts of eastern Asia Minor, where, in sharp contrast to the Kurds, they lived as settled peasant cultivators, exploiting the occasional patches of richer land on valley floors. A markedly high birthrate, coupled with lack of opportunity in their homeland, led to much emigration, so that Armenians are also found in other parts of the Middle East, and to some extent in Europe and America. Again, unlike the Kurds, the Armenians outside Armenia have settled as townspeople, and their frequently high level of intelligence has made it possible for them to enter commerce and the skilled professions. A relatively large proportion of the trade of the Middle East is carried on by Armenians, and many Armenian musicians, teachers, lawyers, doctors, and dentists are to be found.² In some respects, therefore, and particularly by reason of their interest in commerce, and their mental and artistic ability, the Armenians can be compared with the Jewish people.

During the war of 1914-18 the Armenians, as Christians, gave support to the Czarist armies against the Turks, their overlords; and, following the retreat of the Russians in 1915-16, the Armenians were exposed to Turkish vengeance. About half a million of the former were massacred by the Kurds, at the instigation of the Turks, and a larger number saved themselves only by flight—either into Russia, or into Iraq and Syria. There are now between 2,500,000 and 3 million Armenians in the U.S.S.R., including 1,281,000 (1939) in the Soviet Socialist Republic of Armenia, which centres on the city of Erivan.

In other adjacent regions, especially Iraq and Syria, the Armenian refugees were not particularly welcome, as imposing an extra burden on scanty local resources, and also as swelling a Christian minority in Moslem states, thereby provoking a change in the balance of political power. A recent estimate gives the numbers of Armenian refugees as follows :

In Syria	120,000
European Turkey and Greece	50,000
Bulgaria	45,000
Egypt	25,000
France	55,000

¹ One can scarcely imagine a more grotesque combination than an alliance between the perpetrators of a large-scale massacre and the survivors, with the object of achieving greater freedom for the guilty party.

² Most Armenians can be readily distinguished by the fact that the majority of their surnames end in 'ian'.

The Soviet authorities have made strong efforts to secure Armenian loyalty by furthering economic development in the Soviet Republic of Armenia. Outside observers have also agreed that a high degree of autonomy is allowed, and that no anti-religious policy is imposed. As a result, some 16,000 refugees entered Soviet Armenia from the Middle East between 1926 and 1936, and others after 1945. The claims of Russia to have secured the continued survival of the Armenian people are therefore strong.

Like the Kurds, the Armenians have a desire for a politically independent national state, but here the comparison ends, because the latter people are scattered over the world, and as traders and intellectuals have means of forwarding their cause that are denied to the illiterate, semi-civilised mountaineers of Kurdistan.¹ American interest in the Armenian problem was shown by the action of President Wilson in 1919, when he went so far as to draw up boundaries for a projected Armenian state—a proposal that, as we have seen, never reached realisation : and latterly, the question of Armenian aspirations has become directly related to Russian affairs. The problem is in one sense simple : Armenians have now the possibility of settling in an Armenian state, but at the price of accepting Russian tutelage—a condition that some Armenians, strongly religious, or living by commerce under capitalist conditions, do not care to accept. Once again there is the further question of Russian influence in the Middle East. With a majority of Armenians now resident in the Soviet Union, and as protector of the Armenian Republic, Russia has grounds for interesting herself in the districts of Turkish Cilicia and Lake Van, until thirty years ago the ancient homelands of the Armenian people, and now possibly a future component, with the Soviet Armenia as a nucleus, of a wider Armenian state. On this issue, and as a summary of the whole problem, it is useful to cite the opinion of Professor Westermann : that during 1914-19 American, British, and French political sympathy with Armenian aims, together with highly-financed American interest, achieved no practical benefit—rather indeed did it lead to misery and death for many of the unfortunate Armenians. Therefore, as a practical issue, the Soviet solution would seem to have something to commend it.

*The Assyrians.*² This people, very much smaller in number than

¹ The parallel will be noted in this respect between Armenian nationalism and political Zionism.

* This name has no racial or cultural meaning, and has no connexion with the ancient

either Kurds or Armenians, was settled in the Mosul district of the upper Tigris, and was recognised by the Ottomans as a separate Millet. The Assyrians were prosperous until the Mongol devastations of the Middle Ages, but by the nineteenth century they were no more than a small group of abjectly poor peasant cultivators. As a Christian community, they attracted some interest in Europe, and in 1881 the Archbishop of Canterbury sent an Anglican mission as a means of reviving the Assyrian link with Christianity. During 1914-18 the Assyrians, like the Armenians, threw in their lot with the British and Russian armies, and on the withdrawal of these forces, suffered the same fate as the Armenians. In the region of Lake Urmia about half of the Assyrian population, including the head of the sect, the Mar Shimun, was murdered by the Kurds. The remainder fled to Iraq, where camps were set up by the British to receive them.

In 1933, shortly after the granting of full independence to Iraq, 600 Assyrians were massacred by Iraqis, and a body of 8,000 Assyrians fled to Syria, where they were hardly *personae gratae* either to the French authorities, or to the Syrian Moslems. Proposals, and no more, have since been made to settle them in Tanganyika, Kenya, Argentina, Matto Grosso, and British Guiana. The Assyrians number only some 40,000, of which 8,500 are in Syria in the region between the Euphrates and the Tigris rivers, 25,000 in Iraq, and a few hundreds in Russia. With such a small number involved a separate state is out of the question, even by Middle Eastern standards (cf. the Lebanon and Palestine, both with less than 2 million inhabitants), yet under existing circumstances this people faces complete extinction. From certain viewpoints, the problem of the Assyrians epitomises many political difficulties throughout the Middle East: as a Christian community, it is difficult to fit them into any Moslem state because of sectarian rivalry, and in those countries where sectarian feeling is less pronounced, as in Turkey and Iran, the Assyrians are suspect as former British, and possibly future Russian, proteges—in either instance the 'Trojan Horse' of interference by outside powers.

The survey given above serves to indicate the complexity and wide range of Middle Eastern problems. Existing national states, having achieved a hardly-won independence, are little disposed to tolerate

Assyrians. The modern community is an autonomous Christian sect, closest in form of worship to the Nestorian churches, and at the present time the name Assyrian has no more than a sectarian, and therefore a political, connotation.

any shift of internal power to minorities, even when this means denying to smaller groups the same rights that they claim for themselves. Any infraction of present unity—any 'boat-rocking' by dissident sects or parties—may lead to a break-up of existing autonomy, and extreme methods, even direct repression and persecution, appear justified, so long as outward unity in political grouping is maintained. The position is complicated too by the existence of nomadic or minority groups, partly inside, and partly outside various national states. Iran and Turkey went to war during the nineteenth century because both countries claimed the Kurds as their own nationals—a somewhat barren quarrel, since the Kurds were little disposed to admit the effective suzerainty of either state.

Then there is a wider problem involving outside powers. French support of Uniate Christians, British interest in Druses and Assyrians, and American activities on behalf of Armenians and Zionists have served to transform questions that were at first purely local into international issues involving major states and even 'blocks' of states. Turkish claims to possession of the Mosul region in 1926 immediately brought into discussion the position of the Kurds, Armenians, and Assyrians; and Britain, as a Christian power, found herself in opposition not only to Turkey, but also to France, who was not anxious to see a further extension of British influence in the Middle East. Turkish claims also received support from American organisations interested in the exploitation of oilfields. Similarly, and more recently, we have seen how Palestine and Syria have embittered Anglo-French and Anglo-American relations, and how Palestine has become a domestic political issue in America.

Finally, there is the question of Russia. As the one major power that directly adjoins Middle Eastern territory, Russia has a special interest, and special advantages. No other country can influence Middle Eastern affairs so easily and quickly, either by direct action, or by using the aspirations and mutual jealousies of minorities within various national states. During the last thirty years, Russia has made use of Kurdish separatism once to thwart British influence in Iran (1918), and three times to exert pressure on the native government of Iran (1921, 1942, 1946), and by creating an Armenian Republic within Soviet territory, she has obtained a weapon for use against Turkey. One reason for the reluctance in some quarters to support Kurdish and Armenian nationalist aims has been the thought that these would weaken both Iran and Turkey *vis-a-vis* Russia.

It is easily possible to see in the present political situation of the Middle East a recapitulation on a vaster and more complex scale of the Balkan position of 1914. Local sectarian and communal feeling is slowly and painfully transforming itself into political organisation, but the process is often crude and incomplete, with manifest deficiencies. These defects give possibility of interference for their own purposes by non-Middle Eastern powers; and as Austria and Russia opposed each other before 1914 over Serbia, so American, British, French, and Russian interests now clash in the Middle East. Moreover, there are richer prizes at stake : unlike the Balkans, the Middle East is no isolated peninsula, but as has been emphasised, a corridor of unique strategic importance between an awakened Asia and the West; and far more valuable than anything in the Balkans, are the oilfields of the Middle East, potentially the most important in the world.

A further problem arises from the archaic social structure of many Middle Eastern countries. In general, contact by western nations has been with an *elite*—a ruling class based on hereditary position or wealth—since social grouping in the Middle East, often tribal or communal, has tended to concentration of effective power in the hands of a few leaders of great influence. To-day, the basis of that order is being increasingly questioned ; and with the example of Russia not far off, there is a possibility that a social revolution may occur, to place effective leadership in other hands. By past custom and tradition, America, Britain, and France are committed to dealing with the present ruling class of territorial landlords, tribal leaders, capitalist traders, and religious heads. So also is Russia,¹ but Russia can in addition follow a different line. Willing on occasion to negotiate with* the present rulers in the Middle East, she can also appeal over their heads to a proletariat, as in Iran, when workers in British oilfields were incited to strike in 1947, or when Communist separatism was encouraged in Azerbaijan (1946) as a means of pressure on the Iranian government. Social revolution, extinguishing the present ruling class in the Middle East, would probably be little to the taste of America or Britain ; but the same can hardly be said as regards Russia.

¹ E.g. the appeals of Arab League notables—the majority of them men of hereditary wealth—for Russian support over Palestine during the United Nations Organisation discussions of 1947.

THE ARAB LEAGUE

The 'secret' treaties made by Britain, France, and Russia during 1914-20 can be taken as marking the maximum of outside designs on Middle Eastern territory; and from that time onwards, there appears to have been a decline in foreign influence. An increasing number of Arab states shook off outside domination and achieved independence, and the process reached a further stage during 1945-1948 with the ending of the Mandates for Syria and Palestine.

The emergence of Italy as a 'Mediterranean power' during the 1930's, and the steps taken by Mussolini to extend Italian overseas possessions came, however, as a rude awakening to a number of Middle Eastern states. It was borne home by the lesson of Abyssinia that imperialist penetration was to be regarded as by no means at an end, and though the further expansion of British and French power seemed unlikely, the prevailing tendency towards Arab independence might easily be reversed, with other aggressive outsiders seeking to obtain colonial territories in the Middle East. One result of Middle Eastern apprehensions was the Treaty of Saadabad between Iran, Iraq, Turkey, and Afghanistan (1936) by which ancient grudges over frontiers were forgotten, and a defensive alliance between the four countries arranged.

Though this treaty had little positive result, the way had been pointed for further collaboration; and when four years later the Middle East had been drawn into the second world war, and for the second time in twenty-five years opposing armies from Europe were fighting across Arab soil, the idea of political co-operation returned. On this occasion Egypt took the lead, and invitations were issued to a number of Arab states in order to discuss the possibility of advancing Arab interests by joint collaboration in measures to reduce foreign intervention. As a result, the Arab League was formed in 1945 * with the states of Egypt, Iraq, the Lebanon, Saudi Arabia, Syria, and Transjordan as members. The Arab community of Palestine was also represented.

The League is designed to oppose foreign domination by collective action on the part of all members. Thus in one sense it is a negative movement—a reaction against outside influence; it is unfortunate that so far there has been little genuine positive co-operation between member states either in the political or economic spheres. The

¹ The first discussions between various interested states took place in 1944, but formal adhesion to the League did not occur until the following year.

various collaborating states are very unequal in wealth and prestige, and therefore have differing interests and aims ; and in addition to the personal rivalry between heads of states, such as that which divides the rulers of Transjordan and Iraq from Ibn Saud of Arabia, there are traditional differences in culture, religion, and outlook. A number of Arab states, for example Egypt and Syria, feel that foreign influence should be entirely excluded, whilst others desire a limited connexion with outside capital as a means of developing internal economic life e.g. by oil exploitation, revenues from which play a very important part in the state budgets of Iran, Saudi Arabia, and Iraq ; and also as a backing for local currency. Despite strong Syrian disapproval, the Lebanese pound still remains linked to the French franc, even though the French Mandate has ended.

There has, however, been from the start a substantial basis for general agreement and co-operation—all members of the Arab League are at one in desiring to limit Jewish claims in Palestine. This has led to a certain amount of joint economic action, e.g. the imposition of a boycott on Jewish goods, and the establishment of Arab Offices in London and for a time Washington, from which an Arab viewpoint could be presented to the world.

Thus far, the Arab League has had only a limited objective : that of securing joint political action to resist aggression ; but were the scope of the League enlarged, with the aim of fostering active co-operation amongst its members in economic and cultural matters, an advance of enormous significance might be achieved. An immense task is waiting in the Middle East, and should present leaders show themselves indifferent or unable to handle outstanding economic and social problems, these may fairly soon be solved possibly in a way that is by no means acceptable to present Middle Eastern leaders. So long, too, as the Arab League remains a kind of *manage de convenance* of Arab states anxious to preserve their political autonomy and nothing more, there is the risk that with its sole original aim of political action to resist foreign encroachment, the League might ultimately degenerate into a movement of anti-western fanaticism and political xenophobia that could prove disastrous for the future development of the nations concerned.

A second major difficulty in the Middle East, and one that is closely linked to the future of the Arab League, is the spiritual and ideological crisis referred to in Chapter I, which is bringing into question the entire basis of Arab society. Recent experience of

domination by outsiders has exposed the weakness of the Islamic world alongside the West; and this has led to much self-questioning and self-criticism by Moslems themselves. The first problem in the minds of many is whether the Islamic way of life has failed. Does the future lie in complete abandonment of the former way of life, with rapid and unquestioning acceptance of all the beliefs, spiritual values, and methods of Europe and America? Is it possible to pursue a middle course between both Western and Islamic traditions? Or is it a failure to live fully up to the true Islamic code that lies at the root of present difficulties, and should there hence be a return to a more simple and primitive Islamic life? These questions are in the minds of many of the more enlightened people of the Middle East at the present day, and as a powerful influencing factor, there is the example of Europe and America, where nationalism and materialism have been accepted as the basis of national life, apparently with great success.

CHAPTER IX

GENERAL ECONOMIC LIFE (i)

IN this and the succeeding chapters it is proposed to describe in general terms a number of features of economic life that are common to many regions of the Middle East. This discussion should be viewed as a background to the detailed survey of economic activities given under the appropriate regional heading.

I. AGRICULTURE

Agriculture is by far the most important economic activity in the Middle East, since between 70 per cent, and 80 per cent, of the total working population is directly engaged in cultivation, and a further proportion is dependent upon the products of agriculture either as a supplement to the main livelihood of pastoral nomadism, or as a source of raw materials for industrial occupations.

Although agriculture plays such a large part in the life of the region, by no means all the Middle East is cultivated or even cultivable. The following table brings out striking regional differences in land utilisation, and indicates where potentialities for future development lie. Some further reduction must be made to the figures, because on average one-third to one-half of the land stated as under cultivation actually lies fallow each year. In irrigated areas, the proportion of fallow is much less, because annual flooding renews soil fertility; but in regions dependent on rainfall, fields are sometimes cultivated only once in two or three years.

	<i>Total area (sq. miles.)</i>	<i>Proportion Cultivable (Per cent.)</i>	<i>Proportion Actually Cultivated (Per cent.)</i>
Turkey	299,000	30	15
Cyprus	3,500	65	55
Syria and Lebanon	70,000	30	8
Transjordan	35,000	5	4
Palestine	10,000	44	33
Iraq .	175,000	20	3
Iran .	626,000	10	2
Egypt	386,000	5	4
Arabia	* No data available		
Cyrenaica .			

See also Figure 31

Land Holding and Tenancy.—At the present time, some confusion attaches to land holding in the Middle East. A number of titles to land have no other backing than that of tradition—a difficult matter in a region where nomadism and shifting cultivation persist—and in other cases where ownership was legally registered, records have been lost. Moreover, although the Ottoman rule has ended, the Ottoman land code still remains effective throughout many parts of the Middle East; and there has been little attempt at re-distribution of land since 1918, so that a number of persons own estates now outside their own country.¹ One of the principal tasks of the various governments both native and mandatory has therefore been the completion of a cadastral survey, as a basis for the registration and stabilisation of land holdings. Such surveys, though valuable, are expensive, and in most areas still remain unfinished.

Methods of land holding and tenancy have been greatly influenced by social and environmental conditions, and are hence studied in some detail. Five main types of land holding are recognised :

- (1) *Mulk*. This is land held in full ownership. The holder is thus able to develop it as he wishes; and, since any improvements remain as his own property, initiative and foresight are encouraged. Unfortunately, however, *mulk* land is not widespread in the Middle East.
- (2) *Mm* represents land originally held by the state, and transferred, often to feudal landlords, in return for services to the Sultan. In some cases, full ownership was transferred, except for the right to dedicate the land to *waqf* (see (5) below), and the land was therefore in effect equivalent to *mulk*; but in other instances, transfer was made only for a fixed term of years, and sometimes for payment, like a European leasehold. About one half of the land of Iraq is held in this second category of *miri*; and, where tenancies are short, there is an incentive to aim at rapid exploitation of the soil, without thought of long-term improvements.
- (3) *Matrukhi* denotes in Iraq land used for public benefit, i.e. for government buildings, schools, or threshing floors ; and is thus very small in amount. Elsewhere, *matrukhi* land is regarded as the property of an entire community, and may be allocated in shares to each individual member, or even developed in such a way as to produce an income which is then divided amongst all participants. More frequently, however, *matrukhi* land is kept as grazing grounds for the community

¹ A recent High Court decision in Palestine has established the claims of certain of the heirs of Sultan Abdul Hamid II to estates within Palestine valued at several million pounds sterling.

as a whole. *Matrukhi* of this latter class is widespread in mountainous areas, and appears as a frequent feature of tribal organisation, particularly amongst pastoral nomads. Kurdistan and western Iran are the chief regions of its occurrence.

- (4) *Masha* (*tnushaa*) is in some respects similar to *matrukhi*, since there is again communal ownership by a single group. Allocation is made on a basis of one share per male member of the family, including children. With such a scheme, by which a family of boys will receive a far greater holding than a family of girls, the social inferiority of women is emphasised. In this can be seen the influence of a strongly patriarchal social organisation which, although most characteristic of pastoral and nomadic peoples, has also spread into cultivated regions on the desert margins. Eastern Syria and Transjordan are the areas in which *masha* holdings are most numerous.

Masha and *matrukhi* holdings may often be legally registered in the names of a few notables of the group; and under the *millet* system, the head of the *millet* frequently held land in trust for his community. From this derived some of the civil and financial power of religious leaders, whose influence on the everyday life of their followers had thus both a spiritual and an economic basis. It is in the light of such organisation that the present close association of political and religious feeling in the Middle East must be viewed.

- (5) *Waqf* (Turkish *vaquf*) represents a kind of religious or charitable trust by which the revenues of dedicated land are applied under the supervision of special Government Departments in each state to religious objects, and to the charitable maintenance of persons or institutions. Once dedicated, *waqf* comes under state control, and is subject to a considerable number of restrictions. Rights in *waqf* can be inherited; hence as *waqf* continues unaltered after the death of the original owner, holdings often become minutely subdivided between an increasing number of heirs. Because of the many restrictions that apply to *waqf* holdings, and the generally small size of the plots of land, attempts at improvement by tenants are largely discouraged, and short term exploitation without a thought of the future is aimed at.¹ *Waqf* is therefore regarded by many as an obstacle to agricultural development in the Middle East; but because of its religious associations and wide extent *waqf* presents an extremely difficult problem.

In the past, because of lower taxes on *waqf*,² many dedications were made by collusion, whereby religious foundations or even

¹ Because it cannot be transferred, except by inheritance, *waqf* cannot be used as security for loans or mortgages, since the lender cannot foreclose in the event of default.

* As a charity explicitly enjoined in the Koran, *waqf* was liable to no tax beyond the Koranic ten per cent, levied on the revenue. The land itself was not taxed.

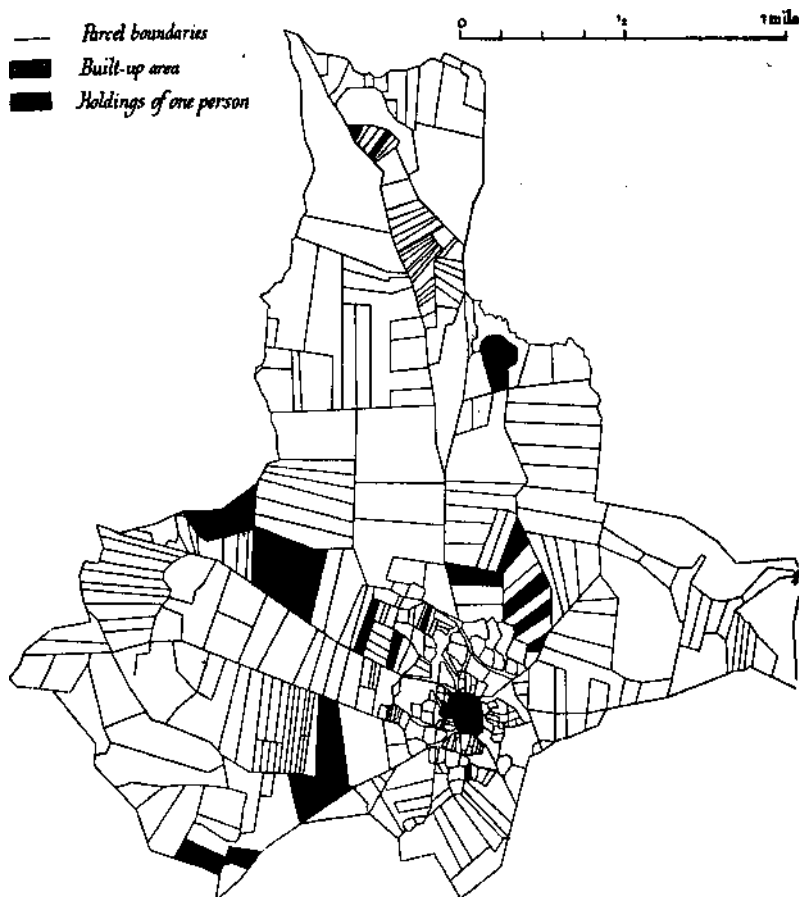
pseudo-charities received the title, but returned most of the revenue to the original owner. At one time, more than half of the entire area of Turkey was supposed to be held as waqf, but it has been the policy of modern governments, particularly in Turkey and Iran, to resume state ownership. The student of economic history will note a similarity between waqf and mortmain, which presented an analogous fiscal problem to the monarchs of mediaeval Europe.

The three types of land holdings, *matrukhi*, *masha*, and waqf, have the general disadvantage of discouraging improvements and long term development. Cultivators are unwilling to grow anything but crops that offer the quickest return; rotation to conserve soil fertility is rarely practised; and fruit trees, that need many years to mature, are never planted on holdings that will be re-allocated to a neighbour at the end of a few months. Besides all this, waqf in particular leads to absenteeism—an owner may not find it possible, even with the best intentions, to visit a plot several hundred miles away which has come to him as an inheritance; yet such a holding of scattered plots may not be grouped together, or sold.

A second evil of Middle Eastern land holdings is excessive subdivision, which often arises because of the large size of Middle Eastern families. Weulersse quotes the instance of Bar Elias, a Lebanese village where 5,285 acres came to be divided into 32,643 plots; and Fig. 30 gives a similar example from Palestine. Recent experience has shown that when communal lands held as *matrukhi* or *masha* are stabilised (i.e. re-allocation is stopped) in order to avoid the evils of shifting cultivation, the opposite extreme of subdivision is liable to develop, so that the limit of viability is passed, and conditions become worse than before.

Tenancy.—The most widespread form of tenancy is share-cropping (*metayage*). Under this scheme the landlord provides seed, and sometimes implements, and receives a proportion, usually at least one-half, of the yield after taxes are paid. At best, share-cropping is intended to protect both landlord and tenant against the vagaries of Nature in a frequently difficult environment—the loss is equally borne if crop fails—but in practice, share-cropping has led to short term, exhaustive methods of cultivation, with the tenant frequently in debt to landlords and usurers. Initiative is again discouraged, and as it is easiest for the landlord to give out a portion of last year's crop for next season's sowing, rotation is little practised.

Cash rents are rarely paid. Two exceptions may, however, be noticed : in rich market gardening areas near the cities, profits **are** relatively high, and tenants have sufficient capital to avoid dependence



(By permission of the Palestine Government.)

FIG. 30. Fragmentation and Dispersal of Land Holdings in an Arab Village of Palestine. Data by permission of the Palestine Government, and reproduced by the courtesy of Dr. E. C. Willatts, and the Royal Geographical Society.

on the landlord for seed. On the margins of the desert, cash rents are also a feature but for a very different reason—the landlord wishes to avoid the total loss resulting from a Badawin raid, and is the stronger party as compared with his tenant.

In many areas, agricultural labourers are paid in the form of shares

in the crop, that is, by a kind of metayage ; but the proportion received is lower than in the case of settled tenant farmers. Overseers (*sarkals*) are employed to supervise numbers of labourers, and this form of exploitation is particularly widespread in Iraq. Landlords themselves are comparatively rarely resident on their estates, most preferring to live in the towns, and visiting their estates only at harvest time—sometimes even with an armed guard. The high proportion of city dwellers of this kind is one of the social features of the Middle East, and stands in contrast to conditions in Europe. One factor in the situation is the limited extent of openings for capital investment. Banks are few and mistrusted ; there have been several devaluations of currency, accompanied by inflation even in Mandated territories;* and there is little possibility of investment in industry. Hence the profits of commerce are most frequently invested in landed estates, as a fixed asset which cannot easily be stolen, or depreciate in value.²

Life of the Cultivators.—Throughout the Middle East, the vast majority of cultivators exist at extremely low standards of living. Communications are often poor, so that all the produce of one district tends to find its way to a single local market, where in times of plenty the price falls because of a glut, and high prices occur only when crops have failed. Under such conditions, 'cornering' by middlemen can easily take place ; and as an example we need only go back to 1942-43 when something approaching military force had to be used to feed the cities of Syria from wheat produced in the immediate neighbourhood.³

Rents and taxes may absorb as much as five-sixths of the total produce of a holding, and the tenant cultivator must frequently have resource to moneylenders. Usury is specifically forbidden by Moslem Law, but the threat of severe penalties has merely made the trade dangerous, and not suppressed it. Interest rates of 50 per cent, to 200 per cent, are therefore demanded ; so that the cultivator rarely escapes from the moneylenders once he has made their acquaintance.

A summary of conditions in southern Iraq (due to D. Warriner), gives a typical apportionment of the income from land as follows :

¹ Cf. the French franc—worth 100 in 1914, and now 100 to the £ sterling ; and the £ itself, which has lost 60 per cent, of its purchasing power.

² Losses by theft are extremely common in all parts of the Middle East, and every house, whether large or a mere hut, has built-in bars on every ground-floor window.

³ In 1914-18, when similar methods were not used, actual starvation occurred on a large scale.

	<i>Per cent.</i>
To Government (taxes)	10
Landowner	40
Sub-tenant (sheikh)	7½
Sarkal (overseer)	2½
Fellah (occupier)	40

From his 40 per cent., the Fellah must also pay a rent for the upkeep of irrigation canals, amounting to one-fifth or one-half of his income.

It is fair to say that the greater number of peasants live on the extreme margin of subsistence. A windowless hut of dried mud, of palm leaves, or of flattened petrol cans, is often shared by humans and animals alike ; and rags for a bed, a few communal cooking and eating utensils, and clay bins for grain form the entire household possessions of the family. Water is often too scarce for washing, and may have to be brought several miles ; whilst dried animal dung provides the only fuel in many parts outside Asia Minor. No margin is left for medical attention, for the simplest anti-malarial precautions, or for amusements : the peasant if ill must find his own cure ; and it is significant that the greater proportion of children born in rural areas are likely to die before reaching the age of ten.¹

Crops.—Much of the Middle Eastern agriculture is still in a stage of development comparable with that of mediaeval Europe ; i.e. subsistence is the over-riding consideration, with the aim of feeding the local population upon local produce. Under such a system, foodstuffs tend to be the main crop, regardless of whether they are suited to geographical conditions in the area, and specialisation in a few products that might succeed better is generally avoided. Only in a few favoured regions is specialisation possible ; elsewhere there is a remarkably uniform pattern of mixed cereal cultivation, with a number of extras such as fruit, vegetables, tobacco, and cotton on a small scale. Conditions in the Middle East thus appear in sharp contrast to those of Australia, or the United States, for there are no corn, cotton or wheat ' belts * : instead, small enclaves of minor crops—cotton or tobacco—tend to appear in areas given over to cereals, and one plant is often grown alongside another of a very different kind.

(a) *Cereals.*—Overwhelming importance attaches to cereal cultivation, since apart from the value of the crops themselves, the relatively slow development of fruit trees, and conditions of land

¹ A study by Professor Dodd of the University of Beirut showed that in one region of the Lebanon the average expectation of life at birth was five years only.

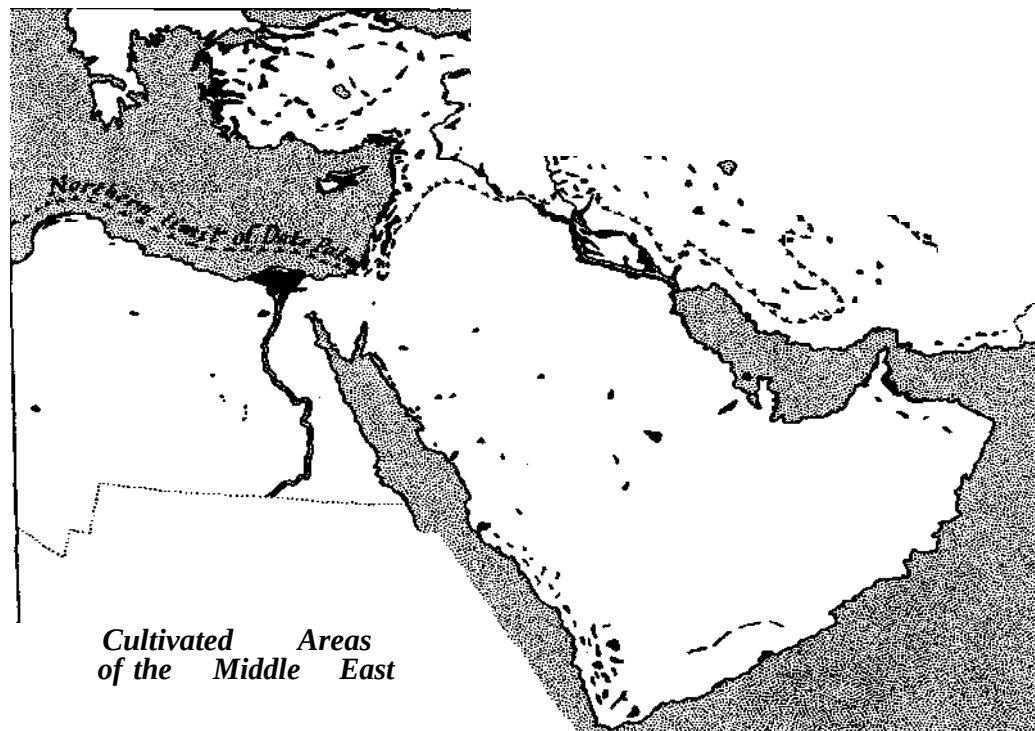


FIG. 31. Cultivated areas in the Middle East.

tenure combine to put a premium on crops that develop in as short a time as possible. Wheat and barley, grown as winter crops (i.e. sown in autumn and harvested in late spring or early summer) are by far the most important, with wheat predominating in all areas except Egypt and Iraq. The chief summer crops are maize, a recent introduction from the New World which is likely to play an increasing role in Middle East agriculture; varieties of millet; and rice. Summer crops are usually sown in spring and harvested in summer or early autumn. Maize has now become the most important cereal crop of Egypt, and ranks third to wheat and barley in Palestine and Transjordan. Rice, originally from south-east Asia, is important in the alluvial lowlands of the great rivers; and oats are grown in the cooler mountainous regions of the north.

Wheat and barley are natives of the Middle East. As a wild plant barley has a wide distribution, ranging from Tunisia through Tripolitania, Cyrenaica, and the Sinai to the Levant and Asia Minor, with extensions to the north-east as far as Transcaucasia, Turkestan, and Afghanistan. The fact that in Mesopotamia measures of barley were taken as standards of value at least as early as 2000 B.C. indicated the importance and antiquity of the plant, which is still the chief crop of Iraq.¹

The origin and distribution of wheat is a more complicated matter. In the first place, the bread wheat now in common use as a food would appear to be a hybrid, developed by cultivation from other strains, and not a domesticated wild species, as is the case with the remaining cereals. Ruggles Gates has suggested that bread wheat has arisen from the crossing of two inferior wheat strains; (a) *einkorn* (alternative name *dinkel* and *spelt*) which is a small plant that grows wild in Greece and the northern part of the Middle East, and (b) *emmet* a much more productive species, which is still widely cultivated in regions of warm dry summers. Most of the hard wheats used in the making of food pastes—macaroni, etc.—are of the emmer group. Wild emmer has a more restricted distribution; the only area where its occurrence seems definite is a narrow strip immediately to the east of the Jordan depression, between Syria and the Nejd. Another possible area is the northern Caucasus. A theory has been put forward

¹ The question has arisen as to which of the two grains barley and wheat was the first to be cultivated by early civilised man. From the botanical and archaeological evidence available, H. J. E. Peake concludes that in all probability, the cultivation of wheat preceded that of barley, although no final answer can be given.

to the effect that bread wheat formed by the crossing of einkorn and emmer must therefore have been first grown in the region where both species grow wild—that is to say, in south-west Syria or Transcaucasia.¹ A second theory due to Vavilov places the origin of bread wheat in Eastern Afghanistan, Iran, or Transcaucasia. This theory is less generally accepted, since it conflicts in some measure with archaeological evidence.

Except in Asia Minor, where it is still an important crop, einkorn is now little grown ; but emmer, because of its tolerance of high altitudes and a cooler climate, is widely grown, particularly in mountainous or semi-mountainous regions. With bread wheat, emmer is the staple food grain of most agricultural areas of the Middle East, barley now being used increasingly for animal fodder, and for export as malting barley.²

(b) *Fruit and Vegetables*,—Because of a deficiency of pasture, fruit and vegetables form an essential part of the diet of most natives of the Middle East. Not only the peasant, but the industrial worker and casual labourer of the towns make a usual midday meal of bread, olives, and onions, with rarer additions such as dates, figs, or apricots. Orchards and gardens are hence an important complement to ploughed land, and, whenever possible, the peasant tries to have a proportion of both. As we shall see later, it is sometimes possible to sow orchards with cereals; more usually, orchards and gardens are planted round houses, since shifting cultivation prevents the establishment of fruit trees on ploughed land.

Thanks to a climate which combines certain of the features of both tropical and temperate regimes, the already abundant natural vegetation of the Middle East has been enriched by the successful introduction of numerous other species from north to south. To the indigenous olive, vine, apricot, fig, pomegranate, cherry, peach, and carob, have been added the banana, orange, and sugar cane, natives of the tropical south ; and from the north, the apple, strawberry, and potato.

¹ Further light on the origin of bread wheat comes from certain features of cell structure. The cells of einkorn (*Triticum monococcum*) show a chromosome grouping of seven ; those of emmer (typical varieties *T. dicoccum* and *T. durum*) a grouping of fourteen ; and those of bread wheat (*T. vulgare*) a grouping of twenty-one—strong evidence in favour of crossing between the first two species.

² By reason of its pale golden colour, barley from some regions of the Middle East, notably Cyprus, Cyrenaica, and Palestine, commands a high price as an ingredient in the distilling of whisky.

It is estimated that the olive occupies one-quarter to one-half of the **total** area planted in fruit trees throughout the Middle East—an indication of the importance of the olive as a source of food. The better fraction of the oil is used in cooking, giving a characteristic style of food preparation ; and the olive itself, easily stored and carried, is often eaten raw. A general lack of animal fat in Middle Eastern diet is largely made up from olive oil ; and the preparation termed *kubbeh*, spoken of as the national dish of the Lebanese peasant, and consisting of chopped vegetables mixed with olive oil, is a typical sample of Middle Eastern food. In addition, the poorer oil is used as an illuminant, and as the basis of an important soap industry, whilst the crushed stones are fed to cattle.

Closely adapted to the Mediterranean climatic regime, the olive flourishes best in regions of abundant winter rain ; yet a long, dry summer is essential to a full development, and it is remarkable how even a small summer rainfall will reduce the oil content of the fruit. Moderate winter warmth is also necessary, though the olive can stand up to 15° F. of frost for a short time. In spite of its predilection for regions of moderate rainfall, the olive is tolerant of aridity, and can grow, with irrigation, on the borders of the desert. This explains its wide distribution outside the purely Mediterranean areas of the Middle East: as an oasis plant it extends as far east as Iran. Irrigation becomes necessary in regions of less than 8 inches of rainfall, but care must be taken not to apply an excessive amount of water, in order to avoid reducing oil content of the fruit. Certain districts of the Middle East stand out as regions of intensive olive culture : the two most important are (1) the valleys of south-west Anatolia, centring on the Biiyiik Menderes (Meander), and (2) the lower Orontes, centring on Antakya (Antioch), and extending as far inland as Idlib. Other districts are the Seyhan plain of Turkey, and the environs of Latakia, Tartus, Tripoli, Damascus, and Beirut.

The vine is second in importance to the olive. Production has varied at different periods, the Islamic ban on alcoholic beverages having had a restrictive effect. At the present time, some wine is made, chiefly, but not exclusively, by Christians and Jews—Cyprus, the Lebanon, Palestine, and to a lesser extent, Turkey, Iran, and the Alexandria region of Egypt being the chief wine producing areas. A large proportion of grapes are eaten as dessert, and a sweetish confection resembling molasses is also prepared. In western Asia Minor, most of the grapes are dried and exported as sultanas.

The vine is much less tolerant of great heat, and is also liable to contract disease in the damp summer atmosphere of the coastal lowlands. Hilly country, therefore, suits the plant best; and the foothills of Cyprus, the Lebanon, and western Syria, almost the whole of the lower hill slopes of Asia Minor, and many parts of northern and western Iran, are the home of vine cultivation. In all parts of this zone, extending from the well-watered hills of Cyprus, western Anatolia and the Levant, to the high valleys of Armenia and Azerbaijan, and to the oases of central Iran, vines form an important adjunct to cereal cultivation. Phylloxera, said to have been introduced into Turkey by the construction of the Orient Express route in the 1880's has now necessitated the introduction of American vine stocks (which are more resistant to the disease) in districts of intensive production.

Another plant showing considerable adaption to Mediterranean conditions is the fig, which has been cultivated in the Middle East from earliest times. Like the olive, the fig needs a long hot summer, but is otherwise able to stand either aridity or abundant moisture, and is therefore of frequent occurrence on the Mediterranean coast, and as far inland as the desert border. Associated with the olive, vine, and fig, but of lesser importance, are the other fruit trees; apricot, peach, and pomegranate. Mention must also be made of the many nut trees—chiefly almond, pistachio, and walnut—which are characteristic of the central zone of the Middle East from south-west Anatolia to Iran; and of the hazels, which are most frequent in the northern half of Asia Minor.

So far, little has been said of the southern portion of the Middle East. In this zone generally higher temperatures, with only a few short cold spells in winter, together with lower rainfall, give rise to a vegetation complex essentially different from that of the cooler and more humid north. Most typical of the south is the date palm, and the northern limit of its occurrence may be taken as a frontier separating the Middle East into two contrasting provinces. The significance of this division is greater than that of mere vegetation zones. To the north of the boundary lies the more specifically 'Mediterranean' area, with a characteristic social development related to the cultivation of wheat, olives, and vines, and tending to look in some aspects of its political and cultural orientation towards the west and north. South of the boundary is a region showing some affinities to the tropics and to the monsoon lands. Here the date is a staple, and rice, maize, and sugar cane tend in some measures to replace wheat and olives as

principal crops. With this alteration go changes in agricultural practices and ways of life : irrigation becomes the basis of cultivation ; and contacts with the south and east assume importance.

Damascus and Baghdad, both approximately on the same line of latitude, but on different sides of the boundary, might be taken as typifying conditions in the two zones. The first, an outpost of Mediterranean civilisation, is linked to the west both commercially, and as a part of Christian tradition : Baghdad has fewer contacts with the west, and might be said to appear, in western eyes, as a more remote, exotic, and truly ' Oriental ' capital. In Damascus are associations with Saint Paul and the Omeyyad dynasty, with its offshoots in Spain and north Africa ; to Baghdad belong the Abbasids —Haroun al Raschid, and the Arabian nights.

Date palms require prolonged hot and dry summers for successful growth of fruit. If temperatures fall below 64° F. for any considerable period during the year, fruit will not ripen, although the tree itself may develop normally ; and summer rain prevents fertilisation of the flowers. Pre-eminently a tree of the hot deserts, date palms can exist on a minimum of water, and produce fruit even when partially buried in drifting sand. The palms can also stand considerable amounts of water, and heaviest yields of dates are obtained when irrigation is applied to roots (Dowson) so that date palms are also characteristic of most riverine areas in the south of the Middle East. In order to obtain a large crop, the female flower must be fertilised by hand with pollen obtained from a male flower, since natural pollination is somewhat slow and unreliable. A date grove will therefore include two or three male palms per hundred of females, and some trade in pollen dust is carried on from southern Iraq, where date palms are most numerous. The banks of the Shatt el Arab are the region of greatest cultivation, and a large surplus is available for export after local needs have been met. The date is also a principal item of diet in southern Iran, the Arabian peninsula, parts of the Nile valley, and in Libya. Its high sugar content and long keeping properties make it ideal as a food for nomadic and semi-nomadic peoples.

Vegetables are becoming increasingly important. Hitherto, the summer drought has been an unfavourable factor ; but with recent development of irrigation schemes this difficulty is being overcome ; and a further stimulus has been provided by the growth of cheap motor transport. Market gardening is therefore becoming a feature

especially in the neighbourhood of large towns; but as Middle Eastern vegetables often tend to be somewhat coarse and insipid, production is dependent on home demand, and a large export trade is unlikely to develop unless quality improves. The chief native plants are onions, cucumbers, pumpkins, marrow, squashes, beans, and garlic; and to these have been added tomatoes and potatoes. Tomatoes are fairly widespread in the Middle East, but potatoes tend to be restricted to the cooler and damper north, where they form an increasingly important crop.

(c) *Commercial Crops*.—In certain more favoured regions of the Middle East, where natural conditions permit, and where the development of communications has led to an abandonment of subsistence agriculture, a number of cash crops are grown, chief of which are cotton, tobacco, mulberries, and narcotics.

Cotton is a summer crop. The absence of late spring frosts, and a long dry summer followed by a distinctly cooler autumn are markedly favourable factors; and where abundant water supplies are available (usually only in irrigated areas) the plant does well. Unfavourable factors are soil salinity, which has a marked deleterious effect, and liability to insect pests. Lower Egypt is the principal area of production, and the famous long-stapled cotton of the region has a world-wide market; a much smaller production in Iraq was until 1940 exported chiefly to Japan, and a limited quantity of Cypriot cotton found its way to southern and central Europe. In Turkey, Syria, and Iran, local production of cotton supplies the needs of small and newly created textile industries, leaving little or no surplus for export.

Tobacco is also a summer crop, and is best grown on hill slopes in regions of moderate rainfall. Despite official Moslem disapproval of smoking, tobacco is widely grown throughout the Middle East for local consumption only, but in most areas quality is poor. In western Asia Minor, and in the Latakia district of Syria, more careful methods of cultivation result in a better product, and an important export trade has grown up. Of recent years, the * Turkish' tobaccos of Anatolia have lost much ground to the Virginian variety,¹ but Latakia tobacco, which is used mainly as a blending ingredient in pipe tobaccos, has maintained its position.

Mulberry plantations for the rearing of silkworms have been a

¹ It is interesting to note the change in smoking habits in Britain since 1900. At that time Turkish cigarettes were fashionable, and it was felt necessary to apologise when offering a stronger Virginian * gasper \

feature of certain parts of the Middle East ever since the cocoons were first smuggled from China in early Byzantine times. Within the last century, the extent of mulberry plantations have undergone considerable fluctuation : under the Ottomans, a heavy tax restricted development, and outbreaks of disease were frequent, necessitating the import of new plant stocks from America. More recently, the competition of foreign silk from Italy, France, and Japan, and the use of artificial silk brought about a crisis in the Middle Eastern industry, and many mulberry plantations were re-sown with cereals. Famine during the war of 1914-18 also led to change-over to cereals. During the war of 1939, however, the Middle East became one of the few sources of raw silk in Allied hands, and a rapid expansion of production took place, especially in the Lebanon. It remains to be seen how the revived Middle Eastern silk industry will fare in the post-war period, when foreign competition is renewed.

The opium poppy and a form of hemp (*hashish*) are grown in the Middle East for medicinal purposes, as a source of morphine and its derivatives. Although production is very small, the high value of the drugs renders the plants extremely useful as cash crops, and there is considerable temptation in the way of the peasant cultivator to produce small quantities above the legal amount allowed. These ultimately find their way to the illicit drug markets of the world. In Turkey, where slightly less than half of the world's controlled supply of morphine is produced, strict governmental supervision is maintained; but elsewhere in the Middle East, although governmental prohibition exists, ineffective supervision leads to the growth of an uncontrolled and illegal market. Opium poppies need a dry and moderately warm spring, with absence of frost. Towards the end of the summer, incisions are made in the capsule of the flowers, and a juice containing opium flows for some 24 to 60 hours, later coagulating into a sticky mass. Rainfall during this period will result in loss of opium. Opium poppies are grown in Iran, where numbers of the people are addicts; and in view of an active smuggling trade on the borders of Palestine, there must be some production of hashish in Syria, although no official figures exist for either of the latter countries.

Pests and Diseases affecting Plants,—Agricultural production is greatly reduced by losses due to pests and diseases. The locust is probably the greatest single menace to crops, since one-half to three-quarters of the entire yield of a holding may be eaten during one visitation. Locusts originate in the deserts of Arabia and the Sahara,

later moving northwards in immense swarms towards the cultivated areas.¹ As the locust is relatively large, measuring some two to five inches in length of body, a considerable quantity of greenstuff is eaten, and whole districts can be stripped bare within a few hours. The Sahara locust, which feeds for preference on grain and fruit, is regarded as more destructive than the Arabian variety, which prefers the leaves of trees. Because of their rapid migration by flight, locusts are an international problem; and a joint committee² has been established by a number of Middle Eastern states to develop methods of control. These include crushing the female locusts by heavy rollers, ploughing the eggs into the ground before they can hatch, and the use of flame throwers, and also insecticides such as sodium arsenite, against the adult locust.³ Another method is to sweep the young locusts into specially dug trenches before their wings are properly developed.

In passing it may be remarked that the appearance of a swarm of locusts is not always regarded as an unmitigated disaster by all sections of the community, as the Badawin Arabs roast and eat the insects. In 1945, when a large swarm threatened the Damascus area, great apprehension was felt by cultivators. Further north towards the desert, however, at Palmyra and Deir ez Zor, locusts were selling briskly at four Syrian pounds per bag.

Another pest is the *sun*n or *sunna* insect, which attacks the ears of cereals, just as they are ripening. The sunna seems to be most widespread in the damper, cooler parts of the Middle East; and, like the locust, the insect passes the first part of its life cycle outside cultivated areas, migrating into these regions only when fully developed. This

¹ An interesting relation between climate and the occurrence of locust swarms has been described by Dr. Uvarov. Between periods of invasion by locust swarms, small numbers of locusts have been found to exist as individuals, quite dissociated from any swarm, and harmless to crops. Such 'solitary' locusts approximate closely in appearance and behaviour to ordinary grasshoppers. If, however, the progeny of solitary locusts are reared under crowded conditions (e.g. in a cage) physical changes occur, so that the solitary grasshopper type of locust becomes transformed into a true swarming locust. These changes, demonstrated under laboratory conditions, have also been observed to take place in grassland areas, when, following a season of drought, locusts are forced to congregate in a few relatively low-lying and damper spots. Hence locusts of the swarming type would seem to develop during cycles of slightly increased aridity, and it would thus appear that the factors producing an invasion by locusts are largely climatic.

² The *Office International des Renseignements sur les Sauterelles de Damas*.

³ Spraying from aircraft has proved markedly successful. Another advance has been the discovery of gammexane, an insecticide that, unlike arsenical preparations, is harmless to vertebrate animals, and may therefore be used in grazing areas.

habit offers the possibility of control by man, since if crops can be harvested before the arrival of the insect, much loss is averted. Hence quick growing cereals are favoured in regions infested by the *surma* ; and barley, which ripens earlier than wheat, is less likely to be attacked.¹ Another form of control is to root out and burn the affected plant, thus destroying the insect, which, being very small, remains inside the ear. Losses from *sunna* infestation are only slightly less great than those from the locusts: up to 60 per cent, of the crops may be affected. The *sunna* does not migrate in large numbers over long distances, so that control measures on an international scale are not attempted.

The production of dates suffers from the activities of certain species of spiders, which cover the ripening fruit with thick, close webs. In the dusty atmosphere of date-growing regions, the webs collect sand particles, with the result that sunlight no longer reaches the fruit, and development is arrested. Other insect pests attack both citrus and soft fruit trees. *Aphis* and the saw-fly do much damage each year, though losses can be reduced by the use of insecticides. On the whole, however, in spite of the great need, preventative spraying is little practiced in most fruit-growing regions of the Middle East, growers feeling that the high cost is not justified. The citrus groves of Palestine, and to a lesser extent, the vineyards of western Anatolia, are the only districts in the Middle East where insecticides are used on any considerable scale.

Citrus fruit is liable to develop small black or red scales, which, although of little harm to the fruit itself, render the crop unsightly and difficult to sell. Hydrogen cyanide spraying is effective in reducing the incidence of scale, but there are obvious drawbacks to its extensive use. *Phylloxera* is another widespread disease affecting vines, and replacement of the plant stocks is the only effective cure. Rust, a kind of mildew, is also liable to develop on ripening grain; and unfortunately, native species of Middle Eastern cereals seem particularly liable to such attacks.

II. HUMAN DISEASE

The extent to which human activity, and therefore economic life, are affected by the incidence of disease, is so considerable that an outline of the main problems involved can justifiably be discussed

This is one reason why barley, and not wheat, is the chief crop of Iraq.

as an aspect of the social geography of the region. The wide variation of climatic conditions within the Middle East, with generally high temperatures; its position between large centres of population to east, west, and south; and the flow of pilgrims of various races towards the shrines of Arabia and Palestine, are all in part responsible for a high rate of disease. Further factors must be sought in the mode of life of the people. Overcrowded, insanitary conditions in many areas are responsible for much disease; and these in turn are related to certain geographical factors: a general deficiency of water, lack of material resources in food and building materials, and social and political conditions such as methods of land tenure, or frequent foreign invasion.

Some of the more widespread diseases originate directly from environmental conditions. Malaria, yellow fever, kala-azar, and various other fevers are all spread by insects, the distribution of which is controlled by climate. Other diseases such as bilharzia, dysentery, trachoma, typhus, and infestation by parasitic worms, are caused mainly by insanitary conditions, and are therefore a more specific human problem. A third group of diseases, chief of which is pellagra, are due entirely to malnutrition, and are thus related to economic productivity.

Few complete statistics of the incidence of disease are available. We may, however, quote Cleland's view that up to 75 per cent, of the total population of Egypt is affected by at least one, if not two, major diseases; surveys in 1942 to 1945 have revealed occasional villages in Palestine and Syria where between 50 per cent, and 90 per cent, of the people examined were suffering from chronic malaria; and we need only recall that during the war of 1914-18 in the Middle Eastern theatre, more troops died of disease than by enemy action.¹

Because of its effects on human activity and therefore on economic production, malaria is by far the most important disease of the Middle East.² Most areas outside the higher mountain regions and unirrigated deserts are affected. The disease, caused by a parasite in the

¹ One could also recall the early death of Alexander the Great, and the destruction of the army of Sennacherib, both of which were due to disease.

² In *Middle East Science*, which gives an admirable outline of the chief problems involved, Dr. Worthington quotes a statement of the Malaria Board of Cyprus 'Malaria is the fundamental reason for the backwardness of many village areas . . . the people, owing to general debilitation caused by malaria and conditions arising therefrom, are physically and morally incapable of taking advantage of such social services and opportunities for advancement as are provided \

blood, is spread by the mosquito, which sucks the blood of an infected person, and transmits a minute quantity of infected blood to the second person that it attacks.¹ As the mosquito spends much of its life in, or near, water, any stagnant or slow moving water in streams, pools, irrigation canals, or even in empty cans and hollows near houses, is a breeding ground, and therefore a potential source of malaria. Although most frequent on warm, marshy lowlands, certain species of mosquitoes can live in moderately hilly country; and many parts of Asia Minor, Cyprus, and the Levant are affected up to a height of 4,000 feet. In addition to these regions, malaria occurs on a large scale in Iraq, particularly in the district of the Shatt el Arab; in Egypt; and in Iran where 100 per cent, of the people are affected in certain districts of the Caspian (Neligan). Arabia and Libya are relatively, but by no means entirely, free from the disease.

Malaria can occur in an 'acute' or 'chronic' form. The first has a rapid course, during which the affected person feels very ill, and must retire to bed. Chronic malaria, as the result of which the sufferer feels weak and 'out of sorts', but not sufficiently ill to lie in bed, may persist for many years without any alteration. The latter form of malaria is endemic amongst the native population of the Middle East, and children are affected at an early age, thus perpetuating the disease for generations. Because of its mode of propagation, malaria is closely related to agriculture, especially in regions where irrigation is employed; and one serious feature, the liability for malaria to increase when new schemes of irrigation are developed, has already been touched on (p. 66). Rice growing, with its flooded paddy fields, is particularly liable to give rise to malaria; and in Iraq and Egypt, where rice cultivation is an important feature, government decrees restrict the areas which can be devoted to the crop, and also lay down rules for preventing the stagnation of irrigation water.

Control of malaria can best be achieved by attacking the breeding of mosquitoes. Care in disposal of water, attention to drainage, clearing of streams and canals, and the use of insecticides all give good results, but these are usually expensive, and therefore not always within the reach of local populations. A cheaper and simpler method of control, which is likely to be more widely used, is the stocking of streams and cisterns by small fish, which feed on the larvae of the mosquito. Striking results have been achieved in parts of Palestine and Egypt by introducing an American minnow.

¹ A curious feature is that only the female mosquito transmits malaria.

Yellow fever is in some respects a more dangerous disease, because of its rapid onset, and often fatal termination. It is fortunately not widespread in the Middle East; but an endemic area occurs in Central Africa, and this is probably extending at the present time into the Sudan. Yellow fever-carrying mosquitoes can be introduced into a non-infested zone by aircraft, and the recent increase in air communication in the Sudan has led to stringent control measures designed to prevent a spread of yellow fever into the Middle East.

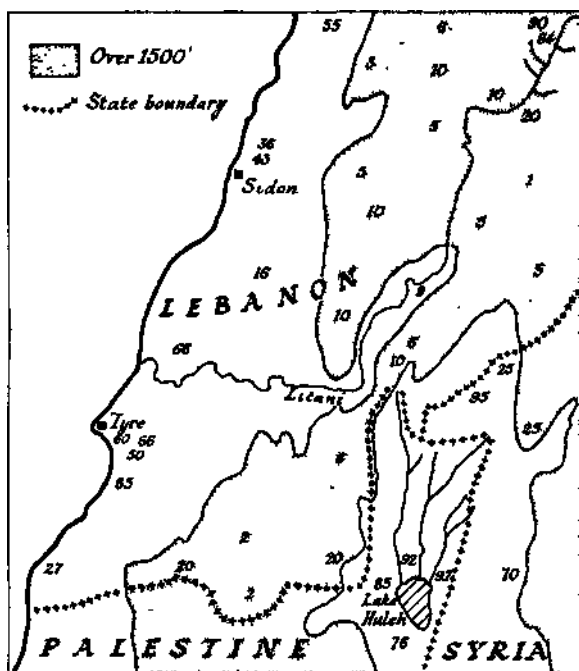


FIG. 32. The Incidence of malaria in one district of the Levant. Figures show percentage of total child population affected by chronic malaria, 1943.

Bilharzia is probably second in importance to malaria ; and even more than the latter, is a disease of irrigated lands. The spread of the disease is related to the occurrence of a species of water snail, which acts as a first host to the bilharzia parasite. After developing in the body of the snail, the parasite later enters the human body, and produces severe debility, which, as in the case of malaria, can continue as a chronic condition for many years. Bilharzia has thus the same effects as malaria upon the energy and initiative of the population.

Egypt is by far the most seriously affected region of the Middle East, and about one-half of the entire population is said to be suffering from the disease.¹ The lower Tigris and Euphrates, with their tributaries the Karun and Karkeh, is also affected, and small outbreaks have been noted in Syria and Cyprus. Control of bilharzia can be achieved by destroying the water-snail by means of a solution of copper sulphate, and by the eradication of insanitary habits amongst the population. The wearing of shoes is also a safeguard, as the parasite enters the body through the feet.²

Another widespread parasite disease, ankylostomiasis or hook-worm, is more directly related to insanitary conditions of life. Egypt, where 40 per cent, of the entire rural population may be affected (Worthington), is the chief centre of the disease, but Iraq, Iran, Palestine, and Turkey are also endemic areas.

Typhus, carried by lice and rat-fleas, is another disease of insanitary conditions, and one more likely to affect urban populations. Severe epidemics can occur from time to time, although with better conditions in the towns, and the greater number of medical men as compared with the country, urban epidemics are becoming less frequent. The stronghold of typhus is Iran ; but other parts of the Middle East are affected, - particularly in the neighbourhood of ports. Dysentery is also caused by lack of cleanliness, but on the whole is rather more likely to affect foreigners arriving in the region for the first time. The native people seem to have developed a very limited degree of 'conditioning' to the disease.

Trachoma, a severe affection of the eye that often leads to blindness, is specially characteristic of the Middle East. Lack of cleanliness is an important contributing factor. Once again, Egypt is the main endemic area, and it has been suggested that the rate of incidence even exceeds that of bilharzia. Trachoma was also found to be the most widespread disease affecting a large number of Arabs who applied to be engaged as labourers in the construction of oil pipe-lines between Iraq and the Mediterranean.

Finally, the two diseases of pellagra and beri-beri are caused by a deficiency of vitamins in diet. It has been shown that pellagra is most

¹ Worthington quotes the district of Kom Ombo (Upper Egypt) which, a desert in 1900, has recently been irrigated, and now supports a population of 40,000. Of this population 84 per cent, suffers from bilharzia, and 24 per cent, from hook-worm.

* This is a practice beyond the reach of many fellahin, since the price of shoes ranges between 10s. and £s (\$2 to \$20), and his total weekly income averages 5s. to £1 (\$1 to *4).

frequent amongst communities using maize as a staple cereal; and a similar correlation exists between the eating of polished rice, and beri-beri. Pellagra is recognised as an important factor in the backward condition of negro and poor white cultivators in the southern states of the U.S.A.; but so far, the disease has occurred only on a small scale in the Middle East. With the extension of maize cultivation in the Middle East, there is a danger that pellagra may also increase; and an unfortunate feature is that greatest development in maize production is occurring in Egypt, which, as we have seen, has an already low standard of public health.

Agricultural Productivity.—The following tables give an indication of the main features of agricultural productivity in the Middle East and may hence be regarded as a summary of the factors considered in this chapter. Despite the fragmentary nature of the statistics, the generally low standard of productivity emerges clearly, and there can be no doubt that extreme poverty and a precarious standard of living are at present the lot of most inhabitants of the region.

AGRICULTURAL PRODUCTIVITY^x

(a) Total Grain Production (annual average 1935-38)

		<i>Amount per head</i>
Cyprus, Egypt, Iran, Iraq, Lebanon, Palestine, and Syria	9*5 million tons	440 lb.
Bulgaria, Rumania, Yugoslavia	22 million tons	1,100 lb.

(b) Comparative Agricultural Productivity

Net production per male worker in agriculture
(in International Units)

United States	661
Great Britain	475
Syria and Lebanon	98
Iraq	93
Egypt	90

An International Unit is defined as the amount of goods and services that could be purchased for \$1 in the U.S.A. during the period 1925-34.

¹ Figures by K. A. H. Murray and A. Bonne\

(c) Food Available per Head of Population (in lb.)

	<i>Egypt</i>	<i>Gt. Britain</i> (1937)	<i>U.S.A.</i>
Meat, fish, poultry	20	187	90
Milk (litres)	73	88	217
Eggs (each)	44	200	228
Sugar	24	95	35
Potatoes	11	222	180
Vegetables .	22	103	79

CHAPTER X

GENERAL ECONOMIC LIFE (2)

I. PASTORALISM

THE pastoral industries of the Middle East lend themselves least to statistical survey, since most pastoralists are nomads, with strong prejudice against any form of census or enumeration, either of themselves or of their animals. Few governments in the Middle East have attempted anything more than an estimate of their herding populations; and in Palestine, where governmental organisation is highly developed, the most that has been achieved is a small sample survey of the Badawin of the Beersheba district. The fact that this survey, though carried out with great care, was thought to have an accuracy of only 80 per cent, demonstrates the impossibility of discussing animal industries of the Middle East in any way other than a broad outline.

For the most part, agriculture and animal husbandry tend to be separate occupations. The 'mixed' type of farming characteristic of many parts of the world is practised only on a small scale, and many villages maintain one or more shepherds to look after all animals in common, whilst the great majority of owners devote themselves entirely to cultivation. In some parts, there is even antagonism between herders and agriculturalists of the same district.¹ The only areas in which mixed farming may be said to be strongly developed are the Jewish colonies of Palestine, where deliberate emphasis has been placed on a balanced economy of herding and cultivation.² In this separation, however, we may trace the operation of a geographical control—herding tends to be restricted to less favourable regions, usually mountain or desert, where water or good soil are lacking. Because of pressure of population, all lands capable of cultivation are given over to cereal growing, which produces a greater quantity of foodstuff per unit of area than land under pasture.

Because of restriction to a generally unfavourable environment, the quality of animals is poor, and yields of food and other products are low. The size of individual animals is markedly less than in many other parts of the world. This is particularly noticeable in the case of sheep and cattle, many of the former being scarcely larger than

¹See p. 118.

²P. 390.

European dogs.¹ Hence the yield of meat and milk is small, and wool and hides are of indifferent quality. Middle Eastern wool is in fact extremely hard and 'hairy', so that it cannot be used in the making of certain fine textiles, but instead finds its greatest use in the making of carpets. One compensation for the leanness of Middle Eastern sheep is afforded by the growth of a mass of fat in the tail, which may weigh up to 10 lb. or even 20 lb. This fat is eaten as a delicacy by the Arabs.

In point of numbers sheep predominate in most areas. Besides providing a small convenient carcase which can be eaten by a single family group in a short time—a factor of importance in view of the hot climate—the sheep provides milk and wool; and because of its ability to travel considerable distances between pastures it is better adapted than are cattle to existence under semi-arid climatic conditions. Goats are also kept in large numbers, both in steppe and mountain areas. These animals are more agile than sheep, and can find sustenance on less abundant vegetation, though, as we have seen, their voracious cropping of all green plant life makes them a menace in certain parts of the Middle East. Goats are kept for their meat, milk, and for their hair, which can be woven into a thick, smooth cloth that will resist soaking by rain, and is hence favoured for the making of tents and Badawin cloaks. The finer hair from Angora goats (mohair) produced in small quantities—chiefly from Asia Minor—is almost all exported.

Cattle are less numerous, and tend to be kept in cultivated areas rather than on the steppes. Except in Egypt, fodder crops are rarely grown specially for these animals, which have to find a bare subsistence on stubble pasture after cereals are harvested, or on the weeds that are found on arable and fallow land. Only in a few areas is there any attempt to develop a dairying industry distinct from cereal farming. One of these areas is the Jewish settlements of Palestine, others the regions of Beirut and Cairo, and the oasis of Damascus; and in all four the presence of a large city has been the reason for the growth of dairying. Milk cattle are often kept within large cities, and stall-fed on the vegetable refuse—stalks, leaves, etc.—from neighbouring market gardens. Conditions are only too often the extreme reverse of hygienic, and frequently milk becomes the carrier of disease (Himadeh). Beef is not greatly eaten, mutton being preferred, so cattle are usually extremely lean and small.

¹ Sheep are sometimes kept as household pets, particularly by Moslem families, who regard the dog as unclean.

Because of Jewish and Islamic religious prohibition, pigs are kept mainly by Christians, though there has been some development in pig-keeping in Turkey since 1923. The Lebanon is the chief area, but because of the warm climate, numbers are not large. Water-buffalo are important in the marshes of lower Iraq, in the Nile delta, in the Caspian provinces of Iran, and in the alluvial coastlands of Asia Minor, where in addition to providing milk, they are used for ploughing rice-paddy fields.

Donkeys are the principal draught animals of the Middle East. Hardy, sure-footed on broken ground, and tolerant of indifferent pasture, or poor fodder, these animals are used both for ploughing and for transport of people and goods. The usual ploughing team is a cow yoked with a donkey ; and most camel caravans are led by one or more guides mounted on donkeys. To ride a horse is a sign of affluence, and most ordinary people are content to travel on the humbler donkey, though motor transport is reducing the number of animals used in this way.

In certain parts, notably Cyprus and Asia Minor, mules are bred in large numbers, and camels are also found in all countries of the Middle East, though they tend to occur most in the more arid south. Breeds have been developed to resist the winter cold of Turkey and Iran, so camels must not be thought of as purely warm desert animals. They are especially important in Iran, where most of the country is arid ; and also, of course, in Arabia.

Horses are the least important of the draught animals of the Middle East, since their natural habitat is the cooler steppe of Central Asia, and they have been introduced only with difficulty into the Middle East. Pasture is usually too rank or poor for much grazing, and keeping a horse is a matter of considerable expense. Hence horses are never used for ploughing or carrying merchandise, but they fulfil a function exactly similar to that of an expensive motor car in Europe or America.

II. MINING AND INDUSTRIES

Mining.—Apart from oil resources, which will be discussed separately, the mineral deposits of the Middle East are of restricted importance. Though widely scattered throughout the region, minerals occur only in relatively small amounts; and in many instances, the size of the ore body hardly justifies the establishment of large scale plant for extraction and treatment. A second disadvantage is the remoteness

and inaccessibility of many deposits ; because of their association with the folded zone of the Middle East, a number of the most productive veins must be sought at high altitudes, in regions that are difficult both topographically and climatically. After ore is mined, there is a long and expensive haul to centres where it can either be treated locally or shipped abroad. Communications, which are frequently indifferent even in the non-mountainous regions, are extremely poor in many mineralised zones, so that cost of production of Middle Eastern minerals is high, and production occupies a marginal place in world markets, exploitation occurring only when prices are high. Even in Palestine, high cost of transport over the 80 miles to the Mediterranean has an adverse effect on the output of minerals from the Dead Sea ; and in Asia Minor and Iran, where ores must move several hundred miles to the coast, this drawback is much more pronounced. Railways and roads are few in number; hence special arrangements are necessary, and in some cases special railway lines to mines have been constructed at a high cost. Aerial ropeways for carrying ore are also a feature in Cyprus and Asia Minor.

Another disadvantage is lack of coal, which apart from the general effect on economic life, has a directly restrictive influence on the production of other minerals, since ores cannot be treated or even concentrated at the mines, and must usually move outside the Middle East for refining. Coal of good quality is found only in the north-west of Turkey, in the Ereğli-Zonguldak basin ; and output is barely sufficient even for the limited needs of Turkey herself.

A fourth obstacle to mineral production is lack of labour. Most mining centres are well away from centres of dense population, and there is little inducement, in the scale of development of mining industries, to attract a large mining population to the hilly zones where minerals could be exploited. The severe winter of the north makes it impossible to continue mining throughout the year in many parts of Anatolia ; and most peasants prefer, if at all possible, to combine with mining some part-time cultivation or herding. Even workers in the Turkish coal mines return to the fields for a short time during the harvest season, and, in an effort to maintain production, the Turkish government has been forced to experiment, not altogether successfully, with convict labour.¹

¹ In cases where convicts could not be used, recourse has been had to students in secondary schools and universities. It would not, however, appear that service in the mines was in any way related to previous performance in examinations.

A further adverse factor, though of minor importance, is the fact that exploitation of metals in the Middle East has been in progress, at least in a sporadic way, since the dawn of history. The gold of Lydia (Asia Minor) where coins were first issued; the copper of Cyprus, and the iron of Anatolia and Phoenicia have all been partly exhausted of their richest ores : and although these considerations obviously do not apply to minerals like asbestos or chromium, certain areas formerly renowned as centres of mineral production have no modern activity. On the other hand, new discoveries have been made on old sites, and improved technique in extraction allows exploitation of ores that were rejected in ancient times as being of too low grade.

It is not proposed at this stage to outline the detailed distribution of the mineral resources of the Middle East: for the present it is sufficient to note that the general picture of mineral production is one of rather sporadic development over a fairly wide area, with a variety of methods of exploitation. These range from haphazard collection of ore from "surface outcrops, with no attempt at actual mining, by peasants whose chief livelihood is in agriculture or forestry, to intensive exploitation on a large scale involving the use of modern machinery. As an example of the former method, we may note the chromium deposits of the Amanus Range of south-east Turkey, and also the umber veins of Cyprus, which are both exploited mainly by foresters and cultivators, who merely collect masses of ore lying on the surface of the ground. Modern methods using solar heat are employed at the Palestine Potash Company's concession at Kallia, on the Dead Sea.

III. INDUSTRY

Industrial development in the Middle East is as yet only on a small scale. Probably less than 15 per cent, of the population of the region derives a livelihood from industry; and of this total, a considerable proportion is still engaged in hand craftsmanship or 'cottage' industry, and remains unaffected by modern large-scale methods. Lack of fuel, chiefly coal, is a principal cause of this restricted development; but scarcity of raw materials, and poor communications are other serious adverse factors.

We have seen that the coal deposits of the Middle East are few in number ; and it is only in recent years that the oil resources of the

region, now recognised as extremely abundant, have been developed to any considerable degree. At the present time oil fuel is used only to a limited extent in industry, partly because the bulk of Middle Eastern oil, being handled by foreigners, moves outside the Middle East, and serves relatively few consumers within the region*; and partly because large-scale industrial plant, having been imported from Europe or America, is designed to use coal or electricity as prime fuels. As time goes on, this situation will probably alter: more oil will be retained within the region of production, and technological processes using oil as a fuel are likely to be developed to suit the special conditions of Middle Eastern industry.²

Before discussing modern industrial production, it is necessary to note the existence of a wide variety of handicrafts and 'cottage' trades. Of these, small scale working of metals has continued since earliest times. First copper and bronze, then iron smelting were developed from the widespread but rather scanty ore deposits of the north and centre of the Middle East; and this irregular distribution of metals, together with chronic lack of fuel in many parts, has tended to give metal working in the region the character of a craft industry, with the value of the finished product lying in workmanship rather than in the raw material itself.³ Highly tempered steel for weapons and harness, ornamental domestic utensils with elaborate chasing and inlay work, and gold and silver ornaments are the chief products of Middle Eastern handicrafts in metal. During the Middle Ages, Damascene steel and inlay work had a world reputation, and something of the ancient tradition still lingers in the modern workshops of the district. Silverwork from Amara (Iraq) and Iran has to-day more than a local renown.

A second product of small scale craftsmanship are textiles of various sorts. Raw materials are abundant: cotton, flax, silk, and wool are all produced within the area, and as well, camel- and goat-hair are available in steppe regions. The natives of the Middle East use cotton and silk for much of their clothing, and cloaks of finely woven camel-hair serve as an impermeable outer garment for the majority of the Badawin. Although traditional 'Arab' dress is

¹ Chiefly for automobiles, and for domestic use in cooking stoves.

² Electric power is little developed, because (a) of the lack of fuel, (b) the lack of water for cooling purposes. It is not always realised that copious quantities of water are essential in the generation of electricity; and even the waters of the River Thames are only barely adequate for the needs of London's power stations.

³ Cf. the industries of Switzerland, where a similar principle holds good.

retreating before European styles,¹ it is still worn exclusively by nomads, and by a minority of townsmen ; and a large proportion of the textiles used in this way are of local production.

In addition to the production of textiles for everyday articles of clothing, the Middle East, particularly Syria and Iran, specialises in luxury brocades, which consist of metallic threads of gold or silver interwoven with a base of silk, or silk and cotton. Mohair, woven from the fine hair of angora goats, is produced on a very small scale, chiefly in Asia Minor ; and there is some production of linen, mainly from Cyprus.

Wool produced in the Middle East is, as we have seen, often too coarse and too hairy for use in high quality textiles. Instead, it is used in the manufacture of carpets and rugs, for which parts of Iran and Turkey are world famous. This activity is *par excellence* a small-scale craft: the finest Persian carpets have as many as 400 tufts per square inch, and take years to complete. The wool is tinted by hand, using special processes that are sometimes family secrets handed down through generations; and designs peculiar to each locality make it possible for the connoisseur to recognise from which district the finished carpet has come. Lately, the competition of cheaper machine-made carpets, and the introduction of aniline dyes have struck a blow at the carpet industry of the Middle East; and changes in fashion have also led to a decline in the European demand for Turkish and Persian products.² The chief sources of demand are now America and the Middle East itself. In the latter region carpets are an essential and much prized article of furnishing, not merely for the Bedouin,³ but also in the houses of townsmen, where, in addition to their normal function, carpets are used for wall decoration, and as coverings for divans.

Another aspect of textile craftsmanship is the needlework and embroidery carried on by women in some districts as a supplement to other occupations. Embroidery, lace-making, and drawn-thread work on silk, linen, and cotton reach a high standard, and testify to a

¹ Less than a century ago, for example, it was unsafe to appear in the streets of Damascus wearing European dress. To-day, about two-thirds of the inhabitants have adopted the newer style.

² Turkey * carpets, in particular, had their greatest vogue in Victorian times, and have since lost in popularity.

³ Carpets, almost the sole furnishing of Bedouin tents, are a sign of affluence and social importance. An invitation to make use of the carpet of a tribal chief confers 'social standing'.

long-continued and skilful tradition. This luxury trade is, however, developed mainly in association with the tourist traffic of the Levant; the product being sold chiefly to travellers and pilgrims. Lace from Nazareth, Beirut, and Aleppo, linen work from Cyprus, and embroidery from the Lebanon, Syria, and Turkey provide a livelihood in areas where population pressure is great, and means of subsistence restricted.¹

Other small-scale but widespread local industries are the preparation of foodstuffs (olive-oil, food pastes, dried fruits, etc.), and soap-boiling. The latter, although of frequent occurrence in olive growing areas, is still inadequate to supply the real needs of the population.

The craft industries of the Middle East are, with few exceptions, carried on in, or near, the towns; communications being too poor to allow an extensive and purely rural 'cottage' industry similar to that of eighteenth century Lancashire or Yorkshire. Small workshops maintained by a single owner with the assistance of his family, or at most, five or six paid assistants, are most characteristic; and shops of a similar trade are often grouped together in a single street, e.g. Street of the Coppersmiths. Equipment is scanty and very simple—hand charcoal braziers, hand looms, or primitive oil presses of stone—and often the workshop is little more than an alcove hollowed out in the thick wall of another building.

Within the last quarter-century, native crafts of the Middle East have declined in the face of competition from cheaper, mass-produced foreign imports, and from the products of large-scale mechanised industry at home. This decline was first apparent in the textile industries but has since spread to almost all trades. Under pressure of competition, hand craftsmanship has to some extent deteriorated in quality: the finest Persian and Turkish carpets are no longer made, and cheaper imitations of machine-made foreign goods are appearing. At the same time, labour conditions are worsening—as in the first stages of the Industrial Revolution in Europe and America, craft or 'home' industry is degenerating into sweated labour, with 10, 12, or even 13 hours of work per day not uncommon. Seasonal employment is also a recurring feature. Such developments are having a repercussion on social life in the region; there is a marked drift of

¹ Numbers of Armenian refugees in Syria and the Lebanon have found a living in this way.

population to the larger towns, with the growth of a rather restless urban proletariat.

Modern Trends.—Since 1918, a number of Middle Eastern states have embarked on a policy of industrialisation, with the object of attaining self-sufficiency in certain manufactured goods. This has led to the adoption of modern, large scale methods, in order to allow newly developed industries to compete effectively in the home market against goods produced in America, Britain, France, Germany, Italy, and Japan.¹ In Iran and Turkey, a form of state capitalism has been adopted as the best means of stimulating industrial development; in Cyprus, Egypt, Iraq, the Lebanon, and Syria expansion has been conducted under private enterprise, with certain concessions, usually a tariff wall against foreign imports, from the state.² The Jewish community of Palestine has adopted an intermediate system relying partly on private enterprise, and partly on controlled development subsidised by the Jewish Agency.

In view of the limited resources both in fuel and raw materials, there seems little possibility of Middle Eastern industry entering world markets as a serious competitor. It is even doubtful whether the more modest aim of national self-sufficiency will be fully achieved : lack of iron ore in many regions makes it more than likely that a large proportion of machinery and capital goods will continue to come from abroad. As regards textiles, the position is somewhat different, and some further expansion may be expected, in view of the unusually wide variety of textile fibres produced within the Middle Eastern region.

So far, modern industrial development has been concerned with (a) textiles, (b) chemical production, (c) light engineering, (d) the processing of foodstuffs, and (e) cement manufacturing. As regards textiles, greatest attention has been paid to cotton. Large scale spinning and weaving plants are in operation in Egypt, Iran, the Lebanon, Palestine, and Turkey ; and Egypt and Turkey are approaching self-sufficiency in certain types of cotton goods. Silk reeling by modern machinery has also started; and in Turkey a number of woollen mills have been constructed. Engineering in

¹ Pre-1939 position. The last three countries now send very little to the Middle East.

² In Iraq, under the Encouragement of Industries Law of 1929, new industrial enterprises are exempt from income tax for a period of six years; their raw materials, if imported, are exempt from customs duty ; and tariff protection amounting to 25 per cent, or 50 per cent, may be given.

Egypt, Iran, and Turkey has been developed partly with the idea of producing hght armaments : and it is significant that the largest single industrial plant in Iran, after the Anglo-Iranian oil installations, is the State Arsenal. A similar trend is also apparent in the chemical industries of Iran and Turkey ; but even so, armaments produced locally within the Middle East consist chiefly of rifles and ammunition. Aircraft, tanks, and heavy armaments are still obtained, at need, from more evolved nations in Europe and America. Other chemical industries have been developed in Palestine, where the deposits of the Dead Sea provide potash and bromide ; and in Egypt, where local demands are now almost met by home production.

Light engineering has become a feature in Palestine, Turkey, and Egypt. In the first country, Jewish capital and technical skill have led to much development in the regions of Tel Aviv and Haifa ; and entirely new small-scale industries have also been introduced from Europe.

Processing of foodstuffs is a traditional Middle Eastern occupation. Of late, several canning factories for fish, fruit, and olive oil have been started ; and, in view of the climate and indifferent communications of the region, this activity would seem to have future potentialities. Lastly, production of cement is also likely to increase. Fuel is the main limiting factor ; large outcrops of calcareous strata provide ample raw material ; and social conditions, which give emphasis to building construction as one of the few secure outlets for capital investment, are likely to maintain a brisk demand for the finished product.

Development of modern industry to some extent on a nationalistic basis has led to the erection of tariff barriers. In some cases, a cheaper and better foreign product has been excluded in favour of a dearer and inferior home produced article ; and though local manufacturing has in many instances been stimulated, this has occurred at the price of a higher cost to the consumer, and also of a slight deterioration in political relations with neighbour states. For example, a number of Palestinian products, both agricultural and manufactured, are excluded by tariff from Egypt which is in some respects economically complementary to Palestine ; and retaliatory discrimination in tariff policy has tended on occasion to assume prominence in several other states.

Another outcome of economic nationalism has been a shift of commercial balance within the Middle East. Under the Ottomans

most of the region (excluding Iran) was a single economic unit, and the craft manufactures of Constantinople, the grain markets of Aleppo, and the textile industry of Syria, to name only the chief activities, supplied a wide area. With the resettlement of 1918, markets were restricted in extent; and although the new policy of self-sufficiency has allowed a wider variety of manufactures within individual states, outlets for a number of commodities have been restricted, with a consequent loss of certain of the economies of large scale organisation. This loss has fallen unequally on certain districts of the Middle East—European Turkey (particularly Istanbul), Syria, and the Lebanon having been the chief sufferers. Palestine and much of Anatolia have been unaffected.

Some reference has been made to conditions of labour in the handicraft industries. Unfortunately, with, however, certain conspicuous exceptions, a low standard also prevails amongst workers in modern industry. Labour legislation, restricting hours of work and the employment of women and children, has been enacted in many states of the Middle East but is sometimes allowed to become a dead letter because of lack of inspection and governmental control. Children of 10 or less are to be found at work, sometimes under hard or dangerous conditions; and the large surplus of unskilled labour, due to high birth-rates and to the gradual extinction of handicraft industries, has meant that the collective bargaining power of the artisan has remained low. Trades unions have in fact been looked on with suspicion by a number of governments, and labour organisation is therefore in a rudimentary stage. Another unfortunate feature has been the fact that although prices have risen considerably since 1939,¹ it is doubtful whether there has been an equivalent rise in real wages amongst the lower classes. Moreover, speculation and hoarding by wealthier members of the community have tended to prevent the benefits of a war-time increase in commercial and industrial activity from reaching the poorer classes.

¹ Changes in the cost of living can be estimated from the following table :

<i>Wholesale Prices Index (Outline)</i>					
				1935-8	1945
Egypt.	.	.	.	.100	330
Iran.	.	.	.	.100	1,200
Iraq.	.	.	.	.100	600
Palestine	.	.	.	.1 0 0	340
Syria and Lebanon	.	.	.	.1 0 0	1,100
Turkey.	.	.	.	.100	500

During the war of 1939, the Middle East was largely cut off from imports of manufactured goods, and hence forced to rely on her own production. Local industry was greatly stimulated, not merely by an increased home demand, but also by large orders for consumption goods placed by allied military authorities. The presence of numerous Allied troops with a purchasing power much above that of the average native population was a further stimulus. As a result, rapid expansion took place : in particular, the silk trade, which in some regions had been facing extinction in 1939, took on great importance as one of the few silk industries left in Allied hands. Palestine probably derived greatest benefit from war-time expansion, but the effects were felt in many other states, especially Egypt. How far the industries established under war conditions will be able to hold their own when foreign competition re-commences is doubtful, but, arguing on the experience of Egypt after 1914, when a similar war * boom ' occurred, it would seem that a proportion of the newly developed industry will remain.

In summarising industrial development in the Middle East, it is important to maintain a correct perspective. Although attention has been devoted to recent developments in industry, it is essential to recall that agricultural and pastoral pursuits retain greatest importance, since they occupy an overwhelming proportion of the population. Modern textile industries in Iran and Turkey, cited as an example of active development, do not compare in scale with textile production in Europe or America.¹ Statistics show that the transformation of agricultural products (e.g. brewing, food preparing, fruit packing, milling, refining, and soap-boiling) ranks as the principal industrial activity of the Middle East, followed by textiles, engineering, chemical production, and cement making. Figures from Palestine, which must be regarded as highly industrialised by Middle Eastern standards, give a fair summary of industrial activities for the Middle East as a whole. Because of the Dead Sea deposits, however, chemical industries assume a relative importance greater than in other regions.

¹ Modern cotton spinning and weaving mills of large or moderate size number no more than 20 in Iran, about the same number in Turkey, and Egypt, 5 in Iraq, and 1 in the Lebanon. Palestine has over 90 establishments classed as ' textile factories ,' but as the average number of employees per factory is less than 20, so many of these are extremely small. The total number of cotton mills in the whole of the Middle East does not therefore exceed the number in a single moderately sized town in Lancashire or New England, e.g. Oldham or Fall River, Mass.

MODERN JEWISH INDUSTRY, 1943

	<i>No. of establish- ments</i>	<i>Personnel</i>	<i>Value of Production (in £ Pal.)^f</i>
Food	385	7,210	10,400,000
Chemicals (with edible oils)	168	3,880	4,820,000
Textiles	246	5,700	3,960,000
Metal works	204	6,060	3,870,000
Machinery	204	4,170	2,120,000
Clothing	216	3,020	1,900,000
Leather	129	1,830	1,830,000
Stone and Cement	71	1,860	1,530,000
Others .	617	12,120	7,070,000
Total	2,250	45,850	37,500,000

* There is very little large scale industry in Palestine run by Arabs,

† £1 Pal. = £1 sterling = \$4.

Lack of statistics make impossible any full or detailed comparisons : one cannot even arrive at an estimate of the exact industrial population in each country, or determine the proportion of workers in craft or ' cottage ' industry. All that can be said with certainty is that in the Middle East industry is at present undergoing a transformation comparable with that in Europe during the first stages of the Industrial Revolution. Home industry, carried on in towns and adjacent country districts, is gradually being concentrated and transformed into mechanised operation on a larger scale. The extent of Middle Eastern resources does not, however, warrant the assumption that industry will reach the scale attained in Europe and America : although likely to expand in a few directions, it will remain an activity subordinate in importance to agriculture and pastoralism.

IV. FISHING

In view of the low standard of agricultural productivity, it might be expected that the Middle East, with its long coastline, would have developed an important fishing industry. This is not so ; comparatively little sea fishing takes place, and of the meagre quantities of fish produced, slightly less than one-half is obtained from inland waters. There are several reasons for the lack of attention to fishing,

and most of these have a geographical basis; but one is mainly psychological—the prejudice of Moslem peoples, and of Shi'a Moslems in particular, against eating certain species of fish.

A second factor is *die* straight, harbourless, and often sheer coast-line, which offers little inducement to seafaring on a small scale. Even in regions where harbours are more numerous, local populations have in a few cases turned their back on the sea, and settled at some distance from the coast, because of the liability to piratical raids in the not too remote past. This is especially true of Cyprus, where one might expect fishing to be an important occupation. Other natural factors influencing sea fishing depend on local conditions; and these will now be examined in turn.

Black Sea.—Below about 250 feet, the waters of the Black Sea are heavily charged with sulphuretted hydrogen. Fish are therefore restricted to the upper levels; and in winter, storms and ice produce a large scale migration of fish towards the calmer Aegean and Mediterranean, with a return movement in spring. Much fishing is, therefore, possible in the Bosphorus, Sea of Marmara, and the Dardanelles—one factor incidentally, in the importance of Istanbul—and large quantities are caught in spring and autumn, at the times of migration, about three-quarters of the total being marketed at Istanbul. In the Black Sea itself, fishing is also a seasonal occupation, and a surprising variety of fish are caught: anchovy, mackerel, sardine, turtot, and tunny being the chief. A proportion of the catch is canned at various ports along the Black Sea, and at Istanbul. Turkish production of fish is higher than in many other Middle Eastern countries; but even so, further development could easily take place, especially in centres at some distance from Istanbul.

Mediterranean.—The Mediterranean is far less rich in fish than is the Black Sea, owing to a lack of nutriment for the fish themselves. This lack arises from a deficiency of calcium salts, which in other sea areas are produced by the entry of fresh water from rivers and by interchange of deep and shallow waters under the influence of tides, currents, and atmospheric turbulence. In the eastern Mediterranean, all these factors are of small effect; the Nile is the only large river, and where it enters the sea there occurs the one important fishing ground of the eastern Mediterranean. In late summer and autumn, when the river is in flood, large shoals of sardine move towards the Nile delta to feed upon the nutriment in the fresh water; and heavy catches are obtained during the short season of Nile flood.

Along the coast of the Levant, sardine, mackerel and mullet are caught; but the number of boats engaged is small. Some extension is planned for Palestine, but a limiting factor is the scarcity of fish away from sea areas influenced by Nile water. The eastern Mediterranean is, however, an important area for sponges, and a high quality product is obtained in most areas, the best coming from the Egyptian coast immediately to the west of the Nile delta. The sponge industry is closely controlled by various governments concerned, since over-fishing can easily occur. Chief areas of production are the Dodecanese Islands, Cyprus, the island of Ruad (off the coast of Syria), Egypt, and Cyrenaica.

Red Sea.—Fishing can hardly be said to have yet begun on any scale. During the war of 1939, interest centred on the Gulf of Akaba as a source of extra food for Palestine and Transjordan; but lack of labour and difficulties of communication between Aqaba and its hinterland were serious handicaps. Moreover, it is not thought that the waters of the Gulf are particularly rich in fish. Further to the south, a scanty population along the shores, together with difficulties of communication inland, are almost insuperable obstacles; and activity is limited to a small production of shark, trochus shell (mother of pearl), and beche-de-mer, the latter being sold in China. Most of the fishing trade of the Red Sea has been developed from the African shore, chiefly from Port Sudan and Massawa.

Indian Ocean.—In contrast to conditions in the Red Sea, fishing on the coasts of Southern Arabia is probably the principal activity of the people. In the words of Worthington, the sea is equally as, or more productive than the land. During summer, shark are caught; and in winter, immense shoals of sardine approach the shore, followed by numerous tunny, which prey on the sardines. The native Arabs live for the most part on fish, fresh and dried, which in inland regions is also fed to transport camels; and even forms the chief fodder for cattle in regions east of the Aden Protectorate. It is not surprising to note that the inhabitants of south-east Arabia were known to the ancient Greeks and Romans as the Ichthyophagi (fish eaters).

Persian Gulf.—So far, only a small development of fishing has occurred in this area. On general grounds it might be expected that relatively large quantities of fish would occur, especially in view of the richness of the waters of the Indian Ocean off the coast of Arabia, and also because of the entry of fresh water from the Euphrates and

Tigris. Some fishing on a limited scale takes place in the lower Persian Gulf and Gulf of Oman ; and one canning factory has recently been established by the Iranian government at Bandar Abbas, **but output** is very small, even below the full capacity of the installation.

At the head of the Persian Gulf, more extensive fishing is carried on to supply local needs in the marshlands of lower Mesopotamia. The Anglo-Iranian Oil Company has recently organised a scheme by which part of the catch is transported to the Abadan region, for consumption by the employees of the Company, who number some 100,000 natives and Europeans.

Caspian Sea.—Fishing in the Caspian is primarily concerned with the production of caviare from the roes of the sturgeon ; and this industry, even in Iranian territory, is almost entirely controlled by Russians. Iran receives only the revenues from the caviare industry, with caviare itself and the flesh of the sturgeon being exported to Russia. Apart from this large scale fishing for sturgeon, local fishing by Iranians produces a small catch which serves the needs of the Caspian provinces, but does not reach the interior of Iran. Fishing in the Caspian has only limited possibilities, since although present production is relatively high, the sea is rapidly shrinking in size, and restriction will be necessary in the future in order to conserve supplies of fish. Production has already fallen by 50 per cent, within the last ten years.

Inland Fishing.—This is, relatively speaking, of considerable importance. One reason is the concentration of population in many riverine areas, as the result of which markets for the catch, and a supply of labour are both easily available. In Egypt, areas of inland water (including the four lakes of the Nile delta) amount to one-fifth of the area of cultivated land, and the catch from inland fishing is several times greater than that from the sea. Chief areas of inland fishing are the four delta lakes, Menzaleh, Brullos, Idku, and Mariut, together with lake Qarun in the Fayyum basin. The latter lake is stocked with fry from time to time, and its fisheries now employ over 2,000 men. The catch provides a most valuable supplement to diet in the Fayyum and Cairo districts. In the view of Dr. Ball, the fisheries of Lake Qarun will decrease in importance because of increasing salinity of the water, which will reduce the number of fish. One remedy, that of raising the water-level by allowing inflow from the river Nile, is unlikely to be adopted, because of the loss of agricultural land that would result.

Fishing is also important along the middle Euphrates and Tigris; and, in addition to satisfying a local demand, quantities of fish have also been sent to Palestine. The fact that fish could profitably be transported some 600 miles across the Syrian desert to places like Tel Aviv, which is itself on the sea coast, gives an interesting sidelight on the difficulties of fishing in the Mediterranean, and is also an indication of the productivity of Iraqi rivers. The volume of exports to Palestine rose from 300 tons in 1933, to 1,500 tons in 1941.¹

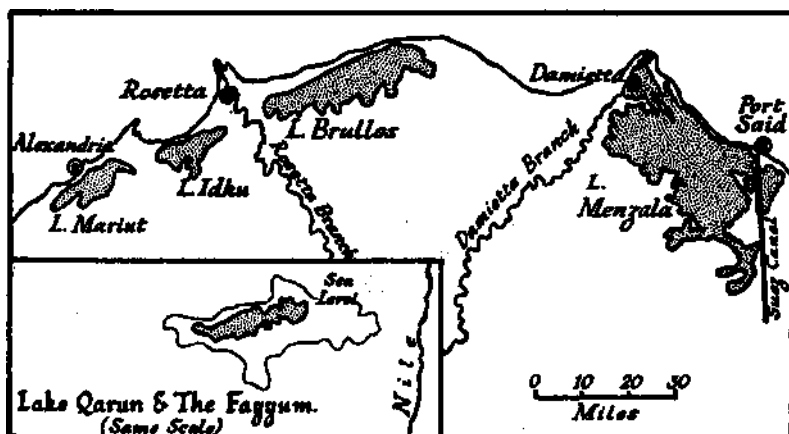


FIG. 33. The inland Fishing Grounds of Egypt.

A third area of inland fishing is the Jordan rift, and its continuation northwards into Syria. The Dead Sea is too salt for fish, but the Sea of Galilee, Lake Huleh, and the swamps of Lake Horns and the Ghab on the Orontes are all productive. Output is smaller per unit area than in the case of Egypt, because of certain natural drawbacks (e.g. the presence of hot mineral springs), and because of less efficient methods of fishing and of breeding control. The Jewish Agency for Palestine has recently devoted attention to the breeding of carp for the stocking of inland waters, partly with the idea of increasing food production, and partly to reduce the incidence of mosquitoes.

¹ The traffic was stopped in 1942, by decrease of the Iraqi Government, which was anxious to conserve the food supplies of the country. In all probability the traffic will be resumed, particularly in view of the new rail link between Tripoli and Haifa, which materially shortens the rail journey to Iraq.

ESTIMATE OF FISHING PRODUCTION, 1944, IN METRIC TONS
 (Mainly due to Worthington)

	<i>Sea</i>	<i>Inland</i>
Turkey	30,000	no estimate
Cyprus	400	nil
Syria and Lebanon	400	500
Palestine and Transjordan	2,300	700
Aden Protectorate .	25,000	nil
Iraq	no estimate	5,000
Iran (Caspian)	5,000	nil
Egypt	10,000	26,000
Cyrenaica	700	nil

OIL RESOURCES OF THE MIDDLE EAST

I. THEORIES OF ORIGIN OF OIL

THE process by which the petroleum deposits of the world have been formed is not as yet entirely certain. It was at first thought that mineral oil was of inorganic origin,¹ but more recent opinion is that oil derives from organic matter, and earlier inorganic theories are now largely discarded.

Petroleum would seem to have been formed by the decomposition of various types of marine life—chiefly plankton, but also algae and lowly animal organisms. As the remains of these organisms collected on the floors of seas and estuaries, they were gradually covered by deposits of thick, fine sediment that excluded air and light. Under such conditions, the normal process of decay did not operate : instead partial decomposition, produced by certain bacteria that exist in anaerobic conditions,² seem to have transformed the original organic material into globules of petroleum. It is also possible that chemical reactions involving mineral salts contained in the surrounding water and silt played some further part in the process of decomposition.³

As sedimentation continued, compression of the mass of silt led to its consolidation into rock measures of various kinds. The recently formed oil globules, at first widely dispersed throughout the entire mass of silt, and intermingled with water-drops, were hence squeezed out of their original parent rock, and forced to migrate, together with water and natural gas (also a product of organic decomposition), to any nearby rock measures such as limestone or sandstone. There,

¹ One theory, due to Mendeleeff, postulated a reaction between chemically charged subterranean water, and metallic carbides in the rocks; a second opinion, due to Bertholot, ascribed the origin of oil to reaction between metallic sodium and ground water containing CO_2 .

² *i. e.* without air.

³ It is interesting to note that the same process of sedimentation and organic decomposition appears to be in process at the present time on the bed of the Black Sea. The same conditions would also seem to be present in the Gulf of Oman. Black, strongly-smelling mud with a high organic content is being deposited, and the waters of the Black Sea below 250 feet are heavily charged with sulphuretted hydrogen (see p. 215).

a slow process of separation began, by which oil, as a lighter fluid, floated on top of the denser water, and gradually collected, under the influence of gravity, into large pools. Above the oil, and sometimes partly dissolved in it, occurred a quantity of natural gas; below was always to be found an accumulation of saline water.

In order for concentration of scattered oil globules to take place, some slight disturbance or irregularity of the rock measures would seem to have been necessary. Without the presence of some kind of trap or basin in which liquid could accumulate, the globules of oil would remain dispersed throughout a considerable thickness of rock, in a way that would preclude all possibility of commercial exploitation. Much of the oil might seep gradually away, and be lost. The occurrence of oilfields is therefore closely linked with geological structure; a limited amount of folding and dislocation is essential to allow the accumulation of petroleum in reservoirs, but excessive disturbance may break up the basin-like retaining structures and allow escape of the oil. Petroleum deposits are therefore associated with the outer margins of large fold structures, where disturbance of the rock measures, although present, is greatly restricted in extent.

A further condition for concentration of petroleum in large quantities is the presence of an impermeable rock layer, which acts as a seal immediately above the porous oil-bearing rock. Without this seal, or cap-rock, oil would not be retained in amounts sufficient to allow commercial extraction. Oil accumulation hence depends upon a conjunction of factors: (a) original richness of oil forming material, (b) the occurrence of porous strata, (c) tilting of the rock measures to allow separation of oil from water, and its concentration in workable quantities, and (d) impermeable cover-rocks to prevent leakage of oil to the surface. The main types of geological structure favourable to oil concentration are shown in Fig. 34, and of these, the first, or anticlinal type, is by far the most widespread.

Conditions in the Middle East are favourable to a remarkable degree for the occurrence of oil. Reasons for this are: (a) long-continued sedimentation in the geosyncline of the Tethys, as the result of which oil was formed in rocks of many different ages and character, (b) the fact that the Tethys was a warm-water sea, and consequently rich in animal life, (c) the further fact that although extensive fold movements took place, these were reduced in intensity over wide areas by the presence of an underlying crystalline platform (the similarity between Fig. 34, which is an idealised diagram, and actual

conditions in the Middle East will be noted),¹ (d) the frequent occurrence of strata that are porous either because of their structure, or because of later Assuring, and (e) a similar abundance of impervious, and sometimes highly plastic rock series near or at the surface : e.g., the occurrence of impermeable beds of sandstone, shale, gypsum, anhydrite and rock-salt. As a result, even though geological exploration is by no means complete, it is now known that the petroleum deposits of the Middle East are on a vast scale, and must be regarded

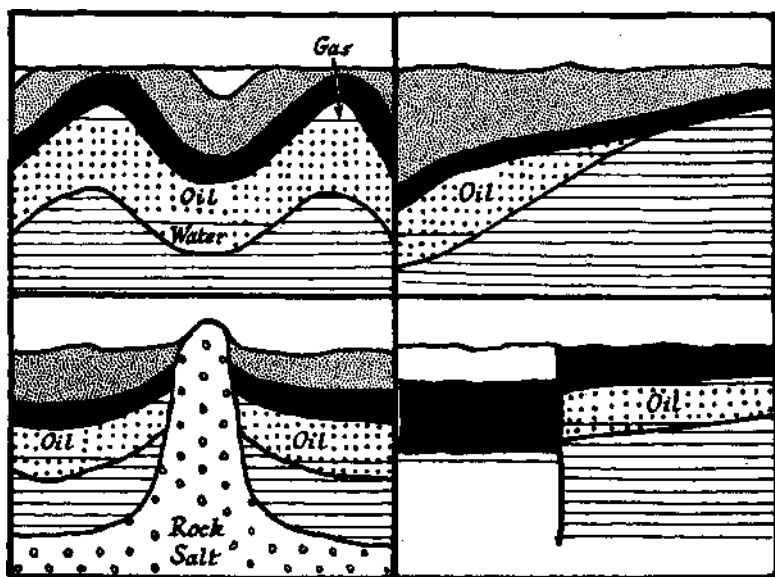


FIG. 34. Geological Conditions for the Occurrence of Oil. Cap-rock—black ; reservoir rock—stippled.

as one of the principal economic assets of the region. Despite the fact that exploitation has been delayed, and is in some cases only in the first stages, there is now little doubt that, on a basis of existing reserves, the Middle East region can be ranked as one of the greatest, if not the chief, potential source of petroleum in the world..

A special technique of geological surveying, known as the Seismic Refraction Arc Method, has been developed as a means of locating the oil deposits of Iran, which are for the greater part associated with

¹ In Iran, folds are steeper than in other oil-bearing areas of the Middle East. This is probably because the later series became detached from the crystalline basement as the result of shearing along the Cambrian salt-beds.

limestone series. It has been discovered that vibrations from an explosion travel much more quickly through limestones of a certain type than through other, non-limestone formations. Hence a charge of explosive (usually one to two tons) is detonated underground, and the results recorded at a number of seismometers spaced along the arc of a circle, the centre of which is at the source of the explosion, or shot-point. The seismometers are 10 to 15 miles away from the shot-point, so as to give time for differences in speed of travel of the vibrations to become clearly apparent; and, after allowance has been made for variations in altitude, the readings of each seismometer are compared. Because vibrations travel most rapidly through limestone, the seismometer placed at a point where an underlying bed of limestone approaches nearest to the surface will be among the first to record the explosion. In this way, by taking a number of arcs, buried anticlines and synclines in limestone formations can be mapped, even though these may lie unconformably with the surface strata. When the general trend of folding has been established, more precise observation of the exact crest of an anticline is made by grouping the seismometers in a straight line passing over the shot-point. By this means, using the same theoretical principle, not merely the position of the crest, but also its exact depth can be ascertained. Elsewhere in the Middle East, the more usual method of prospecting by reflection is followed.

II. OIL PRODUCING AREAS

The oilfields^x of the Middle East, from which production is actually taking place at the present time, can be grouped as follows :

- (1) The Khuzistan fields of south-west Iran.
- (2) The fields of north Iraq-north-west Iran.
- (3) Saudi Arabian and Persian Gulf Coast fields.
- (4) The fields of north-east Egypt.

There are in addition certain other regions in which geological structure is favourable for the occurrence of oil, and which therefore hold some possibility of important future discoveries. These latter regions will be discussed in the succeeding section of the chapter.

Khuzistan Fields.—These lie on the western flanks of the Zagros Mountains, in the region between Bushire and a mountain range

¹ The term 'oilfield' is used in a general sense, to denote an area in which a number of oil pools lie.

known as the Pusht-i-Kuh. The western Zagros is composed of a series of large anticlinal ridges, all aligned in a north-west-south-east direction, but of unequal longitudinal extent. One such ridge, the Pusht-i-Kuh, forms-part of the extreme western edge of the Zagros in the latitude of Baghdad. The range is only some 200 miles long, and where it dies out, both to the north-west and the south-east owing to downward plunging of the fold structures, it is not immediately succeeded by other ranges. Hence the western edge of the Zagros approaches nearer to the river Tigris, and descent to the plain of Mesopotamia is abrupt; but further to the north-west and to the south-east, there are wide lowland embayments within the highland region, where the plain rises more gradually, by a series of foothills, to the main ridges of the Zagros. It is in these two areas of foothills that the major oilfields of Iran and Iraq lie. The southern embayment, drained by the Karun river, contains the Khuzistan fields; in the northern embayment occur the second group of fields—those of north Iraq and north-west Iran—with the Pusht-i-Kuh range as a zone of separation between. Only in the two enclaves, where the transition from plain to mountain is less sudden, and where, as a result, folding is less intense, are oil domes found. In the region of the Pusht-i-Kuh rock series plunge steeply below the sediments of the Mesopotamian plain, and so far have not yielded oil in any quantity.

The valley floors of the foothill region lie at an altitude of 500-800 feet above sea level. Between them run anticlinal ridges, often dissected and terraced, and giving the impression of small plateaus. Towards the west, ridges and plateaus reach a height of about 1,000 feet above the valleys, but further east, topographical features are more strongly marked, with ridges attaining 3,000 feet. On one such ridge, the Kuh-i-Seh Qaleitun, is situated the main production unit of the Gach Saran field, from which oil flows by gravity to tide water on the Persian Gulf.

The oilfields of Khuzistan are related to the occurrence of a bed of limestone, some thousand feet in thickness, which acts as a reservoir for petroleum. This rock, known as Asmari limestone, and of Oligocene-Miocene age, is not, however, in itself especially porous, and were it not for numerous fissures, which have been developed in it as the result of folding movements, oil would not flow in quantities large enough for exploitation. Wells must therefore reach a fissure in the Asmari series before they become productive, but when this is achieved, flow of oil in a single well has sometimes attained one

million gallons per day. Because of the presence in the lowest levels of the Asmari beds of a quantity of water, which can be traced downwards without break through several thousand feet, it is inferred that oil has migrated into the limestone from a considerable number of other rocks of differing character.

In the foothill region, the Asmari beds are folded in a number of simple anticlines. Further to the south-west, however, they dip sharply under the sediments of the Mesopotamian plain, sometimes at an angle of 70° , while towards the north-east they outcrop at the surface among the main Zagros folds well to the east of the foothill region. Above the Asmari series is a complex of shale, salt, and anhydrite beds of Miocene age, known collectively as the Lower Fars series.

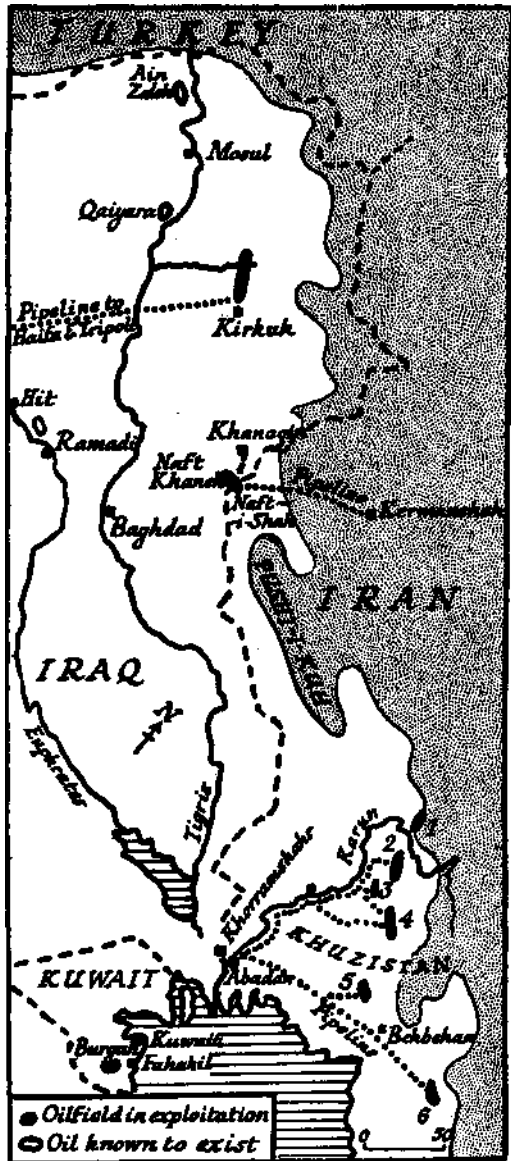


FIG. 35. The oilfields of Iran and Iraq. Land over 5,000 ft.—stippled. 1. Lali. 2. Masjid-i-Suleiman. 3. Naft Safid. 4. Haft Kel. 5. Agha Jari. 6. Gach Saran.

These beds act as an impermeable cap-rock, except where a number of faults allow some seepage of oil and gas to the surface. Because of the plastic nature of the salt beds, folding in the lower (Asmari) series did not conform exactly with that in the upper (Fars) series so that in the oilfield regions, a number of synclines in the lower Fars strata are underlain directly by anticlines in the Asmari measures. Until this disharmony was discovered, much difficulty was experienced by oil prospectors, since the surface features offered no clue to the nature of underground structures.

Oil is produced in six fields in Khuzistan : at Masjid-i-Suleiman, Haft Kel, Gach Saran, Agha Jari, Naft Safid (formerly known as White Oil Springs) * and Lali. The oil occurs in dome-like anticlines, which, each measuring 12 to 20 miles in length, rank amongst the largest oil structures in the world. There is free connexion within the limestone reservoir rock of each dome, so that only a small number of wells are necessary to tap the entire reserve of an individual field.² Wells are spaced at intervals of one to two miles on the sides of the anticlines ; and, as oil is withdrawn, a uniform pressure fall is apparent at all wells in the same field.³ Because of the outcropping of the porous reservoir beds at some distance to the north-east, in the relatively wetter uplands of the main Zagros ranges, part of the Asmari series is saturated with water, and there is considerable hydrostatic pressure in the oilfield regions; pressures of 1,000 to 2,500 lb. per sq. inch being recorded. Pumping of crude oil is therefore at present unnecessary—a factor which, with the limited number of borings required, allows an unusually low cost of production. Another favourable circumstance arises from the fact that as crude oil is withdrawn from a well, natural gas held in solution under very high pressure leaves the oil and fills the upper part of the reservoir, greatly restricting the rise of water at lower levels. Normally, as oil is tapped, salt water rises within the oil dome to fill the space left, and ultimately water mingles with and contaminates the last portion of the crude petroleum deposit. Quantities of oil may also be cut off and trapped by rising water, so that they cannot be withdrawn. In the Iranian fields,

¹ So called because the crude oil has undergone a process of natural underground condensation, and is much clearer than normal crude oil.

² Cf. conditions in east Texas, where there are 24,000 oil wells.

³ The small number of wells in Khuzistan as compared with other oilfields of the world led to a charge of deliberate restriction of production being made against the operating company by the Iranian government, which was anxious that production should be maintained at the highest possible level.

however, pressure of natural gas greatly restricts the rise of salt water, so that losses by contamination and trapping are much reduced.

Oil was first produced in 1908, from the Masjid-i-Suleiman field. After 1918, output steadily increased ; and in 1928, the Haft Kel field was developed. The remaining fields came into production during or after the second World War (Gach Saran 1941, Agha Jari 1944, Naft Safid 1945, Lali 1948). The crude oil is not, however, of particularly high quality, as there is a substantial sulphur and asphalt content, so that an elaborate technique of refining is necessary to obtain aviation spirit. Nevertheless, during the war years aviation spirit was produced at the rate of 20,000 barrels per day—an extremely valuable supply following the loss of Burma and the Dutch East Indies.

In 1910-13 a pipeline, 150 miles long, was constructed from Masjid-i-Suleiman to Abadan, then a small port on the Shatt el Arab. Here a refinery was erected, to treat the oil which flows from Masjid-i-Suleiman (3,000 feet above sea-level) under the influence of gravity. Port and refinery have since been considerably extended, and the plant has a present capacity of 500,000 barrels per day. Some 100,000 workers are employed at the refinery, which is now the largest single installation in the world. Numerous tanker and cargo berths for ocean-going steamers have been constructed at Abadan, and at

PRODUCTION FROM SOUTH-WEST IRAN

<i>Field</i>	<i>Masjid-i-Suleiman</i>	<i>Haft Kel</i>	<i>Gach Saran</i>	<i>Naft Safid</i>	<i>Agha Jari</i>	<i>Lali</i>
Depth to top of reservoir (feet)	600	2,000	2,500	3,000	4,500	3,500 ,
Number of wells 1947. Daily average production at end of 1947 (in thousand barrels)	29	23	3	2	12	0
	73	197	38	17	144	
Total production since discovery to end of 1947 (in million barrels)	793	749	76	13	94	"" —

Khosrowabad, a short distance downstream, but only cargo produced by or consigned to the oil company is handled at either port, so that both towns play a highly specialised role in the economic life of Iran.

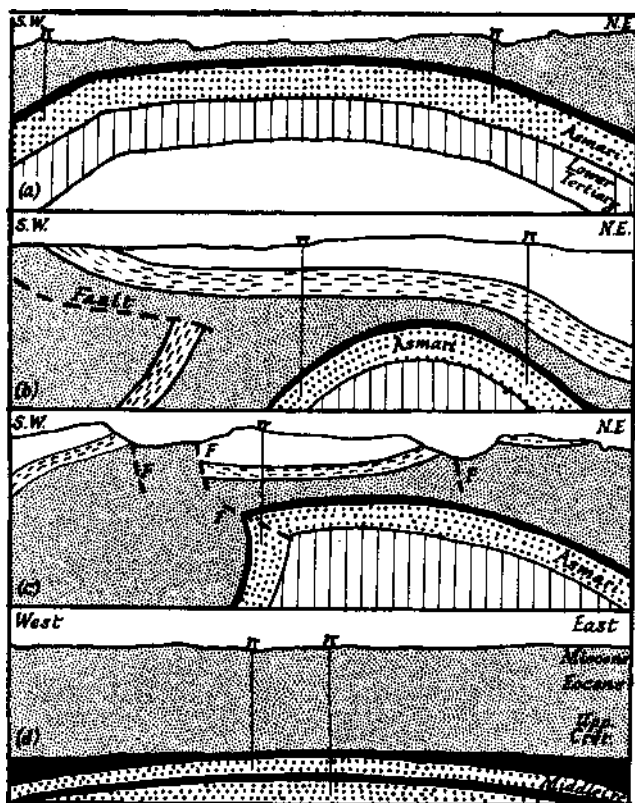


FIG. 36. Structure of Arabian and Iranian Oil Domes. Cap-rock—black ; reservoir—dotted. Note that reservoir rock in Iran is Asmari limestone (Tertiary) ; but Middle Cretaceous sandstone in Kuwait. (a) Masjid-i-Suleiman, (b) Aghajari, (c) Lali, (d) Kuwait (Burgan).

Fields of north Iraq-north-west Iran.—These fields lie in the more northerly of the two embayments previously described. Many of the structural features of Khuzistan are repeated in the north : there is the same foothill topography some 50-80 miles broad, flanking the main Zagros ranges that lie further to the east ; and folding follows a similar pattern of broad anticlines in the foothill zone, with sharper dips to the south-west. The reservoir rock, of Eocene-Miocene limestone (termed Main Limestone) is also closely comparable with

the Asmari series of Khuzistan, but of rather greater thickness. Three oilfields have been developed, at Kirkuk and Naft Khaneh in Iraq, and at Naft-i-Shah in Iran, the latter lying very close to Naft Khaneh of which it is really a part, but on the opposite side of the Irano-Iraqi frontier.

At Kirkuk there is a single narrow anticline between 50 and 60 miles long—an immense size for an oil dome—and, as in the Khuzistan fields, open connexion within the reservoir rock allows free flow of crude oil, so that six wells are sufficient to tap the whole length of the anticline.¹ First developed in 1927, the Kirkuk field now produces 90,000 barrels daily, and this oil moves by pipeline across the Syrian desert to the Mediterranean. At Haditha, where it crosses the Euphrates, the pipeline divides, one branch going to Haifa, at which a refinery has been built since 1939 by British interests. A second branch conveys oil to Tripoli in the Lebanon, where another (smaller) refinery is operated by French companies. At intervals along the pipeline west of Haditha are pumping stations, each numbered according to the branch on which it is situated (e.g. T 1 is the easternmost station on the Tripoli branch, and H 5 the westernmost station on the Haifa branch).² The present pipeline, partly of 10-inch and partly of 12-inch diameter, is only just sufficient in size to handle current output, and plans are advanced for two 16-inch pipes to be laid, first to Haifa, and later to Tripoli. An estimate made *in* 1944 by an American, de Golyer, gave to the Kirkuk field a reserve of 4,000 million barrels; and a daily output of 240,000 barrels (over 3,000 tons) is within prospect.

Another oil region occurs further to the south-east, at Naft Khaneh. Here production is much smaller, hardly comparable with that at Kirkuk. Crude oil is refined at Alwand, near Xhanaqin, 30 miles away, and the entire output serves the needs of the consumers within Iraq, none being exported. Close by, at Naft-i-Shah, oil is produced for the local market of northern Iran. Crude oil from Naft-i-Shah, is conveyed by pipeline to a small refinery at Kermanshah (Iran) which has a capacity of 100,000 tons per annum.

In 1939 yet another oilfield had been discovered at Ain Zaleh, north of Mosul; but threat of invasion in 1941 led to a suspension of

¹ A gas and oil seepage from the crest of this anticline, at Baba Gurgur, is traditionally associated with the 'fiery furnace' of Nebuchadnezzar. (G. M. Lees.)

² Since their construction, these stations have in some instances taken on added importance as meteorological stations, as halting places for trans-desert traffic, and as strategic points in the policing of the region.

activities. The oil produced approximates closely to that of Kirkuk field, and further development in this area is likely.

Other regions of Iraq have been surveyed for petroleum resources, but disappointment has resulted. Large quantities of oil were found at Qaiyara on the Tigris, and in the region between Hit and Ramadi on the Euphrates, but in both cases the crude oil was of very high gravity, so that it was impossible to pump the oil from the ground ; and there was in addition a sulphur content of 5 to 10 per cent. (cf. sulphur content of crude oil at Kirkuk, 2 per cent. ; at Masjid-i-Suleiman, 1 to 2 per cent.). Oil of a similar heavy type has been found in other districts of the Iraq lowlands, but again little can be done, at the present stage of technological development, to exploit these resources. Possibly in the future some method will be discovered by which these heavy low grade oils can profitably be used.

Saudi Arabian and Gulf Coast Fields,—Conditions in Arabia and on the southern shores of the Persian Gulf are in marked contrast to those of Iran and Iraq. Folding of the sedimentary measures has been greatly restricted because of the presence of the ancient continental platform of Gondwanaland ; hence oil structures are very broad, open anticlines. In some localities, anticlinal structures are visible at the surface ; in others, surface topography offers no guide to the presence of oil-domes. The oil reservoir rocks of Arabia range from Jurassic to Cretaceous in age, and are thus considerably older than those of Arabia and Iraq. Another point of difference is that in parts of Arabia petroleum is held in porous sandstones, not limestone.

A sandstone reservoir-rock occurs at Burgan, 30 miles south of Kuwait, where a field was discovered in 1937-39. War conditions have hindered development in this district, and the exact extent of the oil deposits is not yet known. Production in 1945 was at the rate of 200,000 barrels per day. The oil is of good quality, though slightly heavier than the crude oil of Iran, and sulphur content is low. At present, crude oil from Burgan is loaded into tankers at Fahahil, for refining elsewhere, but it is planned to construct a refinery at Fahahil to handle the entire output of the Burgan field.

A second major oilfield is located in the province of Hasa on the Saudi Arabian shores of the Persian Gulf. Production is from three regions—Dammam, Abqaiq, and Qatif, whilst extremely large reserves have recently been discovered at Buqqa, north-east of Abqaiq (1947) and at Ain-Dar, 25 miles west of Abqaiq (1945). The Dammam field consists of a very shallow dome some 4 miles long, and the

reservoir rock is of Jurassic limestone, with a bed of anhydrite forming the cap-rock. Very similar conditions of structure occur in the other two fields, but the Jurassic oil reservoir lies at somewhat greater depths.

Most of the oil produced is passed by pipeline to refineries at Ras Tanura, and Bahrein. The former is now the larger of the two, and further extensions will ultimately give the Ras Tanura plant a capacity of $2\frac{1}{2}$ million tons per annum. In 1947 work began on a large pipeline of 31 inches diameter, and over 1,000 miles in length, across the Arabian deserts direct to the Mediterranean. Political disturbances in the Levant have greatly hindered construction, and it is unlikely that the pipeline will be completed by 1950, as was originally planned. Ras Tanura has now been developed as a port, and can handle 300,000 barrels per day.

One remarkable feature in this oilfield is the occurrence of artesian water supplies (see Chapter XVII) in porous rock measures above the oil bearing layers. Because of the great importance of this water in the district, which is extremely arid, special precautions are taken when drilling oilwells to avoid contamination of the water by crude oil.

A survey in 1944 gave the total oil reserves in Saudi Arabia as 5,000 million barrels ; but with the important discoveries since that

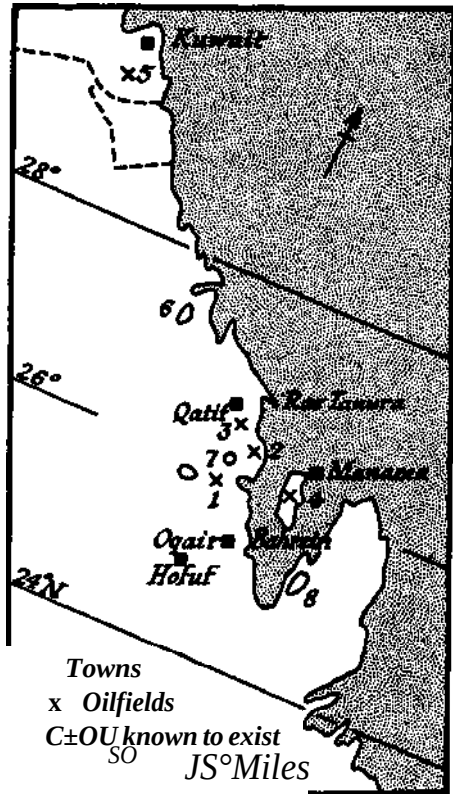


FIG. 37. The Oilfields of the Persian Gulf.

1. Abqaiq. 2. Dammam. 3. Qatif.
4. Bahrein. 5. Burgan. 6. Abu Hadriya.
7. Buqqa. 8. Jebel Dukhan.

date, this figure must now be greatly expanded, and it is certain that Saudi Arabia will become one of the largest producers in the world.

Over 10 million tons of oil have so far been produced at the island of Bahrein, but reserves are thought to be relatively small, and much less than those of the Arabian mainland. Present annual production of oil from Bahrein, averages i million tons. A refinery at Bahrein town (capacity 145,000 barrels per day) handles the local output, and also considerable quantities from Dammam, to which there is a pipeline: but with the extension of refining facilities at Ras Tanura, Saudi Arabian oil is, in the future, unlikely to move to Bahrein.

Finally, oil was also discovered at Jebel Dukhan in the Qatar Peninsula during 1939. Here the oil occurs in a limestone reservoir rock of Jurassic age; but, because of war conditions, no development took place until 1947, when fresh drilling began.

PRODUCTION FROM SAUDI ARABIA, ETC.

<i>Field</i>	<i>Dammam</i>	<i>Abqaiq</i>	<i>Qatif</i>	<i>Bahrein</i>	<i>Kuwait</i>
First year of production	1939	194<)	1946	1934	1946
Depth of top of reservoir (feet) . . .	4,200	7,200	7,000	2,000	3,600 ,
Number of wells, 1948	31	25	2	67	17
Daily average production (in thousand barrels)	80,000	200,000	5,000		200,000
Total production since discovery (in million barrels)	127	75	2	88	22

Egyptian Fields.—These are two in number, and both lie to the west of the Gulf of Suez in broken hill country situated between the Red Sea and the Nile valley. In this region geological structure is exceedingly complex, with a wide variation of rock-types that range from pre-Cambrian to Recent. Strong faulting movements at the

time of formation of the Red Sea rift have produced severe dislocation, hence structures favourable to the large-scale accumulation of oil are infrequent, and of smaller size than those of Iran, Iraq, and Saudi Arabia. Nevertheless, there are many surface indications of the presence of oil in the Suez region, and this has led to much exploration, the greater part of which, however, was for long unsuccessful.

An oilfield was discovered in 1913 at Hurghada, but has since proved to be of only small size, and output is now declining. The crude oil is heavy, though not so heavy as that of the Tigris-Euphrates region, and there is a relatively high sulphur content. From Hurghada crude oil is shipped to Suez for refining. One refinery is operated by the Anglo-Egyptian Oilfields Company (owners of the Hurghada concession) ; the other, Egyptian state-owned, and smaller, handles a portion of the oil which, by terms of the concession, is passed over as a royalty to the Egyptian government.

In 1938 a second field was developed at Ras Gharib, to the north of Hurghada. War conditions had an effect quite the reverse of that in the Persian Gulf—development was stimulated, particularly as the crude oil is of slightly higher quality than that of Hurghada. Oil from Ras Gharib is also shipped to Suez for treatment, and in 1945-46 production from both fields reached just under 1½ million tons, of which nearly 95 per cent, came from Ras Gharib. Egyptian oil is almost entirely consumed within the country, and supplies are hardly adequate to meet demand. Recently (1946) oil has been located in the Sinai Peninsula, at Sudr and at Asl; and although the full extent of the deposits is not known, there may be important developments in this region. One estimate (1948) gives a possible future production from the Sudr field of 10,000 barrels daily.

III. REGIONS OF POSSIBLE FUTURE DEVELOPMENT

Egypt.—Oil seepage has been observed in many parts of the Suez region, and much prospecting took place in the region between the Nile and the Red Sea-Suez Canal, and in the Sinai Peninsula, for a time without success. Two small and very short-lived fields were discovered, at Abu Durba and at Gemsa, but both are now exhausted. Recent developments in the Sinai may, however, stimulate further interest in the north-east of Egypt. Prospecting by British and American interests is also active at the present time in the Western Desert, so far unsuccessfully.

Iran.—There are grounds for supposing that the Elburz Range of north Iran has close affinities to the Caucasus system of Russia; and in view of the wide extent of oil deposits in the latter region, it would seem that there are prospects for oil development in northern Iran. So far, however, despite the presence of known oil seepage in the Elburz, no exploitation has taken place. Further south, an American company, the Amiranian Oil Company of Delaware, carried out much exploration in 1936-37, without finding oil in quantities sufficient to justify large scale exploitation. The concession granted to the Amiranian Company was relinquished shortly afterwards. A Russo-Persian company^x undertook a number of borings in central Iran, but also without success.

Iraq.—Reference has already been made to the occurrence of large quantities of sulphurous oil, too heavy for pumping, in the lowlands of central Mesopotamia. Further south, towards Basra, exploration is at present in progress in the hope of discovering oil of higher quality, and discoveries have been made at Zubair near Basra. It is as yet too soon to be certain of the potentialities of the district. The presence of good quality petroleum in Kuwait, adjacent to the Basra region, gives some ground for the expectation that any oil discovered will be of a higher grade than that of central Iraq, and readily exploitable.

Palestine.—The Dead Sea was known in Classical times as *Lacus Asphaltites* since from time to time large masses of asphalt form on the bed of the lake and later rise to the surface. Other indications of the possible presence of oil are an escape of natural gas near Gaza, and the existence of a large hill of salt, the Jebel Usdum (the Arab name for Sodom) at the southern end of the Dead Sea.² (For the significance of this structure, see Fig. 34.)

In 1914 the Standard Oil Company of New Jersey had decided to drill a test-well at Kurnub, south of Hebron, but war altered these plans, which were subsequently abandoned. In 1939 another project by a second company was put off, but since the end of the second World War, prospecting has recommenced near Gaza. Despite promising signs near the Dead Sea, no drilling has so far been undertaken, though oil concession rights have been granted to the Palestine Potash Corporation, which is concerned with the extraction of minerals from the waters of the Dead Sea.

¹ The Khurian Company.

² There is a tradition that this salt hill, or pillar, is associated with Lot's wife.

Syria and the Lebanon.—The numerous yet open fold structures of Syria and the Lebanon, particularly those of the eastern part of the region, where folding continues directly into the foothills of Iraq, would seem to offer considerable possibilities for the occurrence of oil. Exploration has taken place, notably in the desert zone east and west of Palmyra, and in the Jezireh east of the Euphrates. Results achieved have, however, been negligible, but search is continuing both in Syria and in the Lebanon, where a number of concessions are held.

Turkey.—Oil shows have long been known in the region of the Sea of Marmara, and a number of wells were drilled at Murefta on the northern shore in 1914. Results were disappointing, and further test-wells sunk at a later date in the same area have been unsuccessful. In view of the structure of the region, it is not thought that oil is present in large quantities. Similar remarks also apply to the region of Sivas (central Anatolia) where oil shows also exist.

More promising is the Siirt region of south-east Anatolia, on the outer fringe of the Anti-Taurus fold ranges. Here, geological formation is closely comparable with that of the oil region of the Zagros; and recently a large anticline some 25 miles in length and 6 miles across yielded a small quantity of oil. This well is at Raman Dag, south of the town of Besiri, and although the actual amount of oil yielded was very small, there is at least an indication of possible richer deposits in the same region. The crude oil obtained had to be pumped from the ground, so that up to the present there can be no direct comparison with the oil regions of Zagros.

Ownership of Oil Concessions.—In 1872 Baron Julius de Reuter (founder of the well-known news agency) obtained a concession to prospect for oil in Iran, but, following political pressure by Russia upon the Iranian government, this concession was soon afterwards withdrawn. In 1889 a second concession was granted, and an Anglo-German company^x drilled three wells, all of which, however, proved unsuccessful. In 1901 another concession was obtained by W. K. D'Arcy, an Englishman who had made a fortune in the gold mines of Australia. This concession covered the whole of Iran, except for the extreme north; and after a number of failures, oil was struck at Masjid-i-Suleiman in 1908. Further capital was required to develop the newly discovered field, and a company known as the Anglo-Iranian Oil Company came into existence, with the Burmah Oil

¹ The Persian Bank Mining Rights Corporation.

Company as a substantial shareholder. Six years later, under a threat of imminent war, the First Lord of the Admiralty in Britain, Mr. Winston Churchill, was anxious to ensure a fuel supply for the Navy, a part of which had recently been converted to oil-burning ; and he arranged that a large interest in the Anglo-Iranian Oil Company should be taken over by the British Government. Since that time (May 1914), the British Government has, therefore, been an important shareholder in the Company.

A few months after the outbreak of the war in 1914, the Ottoman Empire joined the Central Powers, and British supplies of oil from Iran were menaced. A British force was landed in Mesopotamia to protect the oil pipeline which had been constructed from Masjid-i-Suleiman to Abadan ; and the Near and Middle Eastern campaigns of 1914-18, both in Mesopotamia and the Levant, had as one objective the safeguarding of oil fuel supplies from Iran.¹

The concession as negotiated by D'Arcy covered some 480,000 sq. miles in Iran, excluding only the northern provinces of Azerbaijan, Gilan, Mazanderan, Asterabad, and Khorassan. The terms of the concession, which was to expire in 1961, gave the Iranian government 16 per cent, of the net profits of the Company as a royalty ; but after 1930, during which time much development had occurred in the oil-fields, considerable disagreement arose between the Anglo-Iranian Company and the Iranian government, concerning the exact nature of 'net profits'. The price of oil in the world market had for some time shown considerable oscillation as the result of over-production and economic uncertainty, and following the slump of 1929-30, a marked fall had occurred. Further difficulty arose from the nature of physical conditions in the oilfields. It was mentioned earlier that because of the large size of oil pools and underground connexion within the reservoir rock, the exploiting company found itself able to avoid drilling many wells. The Iranian government, anxious to secure maximum development of the oil resources of the country, felt that output was being deliberately restricted by the Anglo-Iranian Company.² Profits for 1931 showed a marked decline on 1930, as the result of a further fall in prices, whereupon the Iranian government cancelled the concession.

¹ Although there were other important objectives (notably the defence of the Suez Canal), the Palestine campaigns of 1916-18 were undertaken partly to relieve Turkish pressure on the Mesopotamian army.

² Cf. the U.S.A., with 300,000 oil wells; and Mexico, with 400.

This dispute was brought before the League of Nations, and ultimately amended terms were negotiated, by which the concession was renewed until 1993, but reduced in area from 480,000 to 100,000 sq. miles in the south-west of Iran. From 1933 onwards the Iranian government has received a fixed royalty of 45. per ton of oil produced (the value of a shilling having been fixed in relation to gold), plus a share in the Company's profits when these exceeded 5 per cent.

In 1937 an American company, the Amiranian Oil Company (associated with the Seaboard Oil Company of Delaware, and later also with the Caltex oil group of the U.S.A.¹) obtained a concession for north and east Iran; but as we have seen, prospecting by the Amiranian Company had no success, and the concession was relinquished. During the second World War, American, British, and Russian interests attempted to obtain other oil concessions from the Iranian government; but the latter was unwilling to undertake any negotiations so long as foreign troops were stationed in Iran. In April 1946 a concession covering northern Iran was granted to a Russo-Iranian company, under circumstances that led to a suspicion of underlying political pressure on the part of the U.S.S.R. The matter was debated at some length in the United Nations Assembly.

At present, therefore, Iranian territory covered by oil-concession rights comprises the south-west (Anglo-Iranian Oil Company) and the north (Russo-Iranian). Over the remainder of the country, i.e. the centre, and east, concessions formerly held by the Amiranian and Anglo-Iranian companies have now lapsed.

Iraq.—Developments in Iran during the early years of the twentieth century provoked attention to possibilities in Iraq; and W. K. D'Arcy had begun negotiations with the Turkish authorities even before the deposits at Masjid-i-Suleiman were discovered. D'Arcy was, however, unable to obtain a concession in Iraq; but in 1914 rights were granted Anglo-German interests, who founded the Turkish Petroleum Company. During the war years, little development took place, but after the settlement of 1918, the newly created state of Iraq confirmed the original grant of oil rights that had been made by the Ottoman government, and the Turkish Petroleum Company was renamed Iraq Petroleum Company. The new company was reconstituted, in order to allow participation by other groups that

¹ Standard Oil Company of California, and the Texas Corporation Inc.

were greatly interested in Middle Eastern oil; and as a result, the shareholding of the I.P.C. is as follows:

	<i>Per cent.</i>
Anglo-Iranian Oil Co.	23¾
Royal Dutch-Shell Group	23¾
Near East Development Co. (Standard Oil Co. of New Jersey and Standard Vacuum Co. of New York).	23 £
Compagnie Francaise des Petroles	2 3 !
Mr. C. S. Gulbenkian (the Armenian inter- mediary who negotiated the original oil concession).	5

This Company hold rights over Iraq east of the Tigris, and north of the 3 3rd parallel of latitude. A concession for the region west of the Tigris and north of the same parallel was granted in 1932 to a British company, the 'B.O.D. Ltd \ which by 1935 had passed into German and Italian control. Later, the entire company, now known as the Mosul Petroleum Company, was bought out by the Iraq Petroleum Company. A third group, the Basra Petroleum Company, with a shareholding similar to that of the I.P.C., has acquired concession rights over most of the remainder of Iraq. Thus with one small exception (see below) the Iraq Petroleum Company or its associates and subsidiaries now possess rights over the entire area of Iraq.

The exception is the Khanaqin oilfield, a small region which is held by the Anglo-Iranian Oil Company. Prior to 1914, the district of Khanaqin was part of Iran, and hence fell within the region allotted to the A.I.O.C. under the D'Arcy concession. In 1914, frontier adjustments between Iran and the Ottoman Empire brought Khanaqin under Turkish control, and the oil concession made previously by the Iranian government was confirmed, first by the new Turkish rulers, and later by the government of Iraq.

Egypt.—Exploitation of the Hurghada and Ras Gharib fields is carried on by the Anglo-Egyptian Oilfields Ltd., a company in which Shell and A.I.O.C. groups have large holdings. In other parts of Egypt, exploration permits and concessions have been granted to a number of companies, chiefly American and British,¹ but the second World War prevented development; and, although exploration

¹ Standard Oil Company of New Jersey, Standard Vacuum of New York, Standard Oil Company of California, the Texas Corporation, and Anglo-Egyptian Oilfields Ltd.

recommenced in 1945, no further discoveries of oil have so far been made beyond those in the Sinai (p. 233).

The Levant.—Mention has already been made of the concessions held by the Palestine Potash Corporation in the region of the Dead Sea, and also of early attempts at development, later abandoned, by the Standard Oil Company of New Jersey. At the present time, a number of companies similar in composition to the Iraq Petroleum Company have taken out concessions in various regions of the Levant. The Palestine Development Company holds rights in the coastal plain between Haifa and the Egyptian frontier, whilst Petroleum Concessions Ltd. have secured concessions covering the whole of Cyprus. The Syria Petroleum Company, a third associate of the I.P.C., possesses rights over much of Syria, with the exception of the north-west corner. Further concessions in parts of the Lebanon are held both by I.P.C. associates and by certain small French companies, some of which also have limited interests in Syria.

In 1946 an agreement was signed by which all oil rights for the whole of the state of Transjordan were assigned to the Iraq Petroleum Company.

Arabia and the Persian Gulf.—The Kuwait Oil Company has developed the Burgan field of Kuwait, and holds rights covering the entire territory of the Sheikdom. This company, registered in Britain, has a shareholding divided equally between the A.I.O.C. and the Gulf Exploration Company of U.S.A.

Further south a concession for the island of Bahrein was obtained by a British company, but this was later sold to the Bahrein Petroleum Company, a company registered in Canada, but owned by the Standard Oil Company of California and the Texas Corporation. These two American companies also participate jointly in the Arabian-American Oil Company which has secured extremely valuable concessions covering the easterly part of the kingdom of Saudi Arabia.¹ It is this latter organisation which is responsible for present developments in the regions of Dammam, Abqaiq, and Qatif; including large scale plans for new refineries and a pipeline to the Mediterranean.

Further south, Petroleum Concessions Ltd. (I.P.C. associate, see under * Levant') has secured oil rights in a vast territory extending from the Qatar Peninsula through the Trucial Coast, Muscat, Oman, and the Hadhramaut as far as Aden. So far, however, the stage

¹ The westerly limit of this concession area has not yet been revealed.

reached is only that of exploration, although oil is known to exist in the Qatar Peninsula.

In 1948 a company formed by eleven independent oil producers in America negotiated with the Sheikh of Kuwait for his half-interest in the 2,000 sq. miles of neutral territory lying between Kuwait and Saudi Arabia. The Arabian-American Oil Company has secured the Saudi Arabian rights, and it is hence proposed to develop the neutral territory deposits jointly. The financial arrangements are of interest: the Sheikh of Kuwait will receive a bonus of \$7,000,000, an annual rental of \$600,000 until production starts, and then a royalty of 33 cents per barrel of oil produced.

Between the neutral zone and the island of Bahrein, important oilfields lie under the shallow waters of the Persian Gulf. After negotiations between the King of Arabia and two organisations, the Superior Oil Company of California, and the Central Mining Corporation of Britain, regarding exploitation of these fields, the concession was finally acquired by the Caltex Company of America.

As regards concessions in *Turkey*, practically all mineral resources are now nationalised, and a government department, the Maden Tektik ve Arma Enstitüsü (M.T.A.), is responsible for actual exploitation. Development is co-ordinated under state Five-Year Plans for the fostering of industry, and funds are made available to the M.T.A. through a state controlled bank (the E.T.I. Bank).

During the second World War, rapid consumption of petroleum supplies in America gave rise for some concern to the United States Government. As a means of remedying the position, a government-financed company, the Petroleum Reserves Corporation, was created with the aim of ensuring that the U.S. should have control of sufficient oil reserves in other parts of the world to maintain future supplies. After investigation, it was decided that of all the regions of the world, the oilfields of the Middle East offered greatest scope for development by American interests. Accordingly, a survey of petroleum resources was undertaken in 1944 by the American geologist Dr. de Golyer, the results of which fully justified American expectations. The Petroleum Reserves Corporation then made a number of proposals regarding exploitation of American owned concessions in the Middle East—in particular, the construction of a pipeline from Ras Tanura was stressed as a matter of great urgency. These proposals, influenced by short-term considerations, and closely related to war-time strategy and military matters, did not commend themselves to the American

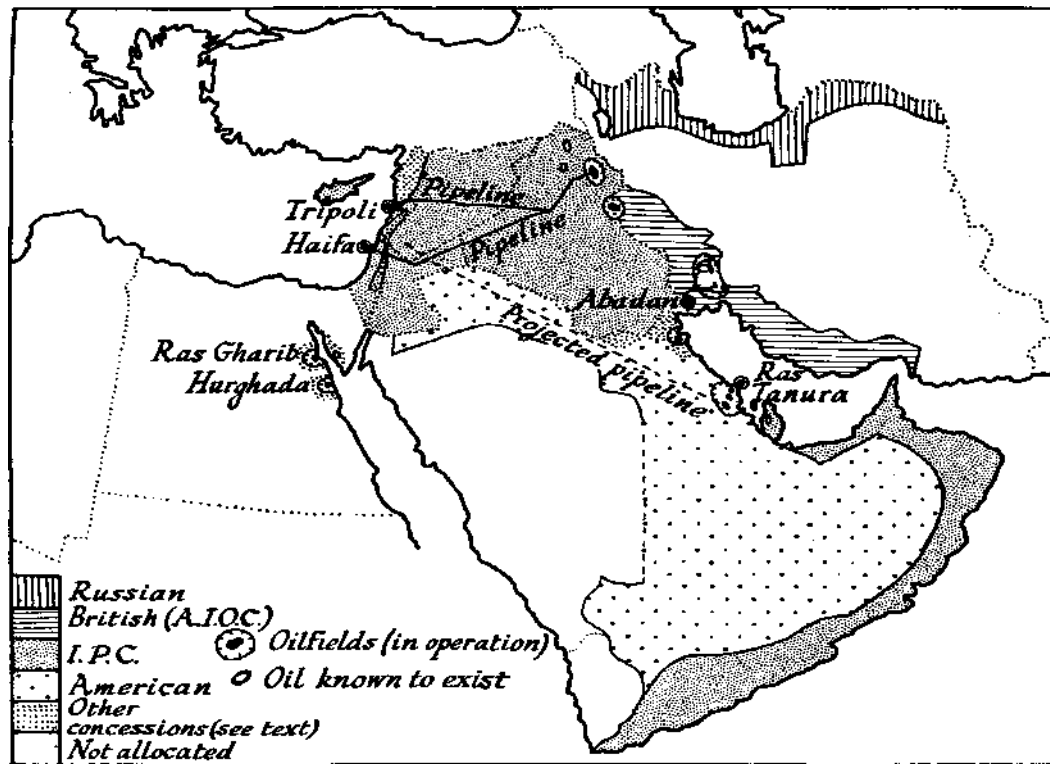


FIG. 38. Oil Concessions in 1948.

oil companies operating in the Middle East, which were more concerned with long-term plans based on purely economic factors. Hence no agreement was reached, and the Petroleum Reserves Corporation finally withdrew from Middle Eastern affairs, leaving as the chief effect of its activity the results of de Golyer's survey.

In contrast with the short-lived attempt at state intervention by the American government, development in British owned concessions has almost from the start been subjected to governmental influence. As a major shareholder (52*5 percent.) in the Anglo-Iranian Company, the British government has been closely associated with development in Iran; and also, because of extensive holdings by the A.I.O.C. in other companies, to a somewhat less degree with oil exploitation in many other parts of the Middle East. It will be apparent to the reader who cares to follow the ramifications of A.I.O.C. interests, that the British government participates (to a varying degree) in no less than ten major oil producing organisations within the Middle East area. It should, however, be made clear that the British government does not intervene in the affairs of the Companies, except at the highest level, and day-to-day running is entirely in the hands of the Company itself.

A.I.O.C. HOLDINGS IN OIL COMPANIES OF THE MIDDLE EAST

<i>Subsidiaries (Complete control)</i>	<i>Partial control (50 per cent, or less of share capital)</i>
Khanaqin Oil Co.	Iraq Petroleum Co. Mosul Petroleum Co. Basra Petroleum Co. Palestine Development Co. Syria Petroleum Co. Petroleum Concessions Ltd. Kuwait Oil Co. Anglo-Egyptian Oilfields Ltd.

The A.I.O.C. now owns the largest oil refinery in the world (at Abadan), together with a tanker fleet that totals ij million tons. Projects for future development by the Company include (i) a 36-inch pipeline from the head of the Persian Gulf to the Mediterranean which will shorten by 3,000 miles the transport of oil to Europe and America, and avoid the payment of heavy Suez Canal dues, (ii) the

construction or extension of refineries in Britain as follows: at Llandarcy, at Grangemouth, and in Kent.

It is hazardous to attempt to estimate future production levels, as prospecting for oil is still extremely chancy, and new discoveries are often made in what may at one time have seemed unpromising sources (cf. developments since 1946 in the Sinai region). Some indication may, however, be given.

In 1946 the *proved' reserves of oil (i.e. oil known to exist) in the United States amounted to 3,000 million tons, which, with an average annual consumption of 240 million tons, would appear to give only about twelve years of assured supply. This is not to say that oil production in America will cease in about 1960, because over 3,000 exploration wells are sunk yearly, and fresh sources of oil are constantly being discovered. For a number of years now the yearly total of new discoveries has exceeded yearly production, so that the total of remaining proved reserves is tending to increase. Nevertheless, the position of the U.S.A. as a world producer is obviously liable to be adversely affected within the near future, and it is unlikely that this country will continue to supply almost two-thirds of the world's oil.

Four other regions in the world after the U.S.A. are of major importance as producers of oil. These are

- (a) The Caribbean area comprising Central America, and the adjacent parts of South America (Venezuela, Colombia).
- (b) The Russian fields of the Caucasus.
- (c) The East Indies.
- (d) The Middle East.

In the opinion of Dr. G. M. Lees, the third of these regions (East Indies) would seem to be smallest in extent and to offer only moderate potentialities for future development. Little is known of conditions in Russia; and adverse geographical factors—difficult topography and the prevalence of tropical vegetation—are likely to prove serious handicaps to further development in the Caribbean. Hence there remains the Middle East as the region that may one day take the place of America as chief world producer of oil; and it is already a fact that proved reserves in the Middle East already exceed those of the entire U.S.A. (3,910 million tons as compared with 3,100 million tons). Latest estimates of reserves by region (1948) are :

THE MIDDLE EAST

Iran	940	million tons
Iraq	700	” ”
Saudi Arabia	700	” ”
Kuwait	1,300	” ”
Bahrein	110	” ”
Qatar	150	” ”

ANNUAL CRUDE OIL PRODUCTION (MIDDLE EAST) (in thousand tons)

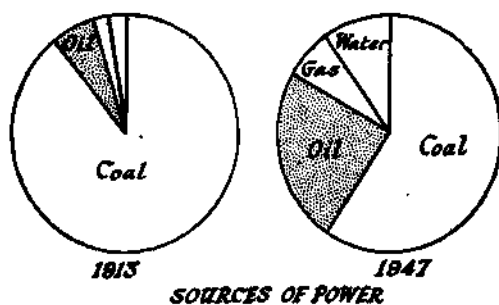
	<i>Egypt</i>	<i>Iran</i>	<i>Iraq</i>	<i>Bahrein</i> *	<i>Saudi Arabia</i> †	<i>Kuwait</i> ‡
1935	186	8,100	3,910	180		
1940	870	9,370	3,460	1,010	770	
1945	1,330	18,280	4,010	1,040	3,040	
1948	1,690	22,560	3,150	1,340	17,200	5,700

Production began 1934. † Production began 1936. ‡ Production began 1946,

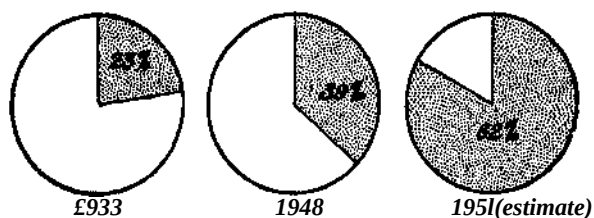
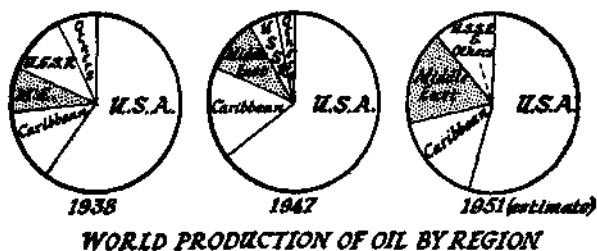
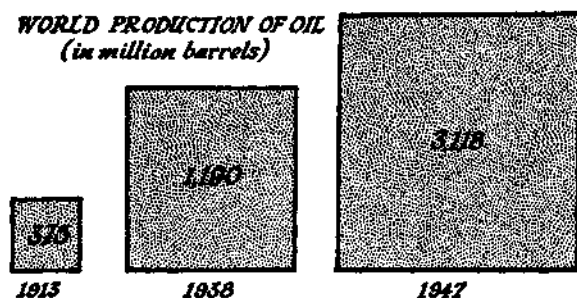
SUPPLY OF OIL TO WESTERN EUROPE (in million barrels)

	1938	1948	1951 (<i>estimate</i>)'
Total demand	299	345	439
Suppliers :			
Middle East	70 (23%)	133 (39%)	360 (82%)
U.S.A.	88 (30%)	39 (11%)	16 (4%)
Other regions in western hemisphere	141 (47%)	172 (50%)	63 (14%)

* Based on figures supplied under Marshall Aid plans.



WORLD PRODUCTION OF OIL
(in million barrels)



THE SHARE OF MIDDLE EASTERN OILFIELDS IN THE TOTAL SUPPLY OF EUROPE

FIG. 39. Diagram of World Oil Supplies.

DEMOGRAPHIC TRENDS IN THE MIDDLE EAST

ANOTHER aspect of political geography, and one that is likely to assume increasing importance in the future, is the question of population growth in relation to natural resources. Because of a lack of data, demographic studies in the Middle East cannot be carried very far,¹ but there is ample evidence that at the present time numbers in certain areas are increasing at a rapid rate beyond the limits set by natural resources. As a result, problems of over population, already serious in a few areas, are beginning to affect a growing number of states, and to exert an increasing influence on national policy.

Population Trends.—The total population of the Middle East has been estimated at 45 to 55 million, a figure slightly larger than that of the British Isles. Density is, however, very uneven ; for example, the Nile valley has between 1,000 and 6,500 persons per square mile, whilst the remainder of Egypt has under 15. Similar contrasts obtain in the valleys of the Tigris and Euphrates. On a somewhat broader regional basis, the Lebanon, European Turkey, Palestine, and north-west Syria (in that order) stand out as fairly heavily populated, with densities ranging from 185 per square mile (Lebanon) to 130 per square mile (north-west Syria). As would be expected, the deserts of Arabia, central Iran, and north-east Africa show figures of less than 10-15 persons per square mile.

Reasons for high density in the alluvial lowlands of the great rivers are not far to seek, being related to intensive cultivation of the exceptionally favourable terrain : but in the Lebanon, which, on the basis of number of inhabitants per unit area of the state ranks as the

¹ Many communities of the Middle East have, in the words of Bonne, * a mentality which does not always view with favour the exact and numerical approach to reality '. Hence statistics of any sort may be difficult to obtain, but as regards census returns, there are special obstacles. Under the Ottomans, the appearance of official enumerators in a village was the inevitable prelude either to an increase in taxation, or to an approaching military conscription. Thus a number of young men were usually concealed, and a low estimate of numbers given. Moreover, some difficulty attaches to the computation of occupants of harems : as recently as 1937 an over zealous enumerator failed to return from a visit to a tribal area. On the other hand, certain communities have also discovered that because of the organisation of civil government on a sectarian and communal basis that prevails in a number of states, an exaggerated return of numbers may produce beneficial results in the political field.

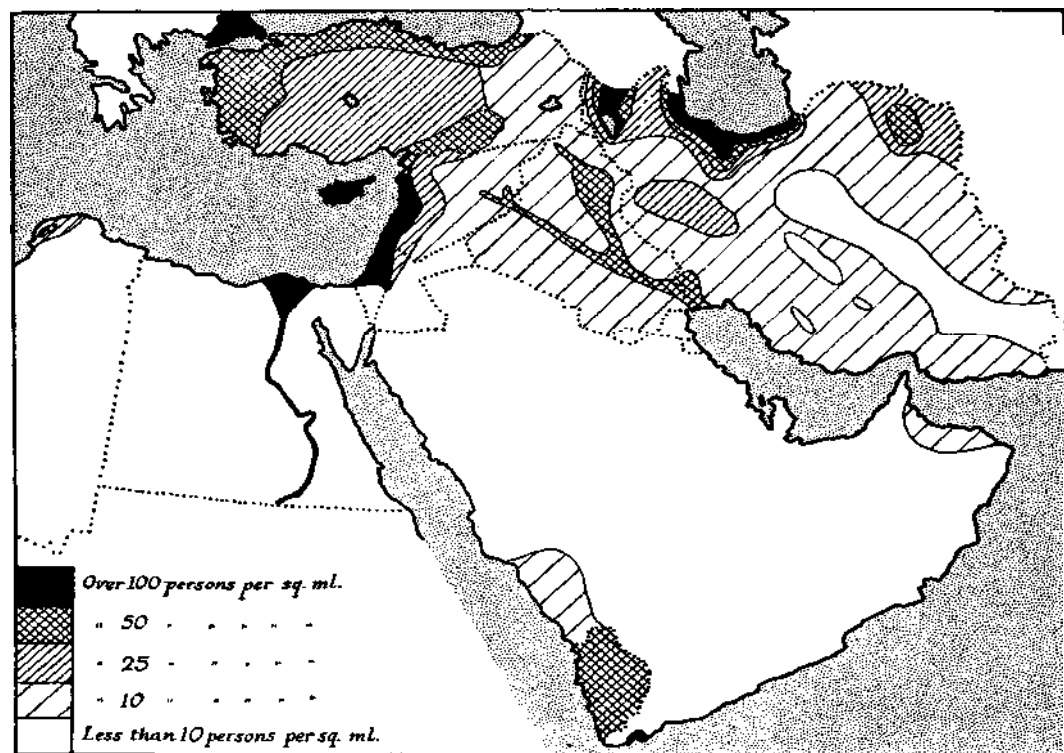


FIG. 40. Sketch of Population Distribution in the Middle East. Data approximate.

most heavily populated country of the Middle East, causes of high density are less obvious. Here, despite a difficult mountainous environment, and the absence of minerals, a number of extremely unusual factors obtain. Remarkable scenic beauty has fostered the growth of the tourist industry that brings visitors from abroad; numerous educational establishments cater for students from many neighbouring countries¹; and by no means the least important, an

POPULATION OF MIDDLE EAST COUNTRIES

	<i>Total Pop. 1943 (estimated)</i>	<i>Crude Birth Rate (per 1000)</i>	<i>Crude Death Rate (per 1000)</i>	<i>Annual Increase (per 1000)</i>
Aden .	650,000	60	40	20 *
Cyprus	393,000	30	13	17
Cyrenaica	250,000	45	25	20
Egypt	19,000,000 ¹	42	27	15
Iran	16,000,000	55	39	14 *
Iraq	4,800,000 [†]	55	38	17 *
Lebanon	1,022,000	45	28	17 *
Palestine : Moslems	1,029,000	48	20	28
Jews .	503,000	24	8	16
Others	145,000	37	15	22
Syria .	2,884,000	53	34	19 *
Saudi Arabia	3,000,000	62	50	12 *
Transjordan	340,000	43	19	24
Trucial Coast	680,000	60	45	15 *
Turkey	18,500,000	45	30	15 *
Yemen	3,500,000	60	42	18 *

* Based on estimates for 1935-40 by E. Jurkat.

† 1947 census.

inflow of remittances from Lebanese emigrants in the New World and Africa to relatives and dependents at home, helps to maintain a relatively large population upon restricted local resources.²

¹ The head of one educational institution in the Lebanon estimated the annual gain to the state from his establishment at £250,000 (\$1,000,000).

² Emigration from the Lebanon has been estimated as follows : Annual total 1860 to 1900, 1,000 ; 1900-1929, 5,000 ; 1929-1938, 1,500. Money sent back to the Lebanon in 1924 totalled £4,800,000 (\$19,000,000), as compared with a total commodity export of £4,250,000 (\$17,000,000).

Birth rates in the Middle East range from 25 to 60 per thousand of population—figures far in excess of those in Europe and North America (ten-year average, Great Britain 15 per mille, U.S.A. 17 per mille). Were it not for a high general death rate, due chiefly to low standards of living and the frequency of disease, population would be increasing at an alarming speed. Deaths average 15 to 40 per thousand, infantile mortality accounting for a considerable proportion of these. About one-half of *all* babies die before reaching the age of 5 ; and the general expectation of life in the Middle East has been reckoned as 25-30 years, compared with 60-64 years in England (1937-47).

Even with such high mortality, survivors are numerous, and it will be seen from a comparison of birth and death rates that the

POPULATION INCREASE IN CERTAIN MIDDLE EAST COUNTRIES

	<i>Population</i>			<i>Relative Increase since 1900 (1900 = 100)</i>
	1800 <i>(estimated)</i>	1900	1946	
£gypt ^t	2,500,000	10,000,000	18,700,000	187
Iraq	1,000,000	2,000,000	4,500,000	225
Palestine	300,000	600,000	1,800,000	300
Syria and Lebanon	800,000	2,400,000	4,000,000	167

population is increasing yearly at the rate of 15 to 25 per thousand, i.e. the population doubles itself every forty or sixty years. Comparative figures, 3 per mille (Great Britain), 4 per mille (U.S.A.), and 15 per mille (Japan).

Population and Means of Subsistence.—As regards population in relation to means of subsistence, the world as a whole can be divided into two unequal parts. In one part, the smaller, which includes Western Europe, the U.S.A., and the British Commonwealth, economic resources are highly developed, and the standard of life is also high. One curious but well marked effect of economic progress has, however, been to bring about a considerable fall in the birth rate, so that in countries at the highest level of development, population is

either increasing very slowly, or entering upon a period of actual decline in numbers.

For the remainder of the world, other conditions obtain. Economic development is at a lower stage, standards of life are depressed, yet birth rates are high, and population is increasing at a rapid rate. China and India present large-scale illustrations of the situation; and the Middle East, although smaller in terms of area and population, can be ranked with these two countries by reason of the acuteness of its demographic problems. Parts of the Middle East have a rate of increase which must be regarded as the highest in the world; and moreover, the general tendency during the last few years has been for population to multiply at an even faster speed than ever before.

In order to keep pace with this growth, food supplies must also be increased at a commensurable rate, otherwise pressure on available resources will increase, and standards of life inevitably fall. With annual population increases of the order of 15 to 25 persons per thousand, this does not usually occur, unless conditions are exceptionally favourable. Instead, rough checks to population growth are applied by increasing poverty, leading to a greater incidence of disease either in the form of severe epidemics,¹ or general (chronic) ill-health; and by periodic disasters on a large scale, such as flood and famine.

Within recent years the effectiveness of those natural checks on population increase have been greatly reduced. In the case of India, engineering works have reduced losses from drought and flood; and improved medical care has reduced the high death rate from preventable disease, particularly as regards infantile mortality. Birth rates have, however, remained largely unaffected, so that one result of increased health measures and public works has been to intensify human pressure on existing resources, and create a problem of over-population. This unfortunate situation is now recognised as one of the principal difficulties facing India; and although numbers involved are smaller, a similar problem exists in the Middle East. Here, measures to secure better health and living conditions seem liable at first to react unfavourably on the general population by giving rise to increased pressure of numbers, and hence depressing the general level of existence, already far too low.

The principal means of remedying the position is obviously to

¹ Cf. the malaria epidemic of 1944 in Upper Egypt, and the cholera epidemic in Lower Egypt during 1947. At one time the daily death-rate in Cairo from cholera reached 300.

bring about further development of natural resources : firstly, by improving agriculture with the use of better methods, and an increase in the amount of land under cultivation ; secondly, by industrial and commercial expansion. The countries of the Middle East can be grouped in three categories : (1) those in which overpopulation is marked, and pressure on resources is very great ; (2) those in which an increase in population can be reasonably supported by further development; and (3) those in which population is actually deficient and resources under-developed. In the first category come Egypt, Palestine, and the Lebanon ; in the third, Iraq and possibly Iran ; with the remaining countries of the Middle East in the second category.

Countries of High Population Density.—Population pressure is greatest in Egypt, where 99*2 per cent, of the population is living on the 4 per cent, of area comprised by the Nile valley. In the regions of Cairo and Assiut, density reaches 6,500 per square mile ; but in the lower delta, because of a proportion of salt marsh and unreclaimed land, the figure falls to 1,000 to 2,500 persons per square mile.

The overwhelming bulk of the population live by agriculture ; less than 15 per cent, are town dwellers; and it has been estimated that for an average family of five, the total income is between 5s. and £1 (\$1 to \$4) per week.

Since 1882, when a census was first taken, the population of Egypt has more than doubled. And as we shall later see, more intensive exploitation of the Nile valley has been rendered possible by a changeover from basin cultivation to perennial irrigation ; but at the present time, the limit of expansion may be within sight, and diminishing returns from agriculture are becoming apparent. Already Egypt imports large quantities of fertiliser, since under intensive cropping, Nile floods are no longer entirely sufficient to maintain soil fertility. Moreover, in view of the topography of the country, there are strict limits to the extent of cultivable ground—only land actually on the floor of the Nile valley can be irrigated. In this connexion it has recently been suggested by Clcland that the towns and cities of Egypt, many of which lie within the Nile valley, should be re-sited a short distance away on the desert border, in order to release valuable land which is capable of irrigation.

In addition to the low standard of living in Egypt, illiteracy and liability to disease are further unfavourable circumstances. The country districts, where most people live, are much worse off than towns

in the matter of medical services: in the former there is one doctor per 13,000 inhabitants; in the latter, one doctor per 1,100 people.

There would also seem to be only a limited prospect of further industrialisation in Egypt, since except for cotton, raw materials and fuel are generally lacking. One possible solution of current difficulties might lie in the emigration of numbers of Egyptians to adjacent regions which are now sparsely occupied. By draining the Sudd region of the central Sudan, large tracts of excellent land could be made available to cultivators who were already familiar with agriculture under the unusual conditions of the Nile valley. Other regions of emigration might be lower Iraq, where large riverine tracts remain unused, and Ethiopia.¹

The highly special conditions of the Lebanon have already been noted. Slowing down of emigration, which has been a feature since 1929, is leading to intensification of pressure within the country, and to a falling off in the volume of remittances from abroad. There would appear to be little possibility of increasing the area of cultivated land; but technique could be improved by adopting a better crop rotation, and by using fertilisers. Attention to fruit and vegetable growing for export, and further development of the tourist industry are other possibilities.

Conditions in Palestine are doubtful. There are some grounds for expecting that further industrialisation could take place, and geographical position in relation to land and sea routes favours trade with other parts of the Middle East. Unfavourable factors are a dearth of raw materials and fuel, and the heavy political atmosphere, which reacts adversely against commercial expansion. As regards agriculture, we have the opinion of Lowdermilk that the Jordan valley is capable of considerable development under a comprehensive scheme of irrigation; but against this there is the view of Ionides that any future expansion in Palestine will be largely at the expense of irrigation projects in neighbouring regions of the Lebanon, Syria, and Transjordan. In matters concerning future immigration into

¹ The population position in Egypt, and the necessity for some positive alleviative action, was summed up by a speaker at the Middle East Supply Conference of 1944, who suggested that in Middle Eastern affairs there was a cycle first of prosperity, then at a later date, and possibly as the result of over-population, disaster. One of the first of these cycles dates back to about 3000 B.C. * Egypt was invaded, and prosperity followed. Then the population became excessive, and in order to find work for the population, they built the Pyramids. The population was still there, and went on breeding. There follows a blank of 400 years in the records of the people of Egypt.'

Palestine, the view of two American authorities on population is worthy of serious attention.¹

Countries of Moderate Population Density.—In Turkey, although it is estimated that between 1935 and 1970 there will be a 70 per cent, increase in population, the present area of cultivated land is small, and capable of considerable extension. Irrigation projects, to be developed on a relatively restricted scale because of the scattered distribution of lowlands, are expected to add some 20 per cent, to Turkey's agricultural land. The presence of minerals also gives future possibilities of industrialisation to a limited degree.

In the Jezireh region of eastern Syria, irrigation from the Tigris and Euphrates could be developed to absorb new population. Even more than in Palestine, space relationships give to Syria the advantage of extensive trading contacts, by which an already dense urban population is supported. Though minerals are lacking, commerce and textile manufacturing might increase further, provided that wider markets became available. This in turn depends on political conditions.

Countries of Low Population Density.—In Iraq, and to a less extent in Iran, the chief problems arise from a deficit of population. Although parts of the Mesopotamian valley are now densely settled as the result of the rapid increase in numbers during the last fifty years, other parts of the valley are empty, in contrast to conditions of the Nile valley, which is exploited along every mile of its course in Egypt. Wasteful methods, paying little heed to long-term maintenance of fertility, tend to be used, since fresh agricultural sites can be cleared when the first is exhausted. Technically then, Iraqi agriculture is inferior to that of Egypt; and until the land is more closely occupied it is unlikely that standards will improve.

¹ F. W. Notestein and E. Jurkat, *Population Problems of Palestine*. *The needed economic development may be possible; it can scarcely be profitable . . . Clearly therefore, all parties in the region have a stake in the maintenance of Jewish interest as a source of future capital supply.

On the other hand . . . it appears that a catastrophe . . . is not outside the bounds of possibility if enthusiasm for a Jewish state should result in . . . really heavy immigration. . . . There are almost no limits to the population that could be supported, given some one to bear the cost. There are very real limits to the population that has any prospect of being self-supporting at reasonable levels of living. . . . The higher the density, the greater the difficulties, and the greater the cost. . . . If heavy immigration should come about soon, there is even a considerable chance that the whole process will break down, and within a decade or two there will be an emigration of Jewish population.' Cf. also the report of the Anglo-American Committee of Enquiry, 1946, * It is conceivable that the . . . expansion of an economic structure upon a dubious basis of natural resources, might lead to over-development . . . to the point of collapse/

Conditions in Iran suggest that at one time a considerably larger population found a livelihood. Vast regions have returned to steppe and desert, and part at least of these could be reclaimed. As in Turkey, the presence of minerals is a further advantage ; and exploitation of oil is having considerable repercussions on the economic life of the country.

Population problems in arid areas tend to solve themselves in their own special way, by outward migration of excess numbers. As regards Cyrenaica, cessation of Italian immigration has made it unlikely that there will be any considerable pressure of population ; whilst in Arabia the development of oilfields will for some time provide an extra outlet for the growing numbers.

Population Problems and Politics.—It will be apparent that demographic factors are likely to have an increasing influence on national policy in the various Middle Eastern states. A number of countries will escape a severe economic crisis only by careful internal planning,¹ and by resettlement and schemes of development involving co-operation with their neighbours. As a spur to such co-operation, there is the alternative choice of keeping within the cycle of prosperity—overpopulation—disaster. For some other states, there is on the contrary a prime necessity of accepting immigrants in order to foster economic progress.

Another demographic feature with a political implication is the generally higher reproduction rate of Moslems as compared with Christians and Jews. This tendency, which has greatest importance for the Lebanon and for Palestine, has obvious results: in both countries substantial non-Moslem communities, both Christian and Jewish, may be doomed to lose ground *vis-a-vis* the Muhammadans, with far-reaching changes in political life.

Compare the following:

	City	of	Cairo	Mosleni	Christian	Jewish
Crude Birth Rate (per 1,000 of population)				49	29	12
Crude Death Rate (per 1,000 of population)				28	17	15
<i>Palestine</i>						
Crude Birth Rate (per 1,000 of population)					37	24
Crude Death Rate (per 1,000 of population)					20	15
						8

¹ Such planning will have to establish a judicious relation between social services and economic development, so that a fall in the death rate due to better medical attention does not outstrip increase of the means of subsistence.

PART III
REGIONAL GEOGRAPHY

CHAPTER Xm

IRAN

As a high plateau ringed on all sides by higher mountain ranges Iran displays a marked physical unity based on separation from its adjoining regions. To the south and west, the contrast between

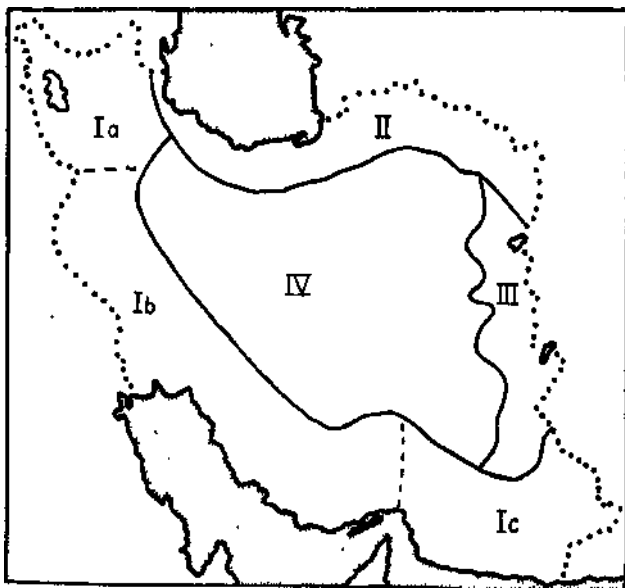


FIG. 41. Natural Regions of Iran.

the massive ranges of the Zagros and the lowlands of Mesopotamia is particularly striking ; and on the north, there is an equally abrupt descent from the Elburz Ranges to the plains of Russian Turkestan and the basin of the Caspian. Elsewhere, however, the mountain ring of Iran continues without much interruption into the highlands of eastern Anatolia, and into the more broilgh massifs of Baluchistan and Afghanistan.

A summary of the main natural regions of Iran may be made as follows:

- (I) The Zagros folds—extending in an arc from Armenia to Baluchistan.
- (II) The Northern Highlands—a narrower, but well defined series of folds that run between the Caucasus Mountains of South Russia, and the Hindu Kush of Afganistan.
- (III) The Eastern Uplands—a more varied, broken, region.
- (IV) The Central Plateau.

I. PHYSICAL—THE ZAGROS

This can in turn be sub-divided into three contrasting zones, the north-west, which lies between the 35 th and 39th parallels of latitude ; the centre, which extends from Lat. 35 N. to about 27⁰ N. ; and the south-east portion, termed in its eastern part, the Makran, which lies between the Strait of Hormuz and Baluchistan.

(a) *The North-western Zagros.*—Adjacent to Anatolia, land forms have been developed primarily as the result of differential tectonic movements along well-marked faults. Horst blocks and downthrow basins are therefore prominent, though in places the outlines of these have been modified by intense erosion. One of these downthrow basins is that of Lake Urmia, which covers 20,000 square miles; and others occur (i) at Khoi, north of Urmia (with the narrow ridge of the Mashu Dagħ acting as a separation between the Urmia and Khoi lowlands) ; (ii) in the Moghan district of the lower Aras (Araxes) river ; and (iii) in the upper reaches of the Qara Su (Ardebil region).

The uplifted horsts form a series of blocks that increase generally in elevation towards the north-west, giving the appearance of an extensive plateau that is tilted towards the south-east. Numerous deeply-incised valleys separate the individual blocks, so that, despite the general impression of a plateau, relief is extremely varied. Some of the river valleys are no more than gorges or defiles; but others (owing to tectonic action) are much wider, e.g. the Aras valley, which forms a corridor some 10 to 40 miles wide, and serves as a frontier between Iran and Russia; and the Safid Rud (named in its lower course the Qizil Uzan), where there is a lowland basin 15 miles in width round the town of Mianeh.

A third important topographical feature in the north-west Zagros is the presence of numerous volcanic cones, formed by the rise of magma along fracture lines. These are often built up on the highest

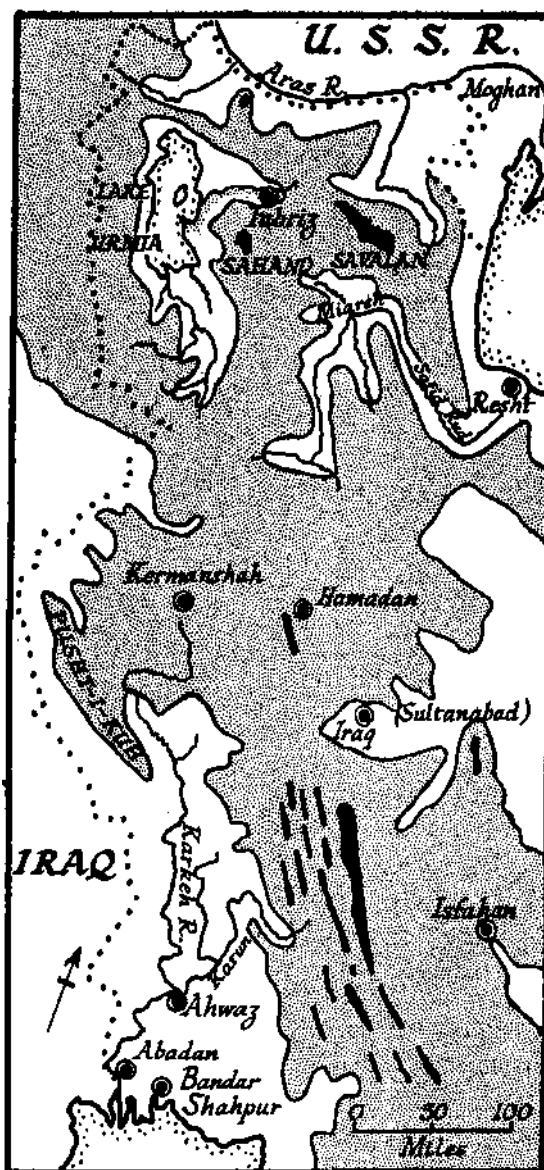


FIG. 42. North-West Iran. Highland stippled ; over 10,000 ft. in black.

parts of the plateau, producing the imposing peaks of Savalan (14,000 ft.), Sahand (12,000 ft.), and Kharazana (11,500 ft.). Generally speaking, the plateau uplands, stony and undulating, or covered by masses of recent lava, offer few inducements to settlement. Intolerably hot and arid in summer, and bitterly cold in winter—possibly with the most extreme climate of any part of the world—these regions are sparsely occupied by nomadic shepherds who spend the summer months in searching for pasture, and pass the winter in the valleys. Permanent settlement is restricted to the broader riverine tracts where climatic conditions are less extreme, and where deposits of water-deposited silt allow cultivation. Here population is relatively dense, and a variety of crops are raised—wheat, barley, tobacco, cotton, opium, and fruit.

The most extensive of these settled regions is that situated round Lake Urmia, which is without outlet, and hence extremely saline—only a little less so than the Dead Sea. Unlike the Dead Sea, however, Urmia is shallow, and fluctuates considerably in extent throughout the year, leaving in summer an expanse of black foetid mud that sometimes reaches a temperature of 120° F. Because of this, settlements occur at a distance from the shores of the lake, on the banks of small streams which can be used for irrigation before the water is contaminated by contact with the lake. Tabriz, the second city of Iran, lies on such a stream (the Maiden Chai) 35 miles away from the lake shore.

(b) *The Central Zagros*.—The second sub-division of the Zagros comprises the portion lying between Bandar Abbas at the opening of the Persian Gulf, and the sub-region just described. Here folding, and not faulting, is the main feature, hence there occurs a succession of parallel ridges, separated by deep valleys. The ridges are not continuous, but die out at intervals and give place to others, though a single direction of strike is maintained throughout. This series of densely packed folds, aligned in ranks, is most characteristic of the central Zagros, and although the actual size of the folds varies—those in the north being broader and higher, those in the south smaller and finer—they form the principal, almost the only, topographical feature in the region.

On the south-west, towards the Mesopotamian lowlands, the folds are open, and consist of simple anticlines (ridges) and synclines (valleys)—an indication of the recent formation of the entire range—but further to the north-east, towards central Iran, shearing and deformation occur, with the presence of nappes and overthrusting,

so that structures are much more complicated. Extensive dissection by rivers has once again led to the development of narrow, steep-sided valleys, some of which are mere slits or defiles, too narrow or too recent in formation even for the smallest alluvium covered terraces to occur. In certain places the rivers appear to follow a direct path to the Tigris lowlands, and plunge directly through the most massive ridges by a series of enormous clefts or gorges. These gorges, named *tangs*, often cut across the highest parts of the ridges, and it seems unlikely that they can have been entirely formed by river action. Some authorities consider that the tangs were originally great cross-faults, developed at right angles to the main axis of folding ; and that they have since been deepened by water, and in some instances wind action. Certain of the tangs are not indeed occupied by a river.

As the result of the presence of tangs, the drainage of the central Zagros follows an intricate, grid-iron pattern. In some parts, there are no gaps through the ridges, and rivers must flow in longitudinal valleys, weaving a tortuous transverse course from one syncline to the next; in others, there is a shorter, but precipitous descent to the Mesopotamian plain.

Because of the uniformity of the mountain ridges, one finds fewer outstanding single peaks than in north-west Iran ; but there is a greater extent of highland, and a considerable number of domes attain an altitude of 13,000 to 15,000 feet. Parts of the Zagros are vegetation covered, particularly in the north, where rainfall is heavier, but much of the central region consists of bare expanses of rock often startlingly coloured in red, yellow, white, grey, green, or black. Between some ridges lie deep open valleys, the floors of which are 4,000 to 8,000 feet above sea-level; and, in contrast, most of these floors are vegetation covered, with parts even wooded. Where water is available, cultivation is possible on small fields or terraces cut in the sides of hills; but to a far greater extent the region supports a pastoral population. The grassy valley bottoms are used at various seasons of the year, and a well organised transhumance, reminiscent of that in the Alps, is a prominent feature. Conditions in Iran are, however, somewhat sterner than in Switzerland—one does not often hear of a Swiss shepherd kicking footholds in the snow for his animals by means of his bare feet, a not uncommon occurrence during spring in the Zagros.

Minor, but striking topographical features of the southern portion

of the central Zagros, are numerous salt hills, or plugs, some of which rise to a height of 5,000 feet. It is thought that these plugs have been formed as the result of isostatic pressure on a deep-seated and plastic layer of rock salt, that is considered by G. M. Lees to be of Cambrian age. As later sediments accumulated above the salt, this relatively plastic layer was pressed upwards through younger series in the form of giant eruptions. Some of these plugs are in active upward motion at the present time, forcing their way through overlying strata, and raising impressive glistening sugar-loaf cones above the surrounding country: others have been eroded after eruption to the surface, and the covering rocks have collapsed into the resulting crater as a bewildering jumble of strata.

Another minor feature of the central Zagros is the occurrence of small lowland basins where the north-easternmost of the Zagros folds have impinged upon the buckled edge of the central plateau. Some of these basins, e.g. those of Shiraz and Niriz, are enclosed, with aretic drainage, and hence have salt marshes or lakes in the lowest part; in others a stream has broken through the surrounding highland rim, and there is a normal drainage outwards towards the south-west. It is interesting to note that certain of these basins, intensely cultivated in the non-saline stretches away from the lowest parts, have been the centres of important cultural movements. Niriz was the homeland of the early Persians, who established a continent-wide empire: Shiraz was later renowned as the cradle of Persian poetry, the home of Hafiz, Saadi, and of Omar Khayyam.

(c) *The South-East Zagros (Makran).*—Immediately east of Bandar Abbas, the trend of the Zagros ridges alters abruptly. For a distance of 150 miles between Bandar Abbas and Jask, the direction of folding is north-south; then, eastwards of Jask, there is a second change, with, first of all, a trend from west-north-west to east-south-east, and later, from west to east.

In striking contrast to the massive, elongated, and regularly aligned ridges of the central Zagros, topography in the south-east is much more irregular and broken, and on a far less imposing scale. A narrow coastal plain bordering the Gulf of Oman and the Indian Ocean is succeeded inland by a zone of plateau country of an average elevation of 2,000 to 3,000 feet, and this plateau is crossed in places by lines of hills that occasionally reach 6,000 to 7,000 feet. Between these hills lie numerous river basins, noteworthy in that they run directly to the sea, with a more directly consequent alignment than

the valleys of the central Zagros, which, as we have seen tend more to follow a rectangular plan.

Northwards, the plateau zone gives way to an extensive trough, the Jaz Murian basin, which consists of a depression with its lowest point at an altitude of 1,000 feet. This basin is partly filled by a thick layer of silt and wind-blown material deposited in dunes. There is no drainage from the basin, and the centre is occupied by a salt lake fed by two streams, the Rud Halil and the Rud Bampur. Other streams from the surrounding high ground fail to reach the lake, and soon disappear beneath the drift cover. The Jaz Murian basin is defined on the north by a single narrow line of highland, which acts as a divide between the Jaz Murian depression and the interior plateau of central Iran. The average height of the ridge is about 4,000 feet, but a single peak of 11,000 feet occurs in the east, at Kuh-i-Baznan.

Most of the south-eastern Zagros region presents a vista of rugged desolate landscapes, either bare rock or sand dunes, with occasional patches of cultivation—chiefly date-groves—in the few favoured spots where water is available. Dates are a staple, supplemented by small amounts of cereals, by dried fish brought from the coast, and by meat and milk from the few animals that find pasture on the scanty grasses of the lower mountain slopes. Even the Jaz Murian plain is largely uninhabited, or only occupied for a short time by nomads.

THE NORTHERN HIGHLANDS

The northern highlands of Iran consist of two distinct groups: the Elburz Range in the west with its outlier, the Talish Hills, and the more extensive chains of the north-east—chief among which are the Kopet Dagħ and the Ala Dagħ. Between the two masses lies a trough, part of which is occupied by the Atrek river.

The Elburz consists of a relatively narrow series of folds disposed in a shallow crescent along the southern border of the Caspian Sea. Although narrow, the fold ridges are extremely steep, and a number of summits reach an altitude of over 10,000 feet within a distance of 30 miles from the Caspian shore, which is 88 feet below sea level. Erosion has been very active on the northern slopes of the Elburz—annual rainfall exceeds 100 inches—and this region is hence broken by deep gorges, at the bottom of which great torrents flow directly northwards

towards the Caspian. Further to the south, when the northernmost crests are passed, there is a development of longitudinal or strike valleys, recalling on a smaller scale those of the central Zagros, in which flow a number of longer and better developed rivers, e.g. the Shah Rud and the Nur. Although only 60 miles wide in its broadest part, the Elburz region exhibits marked climatic variation, and its southern flanks, where rainfall is moderate or even scanty, are much less dissected by streams, so that here the east-west trend of the folds is more apparent than on the north. As in the north-western Zagros, volcanic cones are a feature, the best known of which, Mount Demavend north of Teheran, reaches 18,000 feet, and carries a permanent snow-cap.

The northern slopes of the Elburz are well wooded up to a height of 7,000 to 8,000 feet, but further south a sharp change occurs, and vegetation soon becomes less luxuriant, passing ultimately, in the extreme south, into scattered patches of scrub, with most of the hillsides entirely bare. When water is available, many parts of the southern Elburz are extremely fertile, especially the alluvial cones and river terraces, where there is a thick deposit of rich soil. In some places, however, the river bed is too deeply incised to allow the deposition of silt, and such valleys are uninhabited.

Bordering the northern edge of the Elburz Range, and its western continuation the Talish Hills, which link the Elburz to the larger massifs of the Caucasus and north-west Zagros, lies the coastal plain of the southern Caspian. This varies between 10 and 70 miles in width. Close to the Caspian shoreline is a zone of sand-dunes, behind which lie salt marshes and lagoons. These are succeeded by slightly higher and firmer ground, most of which is densely covered by the Hyrcanian vegetation to which reference was made in Chapter IV. Some parts of the Hyrcanian forest have been cleared for cultivation, and the coastal plain of the Caspian is now the most closely settled of any part of Iran, containing nearly one-fifth of the total population of the country.

The Caspian plain has been uncovered by a gradual retreat of the Caspian Sea, which once extended as far south as the foothills of the Elburz Range. At the present time, the level of the Caspian is falling by about 8 inches per annum, the precise rate depending on the inflow from various rivers, chiefly the Volga. Despite its steady shrinking, the Caspian is much less salt than most sea water, and is only one-quarter as salt as the Mediterranean. The retreat of the

Caspian Sea is having a most unfortunate effect on the economic life of the Iranian ports on its shores, which cannot now be approached by vessels of more than 18 inches draught (1948). A project of long standing, sponsored by the Russians, aims at cutting a canal to link the Caspian and Black Seas, by which the deficiency of water may be made up.

In the extreme east, at about Long. 56° E., the Elburz Range dies down, and is succeeded by a trough or plateau, the lower parts of which are grass covered, and support a population of pastoral nomads. It is hardly correct to speak of this trough as a lowland, since the average altitude is 5,000 feet, but it serves to divide off the higher Elburz to the west from the more massive and widely spaced ranges to the east. These eastern ranges have a predominantly north-west-south-east trend, in contrast to the due east-west alignment of the Elburz. The most northerly of the ranges, the Kopet Dagh, lies partly in Iran and partly in Russian Turkestan, the frontier following the eastern foothills of this range. The Kopet Dagh (termed Kuh-i-Hajar Masjid in its south-east portion) reaches 10,000 feet in maximum elevation, and is then succeeded by a second chain, named the Kuh-i-Aleh (northern part) and the Kuh-i-Binalud (southern portion). In between the Kopet Dagh and Kuh-i-Aleh lies a well-defined valley, occupied by two rivers : the Atrek flowing north-west to the Caspian ;. and the Kashuf flowing south-east towards Afghanistan. A third upland range (the Kuh-i-Surkh) occurs at some distance to the south-west, separated once again from its neighbour the Kuh-i-Binalud, by a broader longitudinal trough.

Main interest centres in the lowlands occupied by the Atrek and Kashuf, which provide a natural corridor between the Caspian region and the Turcoman steppes of the district of Merv. Most of the highland is barren and empty, serving only as grazing ground for occasional nomadic tribes; but the riverine lowlands are relatively densely peopled, with numerous cultivated areas. The richest part is the upper Kashuf valley round Meshed, from which comes a substantial proportion of the wheat and barley of Iran. From the abundance of ruins of many ages scattered in this district, it would seem that there was once a very dense population. Present backwardness is probably due, in the main, to tribal wars and invasion, with liability to earthquakes as a further contributing factor. Situated at the principal natural gateway into eastern Iran, the Meshed region bore the first brunt of Mongol and Turcoman raids; but with stronger

rule during the present century, this menace has disappeared, and there are prospects for a revival of life in the region.

THE EASTERN UPLANDS

This term can be applied to the broken and irregular highland region lying between the region just described, and the south-east portion of the Zagros. There is little geographical unity : the highland massifs are irregular in trend and disposition, and give place in many localities to wide lowland basins. Generally speaking, the entire eastern region is markedly barren and unproductive, for besides the difficulties of irregular topography, with much loose scree, jagged peaks and drifting sand, there are considerable climatic drawbacks—extremes of heat and cold, great aridity, and a special feature, a persistent and violent wind which blows with great regularity throughout the summer season, and sometimes reaches a velocity of 80 m.p.h. In winter, blizzards of 120 m.p.h. are not unknown. As a result, great quantities of sand are lifted, giving rise to a kind of natural sand-blast. In time, the lower courses of buildings are etched away by the wind, and fall in ruins.

On the higher ground, permanent settlements are very few indeed, and occur only in sheltered gullies. In the lowlands near hill-slopes outwash fans of pebbles, and scree of jagged material eroded by exfoliation alike offer little inducement to cultivation. In the neighbourhood of the few rivers that exist, some agriculture is however possible. Most important of such areas is the lower basin of the Helmand river, termed Scistan. Water from streams rising in Afghanistan reaches Seistan, and cultivation by irrigation is carried on. Unfortunately, however, the Helmand river terminates in a shallow lake, which varies considerably in size, and causes floods, sometimes covering hundreds of square miles after heavy rains in Afghanistan. A further misfortune is the prevalence of braided streams which are liable to change their course without warning, and overwhelm adjacent districts. Settled occupation on any large scale in these regions is thus extremely difficult.

Despite its natural handicaps, Seistan, like the Meshed region, once supported a larger population; but the present inhabitants are far fewer in number even than those round Meshed, and only one primitive irrigation channel is now in operation. Besides a small number of farmers engaged in growing dates and cereals, the lake supports a few fishermen.

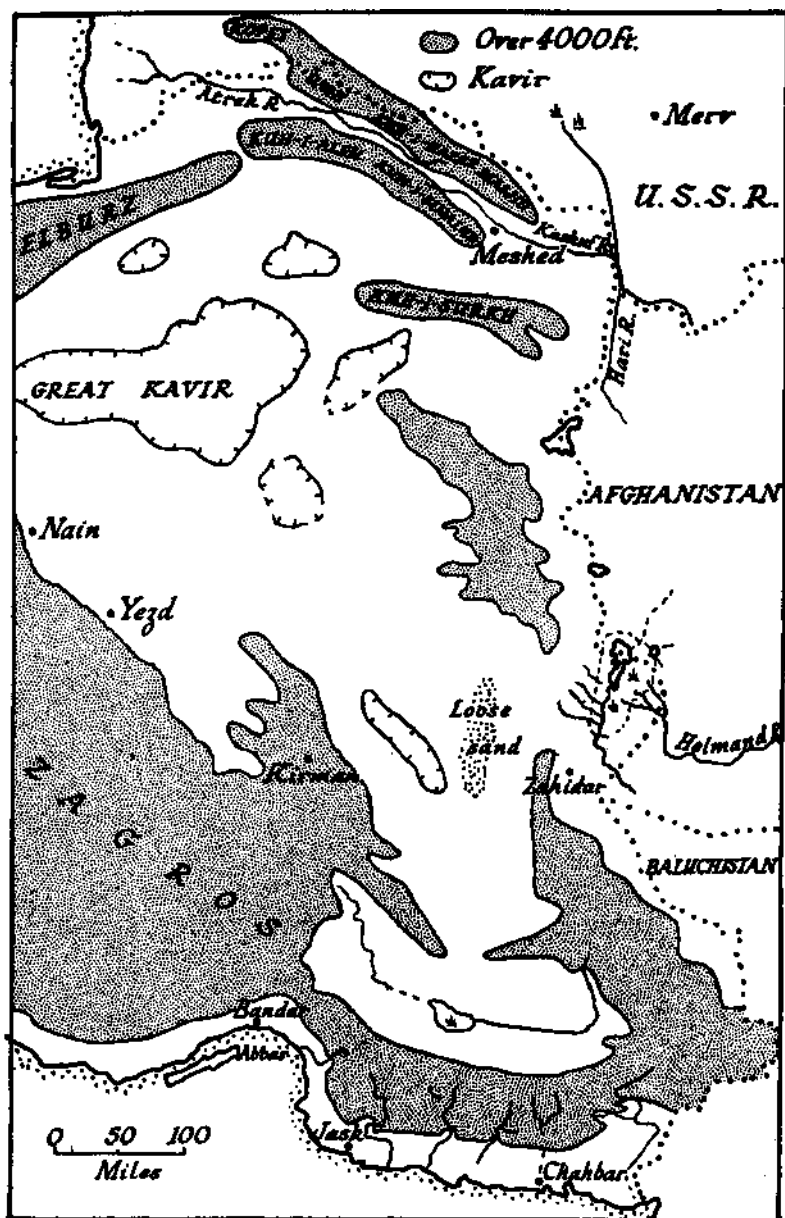


FIG. 43. South and East Iran, and the Helmand Basin.

THE CENTRAL PLATEAU

The inner part of Iran, amounting to about one-half of the total area of the country, is occupied by a series of closed basins from which there is no outward drainage of any sort. In the main, the lowest parts of these basins lie at an elevation of 2,000 to 3,000 feet, though they are 1,000 feet lower in the south-east; and the mountain ring, which almost completely encircles the inner plateau, falls little below a general level of 8,000 feet.

At an earlier period—probably late Tertiary and Quaternary—the basins were occupied by lakes, which have left thick deposits of alluvial material. The central plateau is now almost rainless, and so for the most part the region is one of unrelieved desert. There are, however, certain unusual features. The lowest parts of the basins have a deep deposit of black mud, and evaporation at the surface has resulted in the formation of a salt crust. The salt is precipitated in the form of angular blocks or plates, about one inch thick, and several square feet in area. As evaporation proceeds, the crusts increase in size, and are forced one against the other, so that in time, they become arched upwards, and their rough, sharp edges protrude above the surface, giving an appearance rather similar to that of a glacier or ice floe. Beneath the salt crust lies a sticky mass of salt marsh or mud, with drainage channels at intervals that are filled with watery ooze or slime. It is something of a mystery how such an arid area still retains extensive swamps; but possibly the water is a remnant of the old lakes, supplemented at the present by soakage from the mountain crests. The presence in the swamps of magnesium chloride, a strongly hygroscopic substance, may also attract a certain amount of moisture from the subsoil and from the atmosphere.

The salt marshes are extremely dangerous to travellers, since the sharp edges of the salt crust can cause serious injury to men and animals. Graver still, the layer of salt is often insufficient to bear the weight of a man, and the scattered drainage channels, which occur underneath, and of which there is no indication on the surface, are deep enough to overwhelm anyone caught in their sluggish waters. Movement in the region is rendered even more hazardous by frequent winter fogs. As a result, widespread areas of the marshes are uninhabited and even unexplored. A number of attempts have recently been made to survey the region, but only the fringe has so far been mapped.

The name *kavir* is given to the salt marshes of inner Iran, which cover about one-quarter of the total area of the region. Elsewhere, firm sandy or stony stretches occur, giving a more 'normal' desert topography similar to that of Arabia or the Sahara. The term *dasht* is applied to this firm desert, in which sand dunes (*rig*) may occur. Another expression, *lut*, refers to the arid region as a whole, and is hence a generic term, denoting a region in which both *dasht* and *kavir* may occur.

Settlement within the central basin of Iran is almost entirely confined to the flanks of the surrounding mountain chains—e.g. Teheran, on the southern slopes of the Elburz, Qum, Yezd, and Kirman on the eastern foothills of the Zagros—and important routes follow a circumferential path, avoiding the centre of the Lut. Only a few minor tracks attempt a direct crossing.

II. CLIMATE

The main features of the climate of Iran are :

(a) Marked continentality, with extremely high summer temperatures, and an unusually cold winter—much colder, in general, than the average for the latitude.

• (b) Great contrasts in rainfall, the extreme north and west receiving considerable amounts, and the remainder of the country little or none.

(c) The frequency of high winds, which intensify the effects of extreme temperatures.

These conditions, sufficiently unusual to be distinguished by de Martonne as a separate climatic regime,¹ arise chiefly as the result of the mountainous nature of the region, and its situation as part of the heartland of Asia. In summer the dried-out monsoonal air stream from north-west India and Baluchistan extends westward over Iran, and gives temperatures comparable with those of the Thar Desert, whilst in winter the country can easily fall under the influence of the Siberian anticyclone, with few topographical barriers to prevent the south-westward spread of intensely dry, cold air. On the other hand, maritime influences are excluded by the high mountain wall, most fully developed on the west and south, so that milder, damper air from the Mediterranean and Caspian Seas, and Persian Gulf, affects only the outer regions of Iran.

¹ The 'Iranian' type.

Altitude is partly responsible for the unusually cold winters (Teheran and Isfahan mean Jan. temp. 35° F., cf. Aleppo and Beirut, in the same latitude, 42° F. and 56° F. ; or Seville, 52° F.) and, although altitude does not much mitigate the intense heat of the day in summer, it does produce a rapid fall of temperature at night (Teheran, alt., 4,000 feet, mean day max. July, 99° F., mean night min. July 71° F. ; Meshed, alt., 3,000 feet., mean day max. 92° F., mean night min. 63° F. ; Kirman, alt., 6,000 feet, mean day max., 101° F., mean night min., 62° F.). Annual range of temperature on the central plateau varies from 35° to 45° F., with an average January temperature of 35° in the northern and western districts, and 45° F. in the south and east. Frost is, therefore, common in most parts of the central plateau during late autumn, winter, and early spring ; and in the higher parts of the surrounding mountains, temperatures are lower still, so that snow may lie for many months (mean Jan. temp. at Tabriz, 17° F.) Temperatures well below freezing have even been recorded on the Shatt el Arab, at sea level, where occasionally ice formation has been seen. The only regions of Iran where frost does not occur are the coastal plains of the Makran. The north-west is the coldest part of Iran, and temperatures below 0° F. are by no means unusual.

During summer, most of inner Iran is intolerably hot, and it has been suggested that the highest temperatures in the world may occur in the Southern Lut region of the interior plateau. As no recording stations exist in this area, the claim cannot be justified or disproved. The mountains experience slightly cooler conditions, and a number of hill stations have been established in the Elburz and Zagros foothills as a refuge from the heat of the cities, where temperatures may exceed 110° F. The mean in parts of Seistan is over 120° F., and in the region of the Persian Gulf 125° has frequently been recorded. Under such conditions human activity comes to a temporary standstill. Shops and offices close, travel and business activity is deferred till the evening, and during one or two hot spells in 1941-45, it was recorded that fires were drawn on a number of locomotives, and trains came to a halt, because of intolerable conditions for the driving crews.

A special feature of summer previously referred to, is the persistent northerly wind that occurs in south-east Iran. This is in all probability due to circulation round the main low-pressure centre of the monsoonal system, and because of the very low pressures that prevail, wind strength is correspondingly great. Speeds of 70 m.p.h. for days on end are common throughout the season of onset, which

lasts from May until September. A local name for the phenomenon is ' Wind of 120 days \

Practically all of the rainfall of Iran comes from eastward moving depressions that originate over or near the Mediterranean Sea. Outflowing air from the Siberian anticyclone is dry and gives no precipitation, and the same is true of the monsoonal air masses of summer, which have lost their moisture on arrival in Iran. Hence the summer is completely arid (except in the extreme north along the shores of the Caspian), and rainfall at other seasons depends on the arrival of maritime air masses from the west. Depressions in this maritime air stream are, however, greatly weakened, as most of their moisture is deposited on the highlands of Asia Minor and the Levant; and the remaining moisture is precipitated during the crossing of the Zagros Ranges, so that little or none falls in the central plateau.

When the track of a Mediterranean depression has lain over land, the quantity of rainfall occurring in Iran is very small, but when a sea track has been followed, the amount of moisture is greater, i.e. depressions moving towards Iran via the Aegean and Black Seas give the heaviest rainfall, whilst those moving due east across Syria and Iraq are almost dried out.¹

Thus as might be expected, north-west Iran experiences by far the heaviest rainfall, and the distribution of rainfall in general is closely related to topography. Isohyets tend to follow contour lines, and the north-west Zagros and Elburz regions, lying close to sea areas, receive by far the heaviest rainfall. The amount decreases towards the south-east, markedly so in the lower central plateau, more slowly in the mountain zones. Hence the Kopet Dagħ and Ala Dagħ of the east, and the south-east Zagros have annual totals of under 10 inches, whilst on the plateau a rain shadow area occurs in which rainfall is under 5 inches.

The season of greatest rainfall varies somewhat over the country. In the north (Caspian provinces excepted) the maximum occurs in spring with March as the wettest month ; but in the south, the maximum falls earlier (December at Ahwaz and Khorramshahr, January at Jask). Again, as is usual under Middle Eastern conditions, rainfall is capricious, varying greatly in amount from year to year, and in onset—even in regions where annual rainfall is below 10 inches, falls of

¹ It has been suggested that a partial regeneration of these exhausted depressions may occur over the swamps of lower Iraq and the Persian Gulf.

2 inches in 24 hours are known, and in others, years may pass without any precipitation.

Great contrasts exist in humidity. Over most of Iran the air is dry—as would be expected, in view of a deficient rainfall—and figures for Teheran and Meshed, showing a winter maximum, may be considered as typical. On the Caspian coast, however, humidity is high throughout the year, though still with a winter maximum ; but in the Persian Gulf humidity is highest in summer, giving rise, in combination with the very high air temperature, to extremely oppressive conditions. Where sea breezes carry in moisture from sea to land, as at Jask, summer humidity is high. At Abadan, the opposite occurs, and with the prevailing wind from the north-west (i.e. from the land) humidity is low. This difference in humidity is all the more striking in view of the complete absence of summer rainfall at both places.

PERCENTAGE RELATIVE HUMIDITY

	<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>
Teheran	76	64	44	46	51	50	47	49	50	54	66	77
Meshed	83	83	77	68	59	48	45	46	49	62	76	79
Abadan	77	75	59	45	33	25	25	29	33	39	60	75
Jask	63	71	65	65	64	67	68	72	64	64	62	62
Lenkoran (Russian Caspian provinces)	86	87	87	84	81	75	73	76	82	88	89	89

Cloudiness is in general extremely low. The Caspian region, with an average cloud-cover of *-fa* stands out as unduly cloudy ; but the general lack of cloudiness is an important factor in the wide range of temperature, both seasonal and diurnal. During the days of summer, the sun blazes down on an uncovered land surface : at night, and in winter, much terrestrial heat is given out unchecked to the atmosphere.

CLOUDINESS (In tenths of sky covered)

	<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>j</i>	<i>j</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	<i>Mean</i>
Teheran . .	4	5	4	4	4	1	1	1	1	2	4	4	3
Meshed . .	5	4	5	5	3	1	1	0	1	2	4	5	3
Seistan .	3	3	2	1	1	0	0	0	0	0	0	2	1
Lenkoran .	7	7	8	7	7	5	5	4	6	6	8	8	6
Bushire , .	4	4	4	3	2	0	1	1	1	1	3	5	2

It remains to discuss the special climatic regime of the Caspian region. Here, as the result of the presence of the Elburz Range, and proximity to two expanses of sea, which form a * storm track' for

CLIMATIC DATA REPRESENTATIVE STATIONS IN IRAN

Temperatures (°F.), and Rainfall (inches)

	J	F	M	A	M	J	J	A	S	O	N	D	Total
<i>Teheran</i>													
Temp.	35	41	49	60	70	80	85	84	77	64	53	42	
Rainfall	1*7	1.0	1.9	1.1	0.4	0.1	0.2	0	0.1	0.3	1.1	1.3	9.2
Rainy days	4	3	6	3	2	1	1	0	1	1	3	4	27*
<i>Meshed</i>													
Temp.	34	38	46	56	67	74	77	74	67	57	47	39	
Rainfall	0.8	1.0	2.2	1.8	1.2	0.3	0.1	0	0	0.4	0.6	0.7	9*1
Rainy days	2	2	5	5	3	1	1	0	0	1	2	2	23
<i>Abadan</i>													
Temp.	53	59	65	76	87	93	97	97	90	81	69	58	
Rainfall	1.5	1.7	0.7	0.8	0.1	0	0	0	0	0.1	1.0	1.8	7.6
Rainy days	1	1	1	1	1	0	0	0	0	1	1	1	5
<i>Seistan</i>													
Temp.	48	51	50	70	81	87	90	89	79	69	57	47	
Rainfall	0.4	0.4	0.5	0.1	0	0	0	0	0	0	0	0.3	1.7
Rainy days	1		1	2	1	0	0	0	0	0	0	1	6
<i>Jask</i>													
Temp.	67	69	74	80	85	90	91	89	87	83	76	71	
Rainfall	1.2	0.9	0.6	0.2	0	0.1	0.1	0	0	0.2	0.3	1.2	4.7
Rainy days	2	2	1	1	0	1	1	0	0	1	1	2	9
<i>Lenkoran f</i>													
Temp.	38	41	46	54	65	74	78	71	62	51	43		
Rainfall	3.1	3.2	3.7	1.9	1.2	1.1	0.6	2.4	8.6	9.3	6.5	4.6	44.2
Rainy days	11	11	12	10	9	5	3	5	11	13	13	12	115

*This total may not exactly agree with the monthly total of rainy days, because in the latter, a total of 1 may indicate a fall of rain only once in several years, and should appear as a fraction of unity.

*f Russian territory, but the only station in the region with a run of climatic data for more than 10 years.

depressions, rainfall is very much higher. Moreover, the low altitude of the coastal plain gives winter temperatures more in keeping with the latitude. In summer rainfall occurs, though on a reduced scale, and the resulting cloud cover helps to reduce insolation, so that the high temperatures characteristic of the rest of Iran are not found—it is very unusual for the thermometer to reach 100° F., and the July mean is only 79° F. A hot, but not torrid summer, and a winter milder than in the adjacent areas of Iran, together with abundant rainfall well distributed throughout the year (maximum in early autumn), indicate that climatically, the Caspian provinces stand apart from the rest of the country. Conditions are those of a hothouse, in which vegetation thrives luxuriantly, but in which lassitude and enervation are also found among the people. Although very productive, the Caspian lowlands are a breeding ground for disease, and in some districts, chronic malaria affects 80 to 100 per cent, of the total population.

III. AGRICULTURE

The amount of cultivated land in Iran probably amounts to between 5 and 10 per cent, of the total area ; and of this, about one-third is irrigated, with the rest depending upon direct watering by rainfall. Figures of actual production are extremely difficult to obtain, but from observation, it is clear that large areas lie fallow for months—sometimes even years—and that shifting cultivation is fairly widely practised. The physical and social limitations to efficient production that were discussed in Chapter IX apply with considerable force in Iran : besides the handicaps of a low rainfall and a difficult topography, methods of exploitation are primitive, improvements and initiative are discouraged by the system of land tenure—metayage is the most widespread form of tenancy—and bad communications and vast distances hinder a change-over from a mediaeval level of self-sufficiency to specialisation in cash crops.

In the main, the cultivated land of Iran occurs as small patches or oases surrounded by vast tracts of unexploited desert or mountain slopes, and the true picture of conditions is one of a mosaic, with scattered plots and tiny fields alternating with larger arid and barren intervals.

Crops.—Wheat is the chief crop, and is grown over most of Iran. The regions of greatest production are : [a) the Meshed region of

Khorassan* province, (b) the valleys of the north-west and central Zagros, particularly the districts of Lake Urmia, Hamadan, Kermanshah, Isfahan, Shiraz, and Niriz, and (c) the better watered parts of Khuzistan. In most instances, wheat is grown as a winter crop, but in the high valleys of the Zagros and Elburz, sowing is in the spring, so that the harvest takes place in July and August. Barley is second in importance to wheat, and is grown in the same districts as wheat. Barley ripens 3 to 4 weeks earlier, however, and hence escapes to some extent the ravages of the sunna insect, which appears in late summer, and causes very considerable losses in Iran—losses which are in general higher than in the rest of the Middle East. Much barley is eaten by the people, and the remainder used as feeding stuffs for animals.

Rice flourishes in the Caspian provinces of Mazanderan and Gilan, with the Resht district (lower valley of the Safid Rud) as the region of most intensive production. Small quantities of rice are also grown in other parts of the country where abundant irrigation water is available, e.g. in Khuzistan, Kermanshah, and the Shiraz basin. Rice cultivation demands much labour, as several ploughings are necessary—the first to break up the land, and again when the paddy fields have been covered in water, and the surface must be broken down to the consistency of mud. For this purpose mountaineers from the Elburz (and to a lesser extent the Zagros) are employed as seasonal workers. The fields are broken up in late winter, then the fields are flooded to a depth of over a foot in April, and sowing takes place in May. Later, the crop is thinned out, either by transplantation, or by trampling down unwanted shoots by foot. Harvesting takes place in August or September. Until the introduction of rice in the tenth century A.D., the Caspian provinces were much less productive, because the climate, with cloudy summers and a very rainy early autumn (i.e. closer to monsoon conditions) does not altogether favour the cultivation of wheat and barley.

Two minor crops, planted chiefly in spring, are millet and maize. Production of the latter is still on a very small scale, though its cultivation is increasing in the province of Khuzistan.

Fruit growing is of considerable importance, since fruit forms an important part of the everyday diet of most Iranians. The main regions are situated in the north-west of the country, but small orchards occur in most districts. Iran is famous for its apricots, said to be the finest in the world; and the wide extent of hilly country

favours the cultivation of the vine. Many varieties of the latter occur : some are dried as sultanas and raisins, others are used in wine making,¹ whilst large quantities are eaten fresh. Grapes from the Shiraz district, reputed to be the finest in the Middle East, are exported as far as Iraq and India. The vine is found at altitudes up to 4,500 feet in most parts of the country, and many of the lower hillsides are terraced as vineyards. Other fruit crops are figs, peaches, lemons, melons, and oranges. Some oranges grow to a size of 9 inches in diameter, and melons are also of enormous size. In the north-east, towards Russian Turkestan, the latter attain a weight of over 100 lb.

Citrus fruit-growing is generally confined to the Caspian coastlands, and to the outer foothills of the central Zagros. The wide extent of upland massifs allows a well marked gradation of cultivation of fruit crops : at the lowest levels oranges, peaches, pomegranates, and melons are found, succeeded at heights of 1,000 or 2,000 feet by apricots, nectarines, and the vine. In the cooler zones about 4,000 feet there is a variety of temperate fruits—plums, cherries, pears, apples, and strawberries. Olives are much less important, and cultivation is mainly limited to the Elburz Range, with the Manzil region of the middle Safid Rud as the chief centre. Scattered olive groves are, however, also found on the eastern side of the Zagros range, towards the inner plateau of Iran.

In the south of Iran, date growing assumes very great importance, and in the south-east Zagros and Makran districts, dates form a staple of diet. The country can thus be divided into two distinctive regions, with the northern limit of the date palm as the boundary (see Fig. 31), (a) a southern region, hot and arid, with little or no winter frost, where cultivation of any sort is difficult, and where dates provide a large part of the food ; and (b) the cooler and damper north, where cereals and a wide variety of 'Mediterranean' fruits are grown. The date flourishes most on the coastal plains of the Persian Gulf and Gulf of Oman. About half of the date palms of Iran (total, approx. 10 million) are found round Minab on the Strait of Hormuz, and most of the remainder in Khuzistan, near the banks of the Shatt el Arab.

¹ Despite Moslem disapproval, wine-making has long been carried on in Iran, as the poetry of Omar Khayyam shows.

COMMERCIAL CROPS

Cotton is outstanding as the chief cash crop of Iran, since, in addition to supplying a moderate home demand, more than half of the total crop is exported.¹ Irrigation is essential, and growing is, therefore, restricted to the north and west of the country. A moderately long stapled variety of cotton known as *Filestani* is grown in Azerbaijan, Kermanshah, Fars, and Khuzistan provinces, and accounts for about 50 per cent, of the total of cotton grown. A shorter stapled American variety is found only in the Caspian district, whilst a third kind, a native short staple of inferior quality though hardy in growth, is restricted to marginal (i.e. dry or hilly) areas. The cotton plant is also grown extensively for its seed, which yields an edible oil that replaces olive oil as food in many areas. Over 100,000 tons of vegetable oil are produced annually, and of this 90 per cent, is cottonseed oil, the rest coming from sesame, linseed, the castor oil plant, and the opium poppy.

Silk is a traditional product of Iran, but production declined greatly during the nineteenth century as the result of disease amongst the silkworms. New strains have, however, been introduced from Turkey, and production has lately increased. Mulberry growing is widespread over most of the north and west, but is particularly a feature of the eastern Caspian plain (Mazanderan province). The silkworms are usually hired out by landlords to the peasants who grow mulberry leaves; and when the cocoons have been spun, two-thirds of the cocoons are given to the landlord, the peasant retaining the remainder.²

The growing of opium poppies increased considerably during the nineteenth century, as an alternative to the declining silk industry; and although production is restricted by governmental decree, there is a large illicit crop, since the profits are high, and the temptation in the way of an abjectly poor farmer is very great.³ Extension of the

¹ Besides providing raw material for the home textile industry, raw cotton is extensively used as wadding in the quilted material that is widely employed as bedding and as garments for protection against the winter cold. The wadding is prepared by means of a stringed implement resembling an archer's bow, and this operation is a common sight in the bazaars of Iranian towns.

² A curious feature, occasionally copied by schoolboys in the West, is that the silkworms are often hatched from eggs by being carried in the clothing.

³ In December, 1948, the International Narcotics Committee made severe public criticisms of conditions in Iran.

growing of opium has unfortunately led to addiction amongst many of the population, and opium smoking is now reckoned as one of the chief social problems of the present Iranian state.¹ Opium poppies are grown chiefly in the districts of Yezd and Kirman, the former town being possibly the original home of the plant, and also in the lowland basins of the central Zagros (Isfahan, Shiraz, Niriz, Kirman-shah, and Hamadan), and in Khorassan. Production of the drug depends upon complete aridity during the summer season, as a single shower will wash away sap containing opium as it exudes from the stem. Because of this, the Caspian provinces are not suited to opium-growing.

Minor Crops.—Sugar beet was introduced by Riza Shah, and its production was greatly fostered by the Iranian government as a means of reducing Iran's dependence on imported sugar. Because of rather inefficient methods of cultivation, and an environment that is in the main too warm and dry for really intensive cultivation—the beet is more at home in cool temperate latitudes—there is only a low sugar content. The beet crop is dependent upon irrigation, which, however, must be very carefully applied, in order to avoid damage to the plants.² Cultivation is confined to the regions of Teheran, Tabriz, Kermanshali, Shiraz, and Meshed. Successful production of beet sugar in Iran depends upon the existence of refineries close to the beet-growing regions, and under the regime of Riza Shah these were in process of building in various parts of the country. Since his downfall, however, little further building has taken place, and in parts where refineries are lacking, potato-growing has recently tended to replace the cultivation of beet. Cane sugar, widely grown in Iran during the early Muhammadan era, is now restricted to the Caspian provinces (Gilan and Mazanderan) and to Khuzistan. Planting takes place in March or April, and the cane is cut in November.

Tea is another minor crop that owes its extension to the efforts of Riza Shah. Chinese experts were introduced to develop cultivation on the northern foothills of the Elburz and Talish Hills, overlooking the Caspian plain, where climatic conditions somewhat resemble those of the lower Himalaya. Abundant moisture is necessary, so the crop tends to be restricted to the western portion of the Elburz,

¹ One estimate suggests that 10 to 15 per cent, of the inhabitants of Iranian towns are opium addicts.

² Because of the high temperatures of the surface soil, beets can be 'scalded' when watering takes place.

where rainfall exceeds 35 inches per annum. The eastern province of Mazanderan is used for jute growing, but production of this latter crop is very small.

Tobacco is grown in most districts for local use, but the more important areas are the north-west and south-east Zagros, and the Caspian provinces. Quality is not high, so that there is little or no export. Finally, a number of dye-plants are important in the carpet-making industry. Production is mainly from the central Zagros region, and the adjoining province of Kirman in the central plateau ; the chief crops being indigo, henna, madder, saffron, and oak-gall. Output has greatly declined since the introduction of aniline dyes during the last forty years.

IV. IRRIGATION

Despite the low rainfall of much of Iran, and the fact that irrigated areas give much larger yields than those dependent on rainfall, irrigation methods in Iran are primitive and undeveloped. Cultivators are content to rely on wells, qanats, or on small, crudely formed canals leading from rivers. It is also revealing to note that whereas Riza Shah devoted much attention to the growing of certain crops such as sugar beet, tea, and cotton, little was done for irrigation, and it was not until 1943—two years after his abdication—that a governmental Irrigation Institute was created. This is all the more surprising in view of the extensive irrigation schemes developed at earlier historic periods—e.g. at Susa, in Khuzistan, and in Khorassan. A survey by the Institute showed that 2½ million acres were capable of irrigation, i.e. the extent of cultivated land could be tripled. About one-half of this total lies in the province of Khuzistan. Because of high costs, and the poverty of the state, and certain social difficulties (i.e. conversion of pastoral nomads to a life of cultivation in newly irrigated areas) it is unlikely that the full potentialities of irrigation projects will be realised for some considerable time. As an interim practical measure, it is, however, proposed to bring about half a million acres under irrigation by means of small inexpensive barrages none of which will exceed 100 feet in height.

Chief regions involved in this modified scheme are : Khuzistan, Kirman and Seistan, Fars, Isfahan, and Teheran ; and already new dams have been built along the Karkch and Shair rivers to increase the water supply round Ahwaz. Further to the south-east, near

Behbahan, some 20,000 acres have been irrigated from river water, and there is some development round Teheran. Unfortunately though, the effect on soil chemistry of increasing water supplies was not sufficiently taken into account, and in parts of Khuzistan, after a short time under irrigation, the soil became markedly saline, so that cultivation was no longer possible. The valley of the Karun river is particularly remarkable for its tendency to develop soil salinity.

At the present time, Khuzistan is predominantly a pastoral area, despite the low relief and the numerous streams. Agriculture is restricted, as in most of the rest of the Tigris-Euphrates basin, to the immediate vicinity of larger rivers. Cotton and sugar, which are well adapted to prevailing climatic conditions, might be grown on a far more extensive scale, and the region could become one of the most productive of Iran. The whole problem of irrigation is, however, bound up with internal political conditions—a measure of stability and firm rule are essential, and relatively large sums of money must be made available. Oil royalties from the Anglo-Iranian Oil Company might well be applied in greater amount to the financing of long-term irrigation projects. As it is, development is an urgent, but often neglected need.

V. PASTORALISM

The policy of converting pastoralists to cultivators has nowhere in the Middle East been followed so actively as in Iran. Many tribesmen of nomadic or semi-nomadic habit were compelled by Riza Shah to abandon pastoralism and attempt to take up cultivation. As a result, the number of animals kept has declined considerably, though pastoralism still remains important in many parts of the hill regions. In addition to the social upheaval and human distress, the policy followed by Riza Shah has brought about much economic loss to Iran, not only in foodstuffs—milk and meat—but also in the carpet industry (which is dependent on local wool) ; and as affecting a small, but significant export market for raw wool.

Sheep are most numerous, with a probable total of 14 to 16 million, and these animals are kept either in semi-arid or mountainous areas, where they form the main wealth of nomadic tribes, or else close to partly settled agricultural regions. In the latter areas a village herdsman usually takes care of a single large flock, and is repaid in kind by the owners. Shearing takes place in May and September, and the

wool is used locally for clothing and blankets, or else sent **to market** centres to be sold.

Goats are next in importance, numbering about 7[^] million. Besides providing milk and meat, their hair is woven into cloaks **and** tent-cloth. Cattle are much less numerous—about 3 million—and most are employed in agricultural districts as draught animals, i.e. for ploughing and irrigation. Dairying is little practised except near a few larger towns. Donkeys are much used as beasts of burden, and by farmers, and there is an important mule breeding industry carried on in the districts of Fars, Luristan, and Kurdistan. Camels are employed in large numbers as pack animals in the south and east of Iran, and a special breed has been developed in Khorassan by crossing the Arabian and Bactrian * species. The Khorassan camel is much stronger than the Arabian variety, being able to carry twice the load, and is better adapted to the climate of Iran, since besides its tolerance of great heat and aridity, it can also support the cold of winter.

VI. MINERALS

Iran is known to have a number of useful minerals, but complete exploration of the mineral resources has not so far been carried out. Although minerals seem to exist in fair variety, the size of individual deposits is small, and this fact, together with difficulties of access, has greatly restricted exploitation. Apart from oil, the only minerals produced for export in Iran are red oxide and turquoise, though many others are exploited to supply home needs. With few exceptions, mining methods are primitive, since the small extent of deposits does not often justify the introduction of foreign mining machinery.

Coal deposits occur in the region of Teheran, and also *in* eastern Mazanderan. "Production in the first region is from three centres (Shimshak and Lasherak, 30 miles north of Teheran, and a smaller centre 55 miles west-north-west of the same city); and in Mazanderan, from Zirab and Gulendi Rud near the eastern frontier of the province. The coal is not of high quality (the best coming from Zirab), and total annual production has fluctuated between 100,000 and 150,000 tons. Iron ore is known to exist in four localities—Kirman, Samnan (in the extreme south-east of the Elburz), at Isfahan, and at Anarak (region of the Great Kavir, between Teheran and Yezd). Reserves

¹ The Bactrian camel, a native of south-west Turkestan, is adapted to a colder climate. It also has two humps, instead of the one characteristic of Arabian camels.

at Kirman have been estimated at 15 million tons, but so far no production of iron ore has taken place from any region.

The Anarak district does, however, produce the bulk of the Iranian output of lead (annual total under 1,000 tons) ; some antimony and nickel (the latter mined with lead) ; and small amounts of copper. Copper is also exploited at Abbassabad (south-east Elburz) and at Zenjan, where a modern refining plant has been installed.* Chromium (in demand for tanning of leather) occurs sporadically in the Elburz Range ; and other minerals produced on a very small scale are alum, arsenic, calcium borate, fuller's earth, manganese, rock salt, and sulphur. Red oxide is exploited to a somewhat larger extent on the island of Hormuz (Persian Gulf); and other deposits occur on the adjacent mainland, in association with the salt-plugs of the central Zagros. Annual production averages 20,000 tons. Turquoise, once regarded as the finest in the world, is exploited near Nishapur, but output has declined because of the competition of American and synthetic stones. Emeralds, formerly a well-known product of Iran, are now little produced, and there is no systematic prospecting at the present.

It will be seen that mineral occurrence tends to be restricted to a few districts, and of these south-east Elburz is easily the most important. In addition to the coal basins near Teheran, other minerals occur to the north and east, at Samnan and Shahrud. Second in order is probably the Bandar Abbas region, where, besides the red oxide deposits, sulphur and rock salt are also worked. Though transport difficulties will be a handicap, the vast kavirs of the interior may offer considerable potentialities at a future date, and there may be development similar to that on the shores of the Dead Sea. Sodium and magnesium sulphate are known to occur in considerable quantities, and it is probable that nitrates are also present.

VII. INDUSTRY

Apart from the installations of the A.I.O.C., no modern industry of any kind could be said to exist before 1934 in Iran, and although Iran produced a moderate volume of manufactured goods, these were made entirely by hand, or with the use of primitive machinery. Efforts, were, however, made by Riza Shah during 1930-41 to introduce modern plant as a means of reducing Iran's dependence on

¹ This plant was installed by Riza Shah, in order to supply materials for the State Arsenal.

manufactured imports ; and within the last 15 years over 200 industrial establishments have been brought into existence. The state has played a leading part in this development, so that a number of the more important factories are state-owned. In cases where private ownership is allowed, the government supervises all development and operation.

The location of the new industries has been carefully planned with the objects (i) of spreading the factories as fairly as possible over the whole country, whilst at the same time (ii) placing particular industries in regions where raw materials and labour were available, and communications best developed. This has meant that most provincial capitals and route-centres have obtained one or more new industries, and development has in general been widely dispersed. Geographical advantages in a few regions (e.g. the existence of minerals near Teheran, and the availability of cotton and wool at Isfahan) have, however, prevented an even spread over the whole of Iran. State activity since 1934 has mainly affected the textile and food industries, and a third, yet minor, feature has been the creation of a small metallurgical and chemical industry closely related to supplying light armaments for the Iranian army and police.

Textiles.—About one-half of the cotton production of Iran comes from the Isfahan district, which is a market and collecting centre for the cotton growing districts of the south-west. There are nine spinning and weaving mills in the city, the largest being state owned, and of recent construction. Minor cotton manufacturing centres are Shahi (Mazanderan), and Behshahr (Gurgan), with two large mills each ; and Kasvin, Kirman, Meshed, and Yezd, where there are smaller units and many handlooms. Woollen goods are produced in ten large factories and many smaller ones. Isfahan is again the chief centre, being placed conveniently in relation to the great pastoral areas of the central Zagros ; but Tabriz, another regional capital in the north-west Zagros, and also Kasvin, have a significant production. Jute is woven to a small extent at Resht and Shahi, whilst silk, another product of the Caspian provinces, is woven at Chalus (Mazanderan).

The carpet industry, for which Iran has long been famous, has shown itself to be much less susceptible of concentration and mechanisation under modern conditions, and remains entirely a bazaar craft carried on by hand. The introduction of aniline dyes has lowered the quality of many Persian carpets, since the old colours derived from vegetable dyes are not exactly reproduced by the modern products, and

the peculiar coloration of a valuable carpet seems to depend upon a blending obtainable only from vegetable colours. Hence the use of aniline dyes has been prohibited in Iran since 1900, but the effect has been to raise the cost of Persian carpets in the world markets, because other types of carpet can employ aniline colours to much greater effect, and at a cheaper price.

Wool is the chief material used, but cotton is often employed as a foundation or 'warp', because it allows finer work. Silk is sometimes used also. The finest (i.e. closest) work can be done on a cotton or silk warp, and up to 300 knots per square inch can be achieved with woollen tufts, and 400 with pure silk tufts. When woollen warp is used, the carpet is heavier, and of a deeper pile, though less fine. It is possible from pattern and colour to distinguish Persian carpets according to their region of origin. As compared with Turkish and Caucasian products, Persian carpets have a more flowing, curvilinear design, and employ brighter and more varied colours—Turkish carpets in particular show a strong influence of geometric patterns based on straight lines, and colouring is cruder and simpler.

Each district in Iran has its own distinctive designs and colours—e.g. Tabriz specimens employ pastel tints, whilst Sultanabad carpets are more vivid; and the lighter, finer rugs, made on cotton or silk warps, come from Kirman, Tabriz, and Teheran. Heavier carpets in wool are associated with the uplands of the Zagros—Shiraz, Hamadan, and Khurramabad. Kirman is the leading centre for carpet-making, with about 1,500 persons employed (including children of seven years and upwards). Other producing towns, besides those already mentioned, are Bijar, Senna (Sanandaj), and Kashan.

Food Processing.—This employs the majority of workers described as 'industrial', and is hence an index of the low industrial level of the Iranian state. Eight state-owned sugar refineries have been built, three at Teheran, and the remainder in the north-west provinces. Flour milling is carried on in many places, with the larger mills again in the north-west where the bulk of the cereals are grown. Teheran has most of the remaining factories, which carry out food canning, distillation of spirits (arak) and industrial alcohol, soap boiling, and the processing of tobacco. The remaining industries of Iran (comprising the manufacture of chemicals, glass, paper, cement and pottery, etc., with small scale iron and steel working), are either bazaar crafts, or in very small workshops with little modern machinery. Production by modern methods is almost confined to the Teheran area,

where sulphuric acid, arsenic insecticides, and caustic soda are produced from local materials, using as fuel coal from the Elburz fields. The largest industrial establishment of Iran, after the A.I.O.C. plant, is the arsenal at Teheran, where light armaments are produced. An iron smelting plant, designed to utilise iron ore from Samnan and Kirman, and coal from Teheran, was in process of erection by German interests in 1941, but was never completed.

It is important to set the scale of Iranian industry in proper perspective alongside other economic activities. Although detailed figures are lacking, it would appear that despite governmental activity in fostering factory building, Iranian economic life is still overwhelmingly concerned with agriculture and pastoraism. In reading accounts of recent industrialisation, there is a tendency to assume that Iran is rapidly becoming an * industrialised state \ The fact that this is far from being the case is shown by figures which indicate that in the whole of the country there are only 2,000 modern looms for cotton weaving,¹ and 500 for woollen weaving. The total number of employees in modern industry as a whole amounts to 30,000—some 70,000 less than the number employed by the A.I.O.C. alone.

VIII. PEOPLE

The, main features of population distribution will be apparent from Fig. 44, which, however, can do no more than give a broad indication of the position, since no census has ever been taken, and even the areas of provinces are only approximately known. In order to relate the generalised distribution, as shown on the map, to actual conditions, it should also be borne in mind that except in the province of Gilan, where the population is evenly distributed over the whole area, extreme irregularity is the main characteristic. For the most part, people are closely crowded into the few fertile spots, with a wide extent of surrounding empty land.

An important feature of the Iranian population is the extent of tribal organisation. The chief areas where this exists are shown in Fig. 44, from which it will be seen that, as might be expected, tribal life is closely related to nomadism. The tribe exists to undertake the complicated routine of seasonal migration from winter to summer pastures, and as natural resources are limited, the size of tribes is

¹ i.e. as regards cotton, the equivalent of three or four moderately sized mills in Europe or America.

relatively small. The broken nature of the Zagros has prevented large scale amalgamation of tribal units ; hence inter-tribal warfare and raiding, with resulting internal disorder, have long been characteristic of the tribal areas. Disunity has been further emphasised in Iran by the varying racial and cultural affinities of the different tribes; e.g. the Kurds are of Armenoid racial stock, fairly strict Sunni Moslems

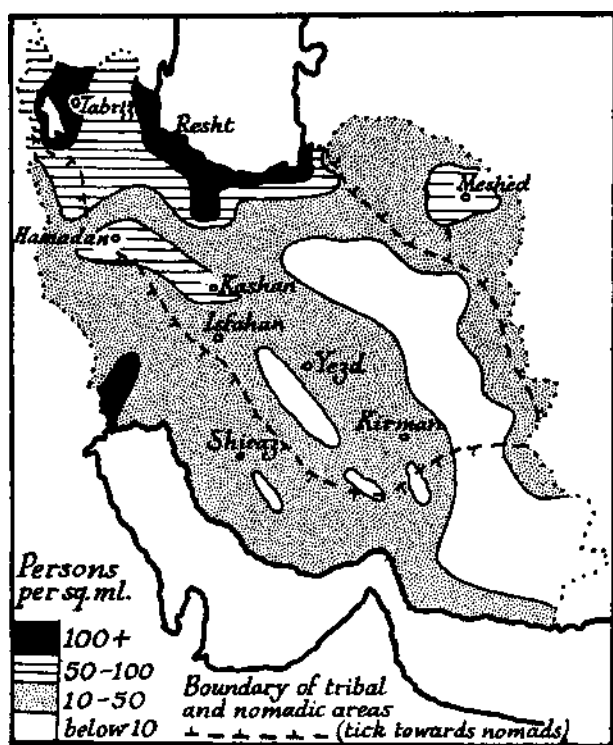


FIG. 44. Sketch of Population Distribution in Iran. Data very unreliable.

and speak an Aryan language ; the Qashqai are of Mongoloid ancestry and use a Turki language ; whilst the Bakhtiari, the most powerful and outstanding of Iranian tribesmen are, to say the least, only nominal Moslems. ,

It was the policy of Riza Shah to break down tribal organisation, which had proved a menace to the stability of the Iranian monarchy (the Bakhtiari have intervened at various periods with great effect in the political life of Iran), and strenuous efforts were made to disarm the

tribesmen, and to settle them as cultivators. Force was used when necessary : a campaign took place against the Bakhtiari in 1925, and many tribal chiefs were held as hostages at Teheran. A number of entire tribes found themselves forcibly re-settled elsewhere,¹ and there was a ban on the migrations of Kurds in and out of Iran. Stone houses were built, in which the tribesmen were compelled to reside, and their grazing lands were confiscated by the Shah.

Politically, this forced re-settlement may have had some justification ; the Zagros was pacified, local unrest and disorder came to an end, and the power of the tribes to sway national policy was broken. Socially, however, the results were disastrous. Hygiene is not a conspicuous feature of pastoral societies, but so long as a community moves regularly to another site, the effects of uncleanness are minimised. When, however, a family is compelled to remain in one spot, disease soon develops, and large numbers of Iranian tribesmen were wiped out by virulent epidemics. Equally seriously, pastoralism is the only possible way of life in many districts of Iran where rainfall is inadequate for crop-growing ; and the attempt to introduce an occupation unsuited to geographical conditions was bound to fail. Iran was deprived of a number of useful commodities—milk, meat, wool, hides, and draught animals—whilst the pastoralists themselves, unaccustomed to a life as cultivators, and living in a difficult semi-arid region, were unable to feed themselves. Thus between the two evils of disease and lack of food, virtually whole tribes were decimated between 1920 and 1940, and the economy of the hill regions greatly disturbed.

Since the abdication of Riza Shah, a reaction has set in ; and with the weaker authority of the present Iranian government, tribal power is to some extent reviving. Pastoralism is again on the increase : certain grazing lands have been reclaimed, and the rule of the chiefs is somewhat stronger. Other influences, though slower and more indirect, may also prove to be of importance in modifying the traditional tribal organisation in western Iran. These are (1) the employment offered to tribesmen by the A.I.O.C., whose pipe-lines pass through tribal territory. A secure cash wage and regular employment is having great effect on the habits and even the physique of former nomads²; and (ii) conscription, both for the army, and for

¹ A traditional policy in the Middle East. Cf *Nebuchadnezzar and the Jews*.

² This has been commented on by Twitchell in the case of the nomads of Saudi Arabia, who, markedly small in stature when living as pastoralists, seem to develop considerably when they enjoy cash wages as oilfield workers, and can afford to buy imported foods.

schools,¹ which has brought many young tribesmen into towns, and given them a taste for urban life.

IX. COMMUNICATIONS AND TOWNS

Iran has long been a centre of routeways linking east and west, but as a result of invasion and misrule in the later Middle Ages, and the change in space-relationships which diverted commerce from China and India to the sea, the road system of Iran decayed, and is at the present time an important contributing factor to the economic backwardness of the country. Despite a certain activity under Riza Shah, there are not much more than 10,000 miles of motorable roads and many are not passable at all seasons. The smallness of this total will be apparent when account is taken of the great size of the country—it is 800 miles from the Caspian to the head of the Persian Gulf, and 1,500 miles from Tabriz in the north-west to Zahidan in the extreme south-east.

Railway building too, has been sporadic, and up to 1927 the only lines existing were a small extension from the Indian rail system across the south-east frontier to Zahidan, and a Russian owned broad gauge link from Tabriz to Julfa in the Soviet Union. In 1927, however, a trans-Iranian railway was planned between Bandar Shah on the Caspian, to Teheran, and Bandar Shahpur on the Persian Gulf. Eleven years later, the line was complete. Further lines from Teheran to Tabriz and to Meshed have been under consideration, but so far both links are unfinished. During 1941 to 1945 operation of the Iranian railways was taken over by the Russians and the British, the latter being replaced by Americans. New lines were laid to connect the trans-Iranian line to Khorramshahr and Basra, thus making Ahwaz a rail junction. All existing lines are single track, with infrequent passing loops.

It has been said that railway operation in Iran is the most difficult in the world. Besides the irregular terrain, which results in very high constructional costs, water supplies are few, and the water, even when available, is at times quite unfit for use in boilers because of salinity. Cuttings and gorges on the routes become so hot and humid that traffic through them has to cease at certain times of the day, and

¹ As part of Riza Shah's policy of de-tribalisation, all tribes were compelled to send 10 per cent, of their children to the towns, where they were educated in special boarding schools, and hence lost some of their desire for a life of nomadism.

heavy gradients necessitate a special sand car in front of the locomotive, since normal methods of sanding the track are ineffective. It is thus doubtful whether there will be any further extension of railways in Iran when the planned network is complete.

Towns.—Despite their predominance in the life of the country, Iranian towns are not large, and only three exceed 200,000 in population. The importance of Teheran arises partly from its position on



FIG. 45. Iran, Railways.

the Veramin plain—the largest of a number of tongues of fertile land that extend southwards from the flanks of the Elburz Range into the central desert—and partly from its command of routes. Owing to the presence of a * 'dead heart' in Iran, the choice of a capital has not been easy—any town was bound to have an ex-central position, and relations with the rest of the country would be of necessity rather difficult. Teheran, is, however, situated astride the important east-west route that follows the southern slopes of the Elburz, at a point

where the route divides, one branch continuing west-north-westwards towards Azerbaijan and Asia Minor, the other turning south-westwards to the central Zagros, Baghdad, and the Persian Gulf. From Teheran northwards, three separate passes, from east to west the Gudar Guduk (7,000 feet), the Imamzadeh (9,000 feet), and the upper Chalus (11,000 feet) give access to the densely populated Caspian lowlands.

The supremacy of Teheran dates only from 1788, when it was chosen as capital. Previously, a number of other cities mainly in the south-west had fulfilled the function of metropolis, and one can see in this shift of influence the operation of several factors: firstly, the difficulty of finding an adequate central site for a capital; secondly, the enhanced economic importance of the northern provinces within the last two centuries; and thirdly, the change in political influence as reflected in the northward movement of the capital. Throughout earlier history, Iranian interests had centred on the west and south, and the ancient capitals were near the Zagros region; but with the modern rise of Russia, the political centre of Iran has gravitated northwards.

THE POPULATION OF IRANIAN TOWNS OF OVER 50,000 INHABITANTS

(Estimate for 1948)

Teheran	450,000	Resht	120,000
Tabriz	215,000	Hamadan	105,000
Isfahan	207,000	Kermanshah	90,000
Meshed	178,000	Yezd	60,000
Ardebil	145,000	Kazvin	56,000
Abadan	143,000	Qum	52,000
Shiraz	130,000	Kirman	50,000

(For ports, see page 292)

As the result of extensive building by Riza" Shah, Teheran has a modern air, and in addition to the occupations usually associated with a capital city—printing, administration, catering, etc.—the district has become the principal industrial centre of Iran, with light engineering (mainly armaments), chemical, textile, tobacco, building, and food processing industries, amounting to about 25 per cent, of the entire modern industrial plant of Iran. Important factors in the rise of Teheran have been the growth of road and rail communications during the last 30 years, and the development of nearby coal resources,

with other minerals within moderately easy reach (copper from Anarak and Abbassabad; lead, antimony, nickel and sulphur from Samnan).

Tabriz is situated in the upper part of one of the largest valleys that drain into the Urmia basin, in a district where there are numerous small alluvial fans formed by erosion of soft lava. The soil is hence extremely fertile, and this, together with the presence of non-saline water, makes Tabriz a rich agricultural area. Moreover, the site of the city, close to the Turkish and Russian frontiers, gives it an importance as a centre of communications. There is considerable exchange of products between the farmers of the lowlands round Tabriz and the pastoralists of the more distant uplands; and a large market is one of the features of the city. Industries based on the agricultural and pastoral products of the two regions (tanning, fruit drying, soap-boiling, distilling, and textile manufacturing) are carried on, partly by means of modern plant introduced by Riza Shah. Carpet making is on an extensive scale, and there is also a certain amount of trade with Turkey and Russia, particularly through Ezerum.

As the largest town of the north-west, and a former capital of Iran, Tabriz is the chief city of Azerbaijan, and has played an important role in political affairs, mainly as the centre of Kurdish and Azerbaijani dissident movements against the central government. Russian influence is strong, and likely to increase. Political instability is also accompanied by physical disturbance—the city, lying on a tectonic fracture-line, is liable to earthquakes, and few buildings are higher than a single storey.

Isfahan lies on the eastern margins of the Zagros, in the centre of a lowland basin occupied by the Zaindeh Rud. Like Tabriz, the city lies in the middle course of a stream which lower down terminates in a salt marsh. Abundance of water supplies, and a rich alluvial soil, make Isfahan a very productive agricultural region, and there is in addition the special function of serving as an outlet for the animal products of the pastoral Bakhtiari country of the central Zagros. With supplies of raw cotton, silk, and wool produced in the immediate district, Isfahan has become the largest textile centre of Iran, and the industry is carried on both in modern mills and as a bazaar craft. Clothing, carpets, and luxury brocade are the chief products, but there is a considerable output of dried fruit, foodstuffs and light metalwork. The open nature of the country to the east, and a command of mountain passes leading westward through the Zagros to the Tigris

lowlands makes the city another important route centre of Iran. Again like Tabriz, Isfahan is one of the ancient capitals of Iran. A special feature is the famous Maidan, an enormous open square, in which the game of polo is said to have originated—an indication of the importance of horse-breeding in the district.

The remaining towns of Iran fulfil on a smaller scale the functions of route-centre, local market, and manufacturing site. Conveniently placed for centralising the economic activity of a small district, they facilitate exchange of agricultural and pastoral produce, and have small-scale manufacturing trades based on locally produced raw materials. Some degree of specialisation exists: carpet-making at Kirman, metal-working at Kashan, fruit-drying at Kazvin, sugar and oil refining on a limited scale at Kermanshah, metal work and the export of fresh grapes from Shiraz, and the production of opium and henna from Yezd. Meshed is the market centre of the east, and the gateway to Turkestan and Afghanistan; whilst Resht has jute, tea, silk, and flour mills, and handles most of the trade between Caspian Iran and Russia. The chief commodities of this trade are caviare, isinglass, salt fish, and tea.

One other function of some Iranian towns is that of receiving pilgrims (usually Shi'a Moslems). About one-sixth of the population of Qum is directly dependent on this traffic, whilst Meshed is another famous centre of Shi'a pilgrimage.

Ports.—Only one port in Iran is of large size. This is Abadan, built and developed entirely by the A.I.O.C. since 1910, and now the largest oil port in the world. The docks can handle ships up to 20 or 30 feet in draught, the limiting factor being the depth of water in the Shatt el Arab. The town has been laid out on western lines, and is growing rapidly in size, a feature which, in view of the great potentialities of Iranian oilfields, is likely to continue. One drawback is the poor land communications of the port, which is rather isolated by the presence of braided river channels, and so far, there is no rail communication with the interior. Apart from oil and stores for the A.I.O.C., Abadan handles no general traffic, so that the principal outlet for Iranian commodities is at Khorramshahr, better known as Mohammerah, which lies at the confluence of the Shatt el Arab and the Karun river, some 11 miles above Abadan. A small quantity of oil is also handled for the A.I.O.C. The small size of the port (see below) is an indication of the restricted overseas trade from Iran, and greatest activity was during 1941-45, when harbour works were

undertaken and Khorramshahr became an important base for the supplying of Russia.

The remaining ports of Iran are small, ill equipped, and often mere roadsteads without shelter for ships. Cargo must usually be transhipped into lighters, and this is the case at Bushire, on the Persian Gulf. Enzeh (recently re-named Pahlevi) is the chief Iranian port of the Caspian, with some fishing trade as well. Bandar Shah,

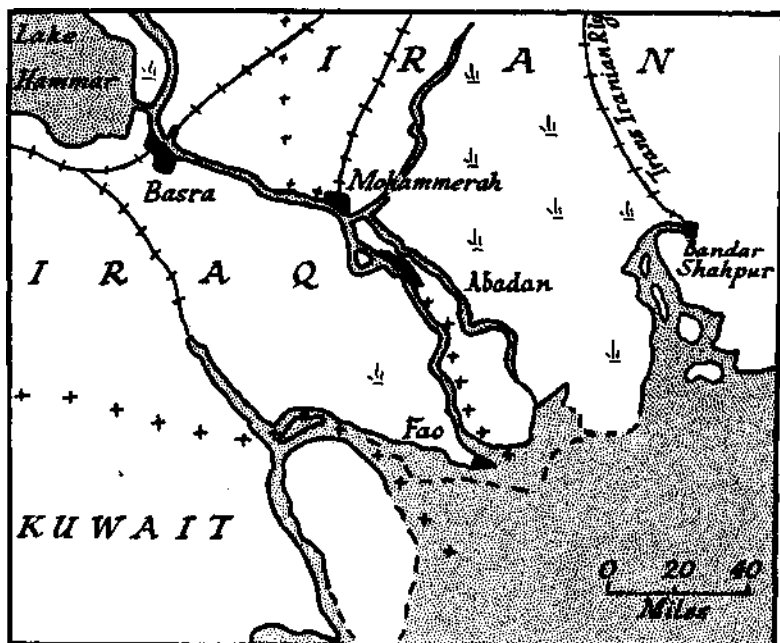


FIG. 46. The Port of Abadan. Frontiers and Railways shown.

chosen by Riza Shah as the northern terminus of the Trans-Iranian railway, was extremely badly sited, and has been greatly affected by the shrinkage of the Caspian. Within one year of the opening of the railway, the harbour was silted up, and although there was a temporary re-opening by the Russians during 1942-45, the port is now abandoned.

Ahwaz is a trans-shipment point on the Karun, Iran's only navigable river. A stretch of rapids above the town makes further ascent impossible, and the importance of Ahwaz has greatly increased since the opening up of south-west Iran and Khuzistan by oil interests.

Bandar Shahpur, the southern terminus of the Trans-Iranian railway, has not developed as was originally hoped, and is unimportant.

POPULATION OF IRANIAN PORTS

(Estimated 1948)

Abadan	143,000	Bandar Shahpur	1,000
Bushire	40,000	Bandar Shah	1,000
Pahlevi	38,000	Jask	1,000
Khorramshahr	32,000	Lingeh	1,000
Bandar Abbas	15,000	Ahwaz	33,000*

* Inland river-port.

THE FOREIGN TRADE OF IRAN

(Year 1946-47)

Total Value of Trade in £ Sterling : £79 million *

Amount per head of population : £6†

<i>Imports</i>	<i>Percentage of Total</i>	<i>Exports</i>	<i>Percentage of Total</i>
Foodstuffs	33	Carpets	30
Textiles	20	Cereals	26
Hides	12	Fruit	19
Total Imports, £79 million		Total Exports, £65 million †	

Suppliers :

- (1) U.S.A.
- (2) U.S.S.R.
- (3) United Kingdom

Buyers :

- (1) U.S.S.R.
- (2) U.S.A.
- (3) India

* Excluding oil exports.

† Comparable figures are : Great Britain, £66 ; U.S.A., £45.

CHAPTER XIV
ASIA MINOR

I. PHYSICAL

LIKE Iran, Asia Minor consists essentially of an inner plateau ringed by mountain ranges that for the greater part fall away steeply on their outer margins either to the sea, or to lowland areas. Only in the extreme east of Asia Minor are the mountain ranges continued without break ; and there the confused highland topography of

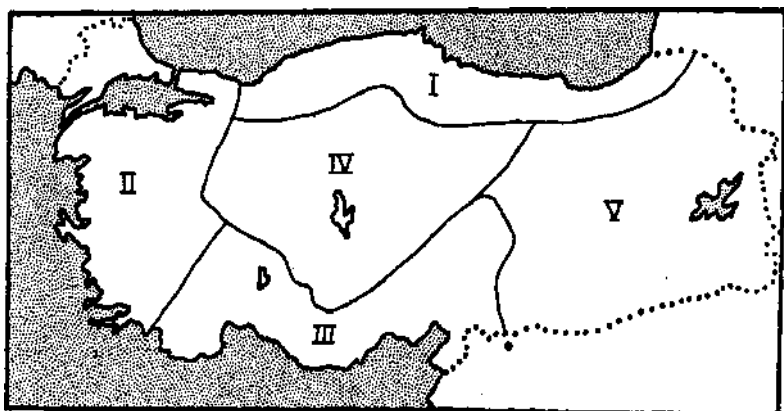


FIG. 47. Natural Regions of Asia Minor.

eastern Anatolia merges on the north-east into the Caucasus, and on the south-east into the Zagros. Within Asia Minor, geographical sub-regions can be distinguished as follows:

- (I) The Black Sea coastlands, extending from the Caucasus of Russia as far west as the region of the Bosphorus.
- (II) The Aegean coastlands, with which may be grouped the region of the Straits, and European Turkey.
- (III) The Mediterranean coastlands.
- (IV) The Central Plateau.
- (V) The Eastern Highlands.

The Black Sea Coastlands.—Present features have come into existence as the result of the foundering of the Black Sea region in Pliocene times. An extensive series of east-west trending fracture lines

was developed on the northern side of the main plateau of Asia Minor ; and differential movement along these fracture Unes, with downthrow mainly towards the north, has produced the present abrupt and harbourless coastline. Fracturing did not, however, take place in a simple pattern : faults are arranged in arcs rather than in a single straight line, so that between Eregli (Heraclea) and Sinop there is a northward bulge of the coastline, which is sharply defined by a small number of bold fracture lines ; whilst further east, between Sinop and Samsun, smaller interlocking faults have given rise to an embayment with a somewhat more irregular and indented coast. In the extreme east, beyond Samsun, there is a return to a simpler pattern of a few large faults comparable with those in the west ; but extensive lava flows along the fault lines have obscured the fault-planes, and again produced a broken, irregular coastline that contrasts markedly with conditions in the extreme west, although fundamentally, there is a similarity in origin (Fig. 48).



FIG. 48. Structure of the Black Sea Coast (after de Wet).

The steep and rocky coast of the western Black Sea region, which is only occasionally broken down into bays and estuaries by the erosive action of rivers, is succeeded inland by an irregular line of highlands that rise to 6,000 to 7,000 feet within 15 or 20 miles from the sea. For the most part, there is hardly any intervening coastal plain, a feature which is characteristic of the entire northern coast of Asia Minor. Eastwards of Sinop, mountains front the coast on an even more imposing scale. Behind Trabzon (Trebizond) and Rize the maximum heights attained are 10,000 to 12,000 feet, and the ranges are distinguished by special names. At Trabzon the coastal ranges are known as the Qakirgol Dag, and further east, near the Caucasus, as the Tatus Dag. The entire coastal uplands are really a series of horst blocks, some relatively undisturbed, others tilted ; and the higher elevation of summits in the east is due to outpouring of lava, giving a series of volcanic cones superimposed upon the general plateau level.

Further inland still, towards the south, the coastal ranges give way to a series of lowland troughs that are defined once again by east-west running tectonic lines. Cross-faulting on a minor scale has also occurred, so that the inland lowland region cannot be said to consist of a single rift valley but is better regarded structurally as an irregular series of downthrow basins sometimes opening one from another, sometimes separated by low divides. Later erosion by rivers has reduced the height of these divides, so that an interior lowland valley system, broad and open in the west, but increasingly narrow in the east, is now a feature of the Black Sea coastal region, and can be traced from the Gulf of Izmit in the north-east of the Sea of Marmara as far as the Russian frontier.

The rivers of the Black Sea coastlands consist chiefly of short torrents cascading from the coastal ranges towards the sea. Here and there, however, valleys have been cut back far enough to reach the inner lowland trough, where an east-west (longitudinal) drainage pattern has developed. The larger rivers, therefore, consist of two distinct portions, a long upper reach, with a generally east-west trend, and a shorter lower stretch aligned from south to north, in which the river breaks through intervening ridges—often by a gorge or rapids to reach the Black Sea. Examples of such rivers are the Coruh, Celkit, Kizil Irmak, and Yenice.

The steep and rocky nature of the coast, absence of harbours, and difficulties in the way of penetrating inland, have all restricted human activities in this region. On the west, the absence of harbours is particularly noticeable; further east, where the coastline is more indented, the mountain barrier is higher. Another disadvantage is that because of the cascades and gorges on the lower courses of the rivers, very few river valleys provide easy routes inland—it is significant that none of the rivers mentioned in the previous paragraph have any settlement at their mouth, and all important towns stand away from the larger streams. Instead, the inner lowland region has come to serve as a line of communications, which, therefore, tend to run from west to east from the Aegean region, rather than southwards from the Black Sea coast itself. In the western half of the trough access from one lowland basin to another is relatively easy, and rail and road construction have been facilitated. A considerable handicap throughout the whole region is, however, a liability to devastating earthquakes, since earth movement along tectonic lines has not yet ceased. Generally speaking, therefore, the Black Sea

coastlands are not thickly populated, and development is confined to a small number of districts where there is either a special geographical advantage—e.g. the presence of coal at Eregh and Zonguldak—or where access with the interior is facilitated, as at Trabzon.

The Aegean Coastlands.—There is no distinctive break between the Black Sea coastlands just described, and the Aegean region. The great fault lines that define the coast of the eastern Black Sea continue without interruption as far as southern Bulgaria, and the foundered trough zone of the interior can be traced from the lake-studded lowlands at the head of the Gulf of Izmit into the Gulf itself, and finally into the northern basin of the Sea of Marmara. Thus east-west trending tectonic lines are again outstanding in the Aegean area, not merely in the extreme north near the Black Sea, but also as far south as the island of Rhodes. The broad valleys of the Gediz and Biiyuk Menderes are east-west running rifts enlarged by later erosion.

Besides the existence of east-west fracture lines, two other features must be noted. These are (a) extensive cross-faulting with a north-south trend, and (b) foundering of the central portion of the Aegean, with consequent invasion by the sea. Occurrence of cross-faulting and foundering in the Dardanelles and Bosphorus justifies the inclusion of the Straits district in the Aegean sub-region, rather than in the Black Sea coastal zone, to which it might at first sight seem more properly to belong. Cross-faulting and later drowning has led to the development of a highly intricate, broken coastline, with many irregularly shaped islands and long, twisting estuaries. The islands are small horsts standing above the sea floor; and on the mainland of Asia Minor the same conditions are repeated, with irregular upland horsts serving to separate broad and shallow rift valleys.

Involved cross-faulting with later erosion and drowning have been responsible for the formation of the Bosphorus and Dardanelles. In the extreme north along the Black Sea, an extensive mass of resistant granite and gneiss has been fractured by the east-west trending faults, leaving a narrow neck of upland joining Europe and Asia, with the Black Sea to the north, and the Sea of Marmara to the south.¹ This neck, or long narrow horst, broadens out westwards to form the Istranca highlands of European Turkey, and is tilted towards the south, so that there is a scarp-face towards the north, down which a number

¹ The scale of this fault system can be gauged from the extent of downthrow in the Sea of Marmara. In places, the sea floor is 4,000 feet below sea-level, and parts of the surrounding coastlands reach 1,500 feet above the sea.

of small torrents fall steeply to the Black Sea. On the southern (Marmara) side there is a much gentler dip slope, and a more extensive drainage system has developed. In many instances lines of weakness due to small north-north-east-south-south-west trending faults have been eroded into narrow valleys, and a number of small synclines have also been occupied. Thus erosion along one such north-north-east running fault gradually pushed back the head of a small stream flowing to the Sea of Marmara, until the highland ridge was cut through, and a channel opened between the Black Sea and the Sea of Marmara. A tributary of this stream that flowed partly in a synclinal valley also entered the Bosphorus on the western side; and subsequent drowning of this tributary has given rise to the Golden Horn (see Fig. 56). The Bosphorus is 16 miles in length, and on average, 1 mile wide; but it narrows in places to less than 700 yards. Both banks, Asiatic and European, rise steeply from the water, and form a succession of cliffs, coves, and landlocked bays. Most of the shores are densely wooded, and are occupied by numerous towns and villages.

The Dardanelles Strait has been formed in a similar manner—by erosion along fracture lines, and later drowning; but the rock series of this latter region are much softer, being composed of limestones and sandstones, hence erosion has been much more extensive, and land-forms are gentler. The Dardanelles is 25 miles long, and increases in width towards the south, from $2\frac{1}{2}$ miles at the northern extremity to $4\frac{1}{2}$ miles in the south. Another contrast is in vegetation—the shores of the Dardanelles are only sparsely covered by trees, the chief vegetation type being a low garrigue. Again unlike the Bosphorus, the Dardanelles has few settlements of any kind along its shores; the whole region being generally empty and desolate, and given over to rough grazing. Because of intense evaporation in the eastern Mediterranean, together with considerable supplies of river water in the Black Sea, there is a continuous flow of water southwards from the Black Sea, producing a strong current in the Bosphorus and Dardanelles. This current averages 3 m.p.h. at Istanbul, and $1\frac{1}{2}$ to 2 m.p.h. in the Dardanelles.

Further south, the immediate hinterland of the Aegean Sea is made up of a complex of east-west trending fault valleys, broken at frequent intervals by rather less strongly developed north-south running fractures. This development has imposed a markedly rectangular pattern of detached horsts and somewhat fjord-like valleys. An

excellent example is the valley of the Biiyuk Menderes, with its numerous sharp elbows and tributary valleys set at right angles to the main stream.

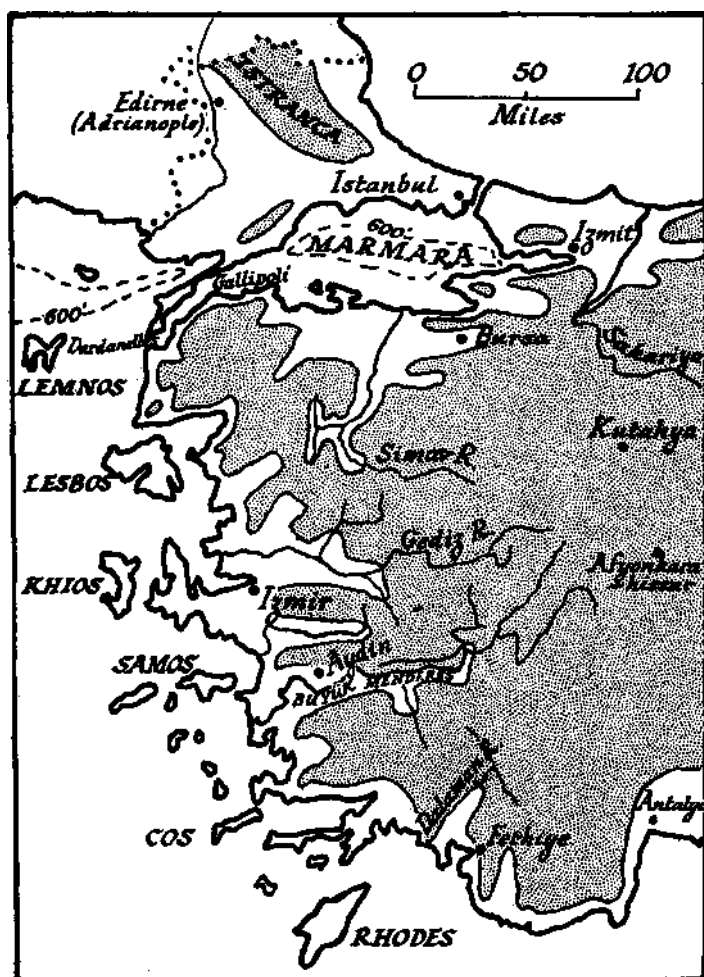


FIG. 49. The Straits and Aegean Coastlands. Mainland above 600 ft. stippled.

Other similar, but less extensive valleys are (from north to south) the Sakariya, which runs mainly in a north-south trending rift, and hence reaches the Black Sea, though passing within a short distance of the Gulf of Izmit; the Simav, which enters the Sea of Marmara;

and the Gediz and Dalaman, both of which reach the Aegean. Generally speaking, all valleys are broad, flat bottomed, and with relatively steep sides. The floors are covered by rich alluvium deposited in great quantities in the lower reaches, and, as a result, an extensive flood-plain has been built up, upon which the river develops a classic * meander' pattern. To find well-developed meanders in a region of broken plateaus and highland massifs may seem unusual, until it is remembered that the lower valleys of most rivers have been formed entirely by tectonic action, and not by fluvial erosion. Large quantities of silt are carried down towards the coast, and the lower ends of the valleys are being steadily filled up, so that the mouths of the rivers are advancing westwards towards the Aegean Sea. The Buyuk Menderes mouth is now, for example, some 25 miles further west than it was in Roman times.

When drained and cultivated, the valleys are extremely productive, and the Aegean coastlands are the most prosperous and advanced part of Turkey. One disadvantage is, however, liability to malaria. A number of larger valleys are also important as routeways to the interior of Asia Minor, since they rise gently inland, and form corridors leading directly to the inner plateau region. In some cases, though (e.g. the Simav and Dalaman) the valleys end abruptly at a cross-fault, being hence shut in by mountain massifs, and useless for communications.

The Mediterranean Coastlands.—Here there is a sharp contrast with the last region described, since fold ranges, not rift valleys and horst blocks, are the chief structural feature. Along the southern edge of the Anatolian plateau, a series of folded arcs has been developed; but because of the complexity of the inner plateau region, around which the arcs have been folded, the folds structures themselves are highly irregular, with sudden changes in trend. Structural features consist in some parts of parallel ranks of folds, in others of single anticlines, and again in others of overthrusts and nappes.

This westernmost arc can be traced from the district of Fethiyc north-eastwards towards Afyonkarahissar, then south-eastwards towards Silifke. This series of folds, known as the Western Taurus, is not disposed entirely symmetrically, since the western* limb of the arc is shorter and more irregular than the eastern limb. In the north, the Western Taurus folds are closely packed against the plateau of Anatolia; and because of recent formation, rivers occupying synclinal valleys have not always been sufficiently long in existence to have

cut valleys leading outwards to the sea. Numerous lakes—most of which are saline—are therefore characteristic of the northern part of the Western Taurus; and a second feature is the completeness of the mountain wall, which acts as a barrier to movement. Roads are few; no rail communication exists with the rest of Turkey, and the whole of the region is in marked isolation from its neighbours.

To the south, fronting the Mediterranean, small streams reach the sea, and have built up a lowland plain that is spoken of as the Plain of Antalya. Here the soil is fertile, although marshy in some places; but the prevalence of malaria and difficulties of communication

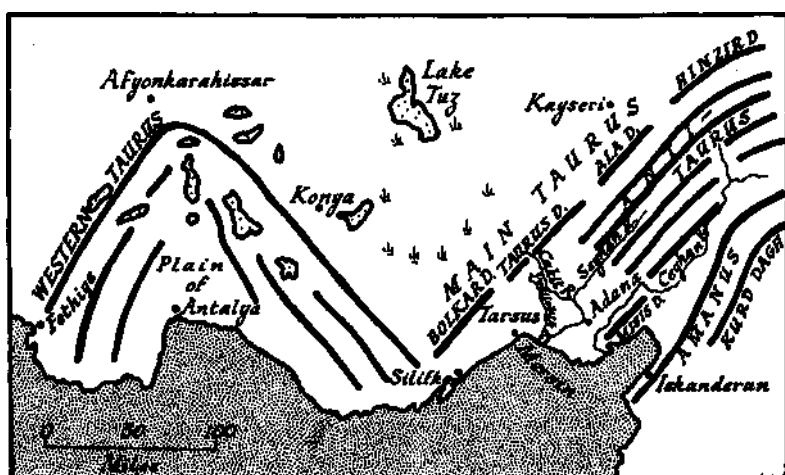


FIG. 50. South and Central Anatolia (structural).

with the remainder of Turkey have greatly hindered development. The coast is straight and shelving because of the rapidity of deposition of sediment from the rivers; and harbours are thus poor and infrequent. As a result, the Antalya plain is sparsely populated, despite good soil and a favourable climate.

East of Silifke, the Western Taurus gives way to a second arc, with an abrupt change of trend. This second fold range, the main Taurus, runs north-eastwards from Silifke as a single narrow fold as far as Hinzir (between Kayseri and Sivas), and has been cut into four separate massifs by river action. From south-west to north-east these massifs are : the Bolkar Dagh, the Taurus Dagh (hence the general name Taurus), the Ala Dagh," and the Hinzir Dagh, the last

massif being a smaller range detached from the main chain, and lying at some distance to the north-east (Fig. 50).

Though distinctly narrower than the western Taurus, the main Taurus is much higher, reaching 12,000 feet in the Ala Dagh region. Owing, however, to its restricted width, erosion has been more active, and, as we have seen, a number of narrow and precipitous river valleys have been cut right through the entire chain at certain points. These gorges offer practicable routes through the mountain barrier, and one such defile, that of the Yeziloluk, a tributary of the Tarsus river, forms the well-known Cilician Gates—a relatively easy, but rather indirect route between central Anatolia and the Mediterranean coast: another valley, that of the Jakit river, offers a more direct but steeper passage, and is now used by the railway from Ankara to Aleppo.

East and south-east of the Ala and Hinzir Dagh, a further series of fold ranges runs parallel to the main Taurus system. These are known in a general way as the Anti-Taurus Range, but the name is loosely applied, and two smaller ranges, structurally an undoubted part of the Anti-Taurus, and of a similar trend, are separately distinguished as the Amanus Range and the Kurd Dagh. The latter can be termed the last member of the Anatolian mountain system: further to the east and south-east the land drops to form the low plateau and plain of Northern Syria; whilst to the south-west the Amanus and Kurd Dagh can be traced respectively into the Karpass and Troodos ranges of Cyprus.

Little can be said of the Anti-Taurus region, since many parts of it are unexplored, and the northern portion is entirely buried under sheets of lava. Between the upfolds lie valleys, sometimes mere gorges, but at times, especially towards the east, broader alluvium covered lowlands that support a relatively dense population. Chief of these lowland areas are the Elbistan plain, and the upper Ceyhan valley centering on the town of Maras. Five main ranges can be discerned within the Anti-Taurus system, four of which die away 40 miles to the north-east of Adana and give rise to a lowland basin, the Seyhan-Ceyhan plain. The fifth range continues further to the south-west as the Misis Dagh, and forms the western side of the Gulf of Iskanderun. The Gulf lies between two fold ranges, the Amanus and the Misis Dagh, and owes its continued existence as a deep water gulf to the absence of any large river entering it from the north-east. A short distance to the west, what would appear to have been a

similar gulf between fold ridges has been filled up by silt brought down by the Seyhan river, and now forms a plain, with a low-lying, lagoon type of coastline.

The Seyhan plain is in many respects similar to the Antalya plain of the western Mediterranean coastlands: there are the same features of low relief, a rich alluvial soil, a straight shelving coastline, and considerable prevalence of malarial infestation. The Seyhan plain is, however, much less isolated by its surrounding mountain chains, as a number of cols give access to central AnatoUa, eastern Asia Minor, and north-western Syria. Hence the Seyhan region carries a somewhat denser population than its western counterpart, particularly in the slightly higher parts where drainage is easier; and certain districts are now in process of development as important crop-growing centres.

The Central Plateau.—This region consists essentially of an extensive and irregular plateau ringed on all sides by higher mountain ranges. In the north, east, and south the mountain ring is well-defined, being 2,000 to 4,000 feet higher than the plateau it surrounds; but on the west, towards the Aegean coastlands, the hills are fewer, and less imposing. The plateau itself consists of a rolling upland diversified by numerous sunken basins, or *ova*, that are occupied by marshes and mud flats; and also by small highland massifs that consist either of volcanic cones or horst blocks. The floors of the *ova* stand at about 3,000 feet above sea-level, that of the largest *ova* (Lake Tuz) being 3,200 feet in altitude. The general level of the plateau surface may be taken as between 3,000 to 5,000 feet, whilst the upland masses reach 6,000 to 8,000 feet above sea level.

Towards the east, the plateau is about 1,000 feet higher, and in contrast to the confused structures of the western plateau, uplands tend to occur more often in the form of definite ridges with a well marked trend. Volcanic cones on a large scale are also a feature, some reaching 10,000 or 12,000 feet in height.

At one time the entire plateau region of Anatolia probably consisted of a series of small basins of inland drainage, with no outlet to the sea, i.e. conditions closely approximated to those of present-day Iran. Differential earth movements—downthrow on the northern (Black Sea) side, and uplift on the southern (Taurus) side—seem, however, to have increased the erosive power of streams on the northern flanks of the plateau, so that these have cut back through the mountain ring, and now drain wide areas of the plateau itself.

The basins of the Sakariya, Kizil Irmak, and Yesil Irmak cover more than half the plateau, leaving only the south-west as a region of arctic drainage. The rivers themselves are often deeply entrenched below the level of the plateau; and their valleys, consisting in places of a series of captured ovas linked by gorges, are irregular and discontinuous. The whole surface of the northern plateau is deeply eroded, with, in many districts, precipitous valley walls, and sheer, rugged hillsides.

The enclosed basins of the south-west arc disposed in a rough crescent between Afyonkarahissar (west), Konya (south), and Kayseri (east). In the absence of drainage, there are no deep valleys, and the whole region is open and undulating, a feature which has favoured the growth of road and rail communications. It will be recalled that Konya was the starting point of the old Baghdad Railway.

Because of its enclosed nature, much of the central plateau of Asia Minor is arid, and supports little plant or animal life. Wooded areas are confined to the extreme north-west and north-east; and cultivation is restricted to the neighbourhood of rivers, in parts where the valleys are sufficiently wide to allow terracing, or where an ova structure provides a stretch of level ground. For the greater part, the central plateau is bare and monotonous country given over to grazing. >

Eastern Turkey.—There is little physical unity in Eastern Turkey, since the region consists of a series of mountain ranges, extensive and continuous in the north, but falling away on the south first into a broken plateau country, and finally into an undulating plain which continues through north Syria and Iraq. Further disunity arises from the presence of several large river-basins—those of the Aras (Araxes), Euphrates, and Tigris; from the existence of a number of downthrow basins (ova), some with outward, some with aretic drainage; and from the occurrence of vast outpourings of recent lava, which have buried whole valleys, and created a wide expanse of fairly level but inhospitable plateau. One such eruption from the cone of Nemrut has blocked a river valley and impounded the water to form Lake Van.

The mountain ranges have a confused trend. On the north, the folds bordering the Black Sea coast run at first in an east-west direction, but later, as in the Gavur Dagħ near Ezerum, the trend alters to south-west-north-east, turning once again to the original direction on approach to the Caucasus system. Further south, in the region of

Erzincan-El Aziz, the line of the Anti-Taurus is continued by a series of folds that later swing round in a great arc towards the south-east, where they form first the Kurdish Taurus (south-west of Lake Van), and finally merge with the Zagros Range. In the hollow part of the arc lies an expanse of plateau country (region of Diyarbekir, Mardin, and Urfa) which can be regarded as the northernmost extension of the Syrian steppe.

The northern and eastern parts of eastern Turkey form the ancient country of Armenia. Here, because of the extremely recent volcanic outpourings, soil cover is often very thin or entirely absent. The



FIG. 51. Eastern Anatolia.

rivers have cut immense gorges in the soft lava, and often lie several thousand feet below the level of the surrounding plateau. Their upper reaches are too narrow for settlement; but lower down expanses of alluvium have been deposited, and these, when cultivated, are extremely fertile. The region of Lake Van once supported a moderately dense population, though because of the brackish nature of the lake water, cultivation was limited to the middle levels of the lake basin, as is the case round Lake Urmia.¹

¹ The waters of Lake Van are less saline than those of Lake Urmia, but contain a high proportion of sodium carbonate.

Because of their altitude (7,000 feet) and barren surface, the lava uplands are for the most part uninhabited. Here and there immense volcanic cones rise several thousand feet higher (the largest, Ararat, reaches 14,000 feet above sea-level), and the heavier rainfall near such peaks allows a scanty Alpine flora that provides seasonal grazing for Kurdish shepherds. The population was greatly depleted by the massacres of 1916-18, and at the present time the Turkish government is attempting to settle immigrants from the west in the empty valleys of Armenia.

Further south, round Diyarbekir and Urfa, topography is much less rugged, though the rivers are deeply slotted into the plateau surface, and the extent of cultivable land is greatly restricted. Certain districts, where water can be more easily raised to the fields, support a number of agricultural communities, but in large measure pastoralism is the predominant way of life. Lower elevation, though facilitating movement, condemns the southern part of Eastern Turkey to semi-aridity.

II. CLIMATE

General.—The climate of Turkey, like that of Iran, is one of extremes. Parts of the western coastlands never experience frost, yet in Armenia snow lies even in the valleys for a third of the year ; and in respect of rainfall much of the entire country has a deficient water supply, whilst the north-east has an excess. Season of onset of rainfall also varies, from winter in the south and west, spring in the central plateau, summer in the northern coastlands, and autumn in the extreme north-east. The reasons for such contrasts are to be found in (a) relief, (b) the position of Asia Minor on the margin of the * Mediterranean ' and interior Asiatic climatic zones, and (c) the extent of sea, which has a modifying influence on the western part of the country. It should be noted that the Anatolian plateau is considerably higher on average than the interior of Iran, although the surrounding mountain chains are less developed. This gives rise to lower winter temperatures, and hence to the frequent occurrence of a separate and distinctive high-pressure system over Asia Minor during the months between November and April. The effect is to divert rain-bearing depressions as they move along the Eastern Mediterranean either to the north or the south of Asia Minor, so that relatively few can penetrate into the interior of the plateau. It is thus possible to appreciate why a winter maximum rainfall is by no means universal in Turkey.

During the summer and autumn, on the other hand, the north of Asia Minor lies in the outer margins of the current of monsoonal air that moves westwards from India and Iran in a circuitous passage round the Cyprus low-pressure area. Intermixture with an easterly moving air stream from western Europe (the 'westerly' circulation) can thus easily give rise to the development of cyclonic rain in the Black Sea regions; and the effects of such mixing are enhanced by the contrasts of relief along the northern coast of Turkey.

As also in Iran, the high encircling ranges receive a disproportionate share of precipitation, and the interior lies in a rain shadow area. Aridity is, however, much less complete than in Iran, since the eastern portion of the plateau stands at an elevation of 5,000 to 7,000 feet, and so receives more rain than the lower-lying interior basins of western Anatolia.

It is convenient to discuss the climate of Asia Minor on a basis of the natural regions already distinguished. In the *Black Sea Coastlands* winters are mild, summers moderately hot, and little difference is apparent between east and west. Rize, on the extreme east, shows an average January temperature of 43° F., Samsun one of 44° F., and Trabzon one of 45° F. Highest temperatures occur in August, and corresponding means are Rize 71° F., Samsun 68° F., Trabzon 74° F. Inland, the moderating influence of the sea is much less felt—Merzifon, a short distance south of Samsun, in the interior lowland trough, has a January mean of 30° F., and a July mean of 68° F. A special feature of the eastern Black Sea coastlands is the prevalence of Fohn winds in winter. These occur when heavy stagnant air from the plateau moves towards the coastlands. As much as 30° to 40° F. of warming may take place during the 7,000 to 10,000 feet of descent from the interior, hence, although the air may be initially below freezing-point, temperatures of 60° F. or even 85° F. may be attained at sea level. Thus instead of a beneficent wind that tempers the rigours of winter, an unduly warm blast may actually wither growing vegetation, and is responsible for the barren condition of many of the foothills of the region, which would normally be thickly forested. It is significant that at Rize and Samsun, temperatures of 70° F. have been recorded in January and February, and over 80° F. in March.

Rainfall is almost everywhere abundant in the Black Sea coastlands, and ranges from 25 inches in the west to over 100 inches in the east. At Izmit (extreme west) February is the wettest, and August the driest month, though no month is without rainfall. Rize (annual

rainfall 96 inches) with a maximum in November, and a minimum in late spring, has a rainfall that is well distributed throughout the year.

The Aegean Coastlands.—Temperature conditions in this region have some similarity to those of the Black Sea region, though local variation is somewhat more prominent, and there is a marked rise in temperature towards the south. In winter there is a January minimum of 41 ° to 46° F. on the coast, and 35° to 40° F. inland ; whilst in summer, July and August show little difference in temperature, each having figures that range from 74° F. at Istanbul to 81 ° F. at Izmir. Despite the presence of the sea, diurnal variation of temperature is very pronounced during the summer months, and much more prominent than in the Black Sea region : day temperatures frequently exceed 90° F. during July (and also in the south during August), with correspondingly cooler nights—indications that the Aegean comes more definitely within the Mediterranean regime. Even Istanbul has a mean July maximum of 91 ° F.

Rainfall is fairly evenly distributed over the entire Aegean coastlands, with amounts ranging from 20 to 30 inches per annum near the coast, and 15 to 20 inches in the extreme east, on the borders of western Anatolia. December is everywhere the wettest month, and it may be noted that although many areas have a fall of under 1 inch during each of the three months, June, July, and August, there are few instances of an entire absence of rain during the summer. One feature of the west is the steady northerly winds (termed Etesians, or Meltemi) which blow throughout the summer, and, except in the sheltered lowlands, temper the heat of the day. In the deeper valleys, which are often shut in by hilly massifs, moisture can be brought in by sea breezes, and humidity is high—too high, often, for comfort and sustained human activity.

The Mediterranean Coastlands have slightly hotter summers than the Aegean region (mean 83° F., mean daily max. 91° to 95° F.), with August always the warmest month on the coast, and July further inland. This clearer difference between July and August temperatures as compared with conditions in the Aegean may arise as the result of the straighter coastline—maritime influences are restricted to a narrower coastal belt, and are not carried inland by long estuaries or broken fretted shorelines. Winters are considerably warmer, at least, on the coastal lowlands, January temperatures ranging from 48° F. at Adana to 52° F. at Iskanderun. Rainfall is moderate in amount, but considerable

local variation occurs, depending on aspect and altitude. In general, the south-facing ranges of the Taurus systems receive more than 30 inches per annum, whilst the seaward facing plains at the foot of the mountains receive between 20 and 30 inches, though in a few districts that are especially open to the sea (e.g. Antalya and Fethiye), rainfall is slightly above 30 inches.

December or January are the wettest months; July and August the driest. In summer a very slight rainfall is recorded, usually less than half an inch in the two months together, but towards the east, in the regions of the Seyhan plain and the Hatay, the total fall is higher.¹ Summers are therefore not entirely arid, like those of the Syrian and Palestinian coasts.

Humidity is again high during summer, and maxima for the year tend to occur during June, July, or August—a feature common to the eastern Mediterranean and Red Seas. Iskanderun, with a relative humidity of 59 per cent, in January, and of 74 per cent, in August, is a typical example, though it should be remembered that the Hatay and adjacent Seyhan lowlands, ringed by mountain chains and open to the prevailing south-west winds, are a little damper than the Antalya region further west.

The Central Plateau is characterised by a wider range of temperature and by greater aridity. Winters are cold—January temperatures averaging 30° F. over most of the plateau; and all districts have more than 100 days of frost during each year (cf. Izmir 13, Adana 16). Summers are warm, with high day temperatures and cool nights, though the mean for July (the hottest month), as the result of distinctly colder nights, lies between 68° and 73° F. At Ankara and Konya, day temperatures during July rise to 86° F., but fall at night to 54° F. Diurnal variation is also pronounced in winter, day maxima in January averaging 38° F., and night minima 17° to 22° F.

Between 10 and 17 inches of rainfall are received annually, the precise amount depending largely upon altitude. Konya and Ankara, at approximately similar elevation, have 11.5 and 10.0 inches respectively, whilst Sivas, situated 1,000 feet higher, has 17 inches. It is somewhat remarkable that May is in general the wettest month, and July and August, only a few weeks later, are the driest. This curious regime is probably due to the occurrence of a high-pressure system in

¹ Cf. the extent of cloudiness during July and August. Antalya 0*9 and 0*6 tenths of sky covered ; Adana 2*0 and 1.8 ; Iskanderun 2.8 and 2.2.

winter—on its collapse in late spring rain bearing winds can more easily penetrate into the interior. As is common in regions of deficient rainfall, irregularity of onset is a prominent feature, and most areas record whole months without any precipitation: at Ankara, for example, absolute drought can occur on seven out of the twelve months of the year.

Eastern Turkey is a region of great extremes, with a climate that is one of the most varied and severe in the world. Summers are hot and arid, particularly towards the south and east, where, as the steppes of Syria are approached, maximum temperatures exceed 100°F_f , and in the deep calm valleys figures of 100° to 120°F . are reached. Summer temperatures are a little lower in the north-east, but 90°F . during the day is common, although marked diurnal variation, with a cold night, brings the daily average to 65° to 70°F .¹

Winters are cold, even in the extreme south, where Diyarbekir has a mean January temperature of 31°F . Further north, cold becomes intense; and Kars, in the extreme north-east of the region, has a *mean* January temperature of 9°F ., with a night minimum of -5°F . Absolute minima of less than -30°F . have been recorded; and on the higher plateaus, figures of -40°F . are not unknown. Thus it is not surprising that snow lies for over 120 days each year in the north-east, but only for 7 to 10 days at Diyarbekir.

Because of greater altitude, eastern Turkey is better watered than the central plateau, this despite an inland position; and the total rainfall varies between 17 and 24 inches. The months of heaviest rain tend to be February and March, but towards the north-east there is some approach to conditions of the Black Sea region (i.e. a maximum in summer or autumn), so that at Ezerum, May is the wettest month, and at Kars, July.

The climate of eastern Turkey stands out as one of the most difficult and inhospitable in the world. Summers are hot, arid, and markedly dusty; winters are bitterly cold, and spring and autumn are both subject to sudden hot or cold spells—the former due to Fohn winds, and to southerly (Khamsin) winds from the Arabian desert, the latter to outbursts of cold air from inner Asia, which may give snowfalls as late as the month of May.

¹ A diurnal variation of the order of 50° or 60°F . can bring the night minimum below freezing-point, even in summer.

CLIMATIC DATA FOR REPRESENTATIVE STATIONS
ASIA MINOR (in °R, and inches)

	J	F	M	A	M	J	J	A	S	O	N	D	Total
i. <i>Black Sea</i>													
<i>Trabzon</i>													
Temp.	45	44	47	5i	61	68	73	74	69	64	55	49	
Rainfall	2.5	2.6	2.5	2.4	1.6	2.2	1.6	2.2	3.8	3.4	4.5	4.1	33.4
2. <i>Aegean</i>													
<i>Izmir</i>													
Temp.	46	47	53	59	68	76	81	80	73	66	57	50	
Rainfall	4.2	4.6	3.0	1.6	1.4	0.4	0.2	0.1	0.8	1.7	3.1	4.9	28.5
Rainy days	1 0	9	8	6	5	2	1	1	2	4	9	1 0	6 8
3. <i>Mediterranean</i>													
<i>Adana</i>													
" Temp.	48	50	56	63	71	78	82	83	78	71	60	51	
Rainfall	3.2	3.2	2.6	1.9	2.0	0.9	0.3	0.3	0.6	1.3	3.0	4.5	23.8
Rainy days	6	8	7	5	5	3	1	1	1	4	6	8	5 3
4. <i>Central Plateau</i>													
y <i>Konya</i>													
Temp.	30	34	42	52	60	68	74	74	65	56	45	35	
Rainfall	0.9	1.0	0.9	1.0	1.9	1.3	0.2	0	0.5	0.8	0.9	1.9	11*5
Rainy days	9	10	9	8	7	5	1	0	2	4	6	8	6 8
5. <i>Eastern Turkey</i>													
<i>El Aziz</i>													
Temp.	19	28	40	52	61	69	77	77	68	59	44	31	
Rainfall	1.4	2.1	2.0	2*4	2.7	0.9	0.1	0	0.3	1.3	2.3	1.9	17.4
Rainy days	9	12	12	13	15	7	1	0	4	8	13	12	106

III. AGRICULTURE

Though by no means all of the cultivable land of Asia Minor is actually exploited, Turkey stands out among Middle Eastern states as having one of the most successful and developed agricultural economies. Whilst in many neighbouring regions the problem of feeding local populations is a principal concern, and food must be imported to augment a deficient home production—a feature in Egypt, Palestine, Syria, and Transjordan—Turkey supplies most of her own needs, and has in addition a small surplus of agricultural commodities for export.

Under the Ottomans, little attention was paid to agriculture : but since the revolution of 1923, serious attempts have been made to increase production by instructing the peasants in better methods of cultivation, and by improving communications. As a result, production has more than doubled since 1923 ; yet it must not be thought that Turkish methods are now entirely modernised. The ancient wasteful practises described in an earlier chapter are still characteristic of much of Turkish agriculture, and though much progress has been made, considerably greater expansion is still possible, as even now, only about 10 per cent, of available cultivable land is actually under crops.

Greatest importance is given to the growing of cereals, which account for 80 per cent, of the total crop acreage of the country. Wheat is by far the most important, occupying just over one-half of the land given over to cereals, or about 45 per cent, of the total cultivated area. The western part of Asia Minor is the main growing region, and the steppe zones flanking the inner plateau of Anatolia are particularly important. Here there is a wide extent of fairly flat territory, and rainfall is a little heavier than in the centre of the plateau. Another important wheat growing region is the northern Aegean region, inclusive of European Turkey. Until 1930, Turkey was not self-sufficient in wheat supplies, and imported small quantities, but now the position is reversed, and there is a small export of wheat (in 1946, 35,000 tons).

Barley is the second cereal crop of Turkey, and occupies about half the acreage of wheat. Its main use is as a fodder crop, and it has a wide distribution, especially in the central plateau and the inner coastlands of the Aegean. In both of these places it is often grown on the drier parts, where annual rainfall is from 15 to 18 inches. In the northern Aegean, barley is grown as an export crop, primarily for malting purposes, and there is an annual export of over 120,000 tons, chiefly to Britain. The inferior variety of wheat known as spelt is often grown mixed with, or alongside barley, but only when fodder is required. Over most of Asia Minor all the three cereals wheat, barley, and spelt are sown as winter crops (i.e. in autumn) ; but in the extreme east, winters are too cold, and sowing takes place in spring, with the harvest delayed until late summer.

Next in importance after wheat and barley is maize, which flourishes in the warm and humid Black Sea region, and, with irrigation, in the Aegean coastlands. Rye is also important as a cereal of marginal lands, where conditions are too dry or too cold for wheat

or barley. Eastern Turkey and the inner parts of the central plateau, away from the salt steppe region, are the main districts of production. In places where the soil is poor but climatic conditions a little more favourable, a mixture of wheat and rye, termed *maslin* is often grown.

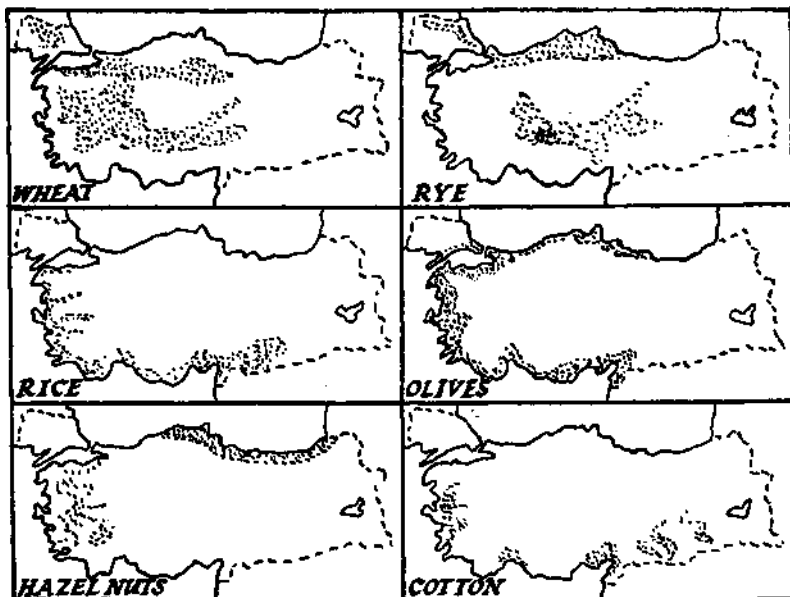


FIG. 52. Distribution of Crops in Asia Minor.

On the low, humid plains of the Mediterranean coast, rice is an important crop, with the districts of Antalya and Adana as chief producing centres. Rice growing is also found as far east as Maras and Diyarbakir, with more restricted and patchy distribution in the marshy Aegean valleys and also in the region of Trabzon. Yet another crop of Turkey is oats, which flourishes on the central plateau, and in the cooler north and north-west Aegean districts. The fact that production of oats is five or six times greater than that of rice is a reminder of Turkey's position as the most northerly of Middle Eastern countries; outside Asia Minor oats grow only with some difficulty on the higher upland regions, and have small importance as a crop. Millet is grown on a small scale as a rotation summer crop in southerly districts, chiefly for use as a cattle and poultry food, and as an adulterant for bread. There is also a very restricted export, chiefly, again, to the United Kingdom.

CEREAL CROPS IN TURKEY (tons)

	<i>Annual Production</i> (10 year average, 1936-46)	<i>Exports</i> 1946	<i>Chief Buyer</i>
Wheat	3,670,000	35,000	Britain
Barley	1,920,000	134,000	Britain
Maize	610,000	nil	"—
Rye	380,000	35,000	Italy, Spain
Oats	250,000	3,000	Greece
Millet	62,000	2,000	Britain
Rice	50,000	nil	—

Potatoes are increasing rapidly in importance, and production has trebled since 1930. Here again a colder climate is an advantage, since only the sweet potato (yam) will grow in many parts of the southern Middle East. Iran, Cyprus, and the Lebanon are the only other countries which rival Turkey in the growing of potatoes, and at present, production in Asia Minor is in excess of the individual output from all the other countries. Potato growing tends naturally to be restricted to the north, and to the higher parts of the central plateau; and the plant is now of increasing value in the extreme east, where it plays a considerable part in the resettlement programme of the Turkish government.

Fruit Crops.—These are extremely important in most districts of Asia Minor, and the wide extent of fruit growing arises from (a) a generally favourable climate, with, in the west and south, mild winters, and long sunny summers, (b) a rich volcanic soil in many areas, which is particularly advantageous for vine-growing, and (c) varied topography, which allows a wide range of species, from sub-tropical to temperate fruits, on the same hill slopes.

Olives are probably the main crop, though by far the greater proportion are for local consumption, and are hence never marketed, so that statistics of production show only a moderate yield. The olive flourishes best on sloping ground, and away from the coast its productivity falls off considerably—60 to 75 miles inland is usually regarded as the limit for intensive cultivation. Thus the foothills of mountain ranges close to the sea are usually given over to olive growing, and groves are found all round the coasts of Asia Minor, with the western and southern districts as areas of most intensive cultivation—i.e. the region of Izmir and the lower slopes of the

Taurus and Amanus Ranges backing the Seyhan plain and the Hatay (Mersin, Iskanderun, Antakya). Izmir is a centre for processing the oil, and for export; though exports have been prohibited since 1944.¹ It will be recalled that too much moisture lowers the oil content of the fruit: similarly, a rich soil produces large luxuriant trees, but a small fruit crop. For these reasons, the best olive groves are on dry stony ridges, and the highest yield is often from gnarled, stunted trees. These facts explain the popularity of the olive in many regions of Turkey.

Vines are the second most important fruit crop of Turkey, and, in contrast to olives, grapes are grown principally for export. In normal times dried sultanas rank as one of the most valuable exports of the country, but during the war period, there was a marked decline in sales abroad. Within the last twenty years great improvements have taken place, and imported stocks of American and French vines have been distributed by the government in order to enhance quality. Vines are grown on flat or slightly undulating land; and although fairly widespread over most of the country, even as far east as the valleys of Armenia, large scale production for export is restricted to the Aegean area (vilayets of Izmir and Manisa). The best grapes grow in a small region situated between the Gediz and Biiyuk Menderes valleys; and from these grapes are made the famous *sultanas*, which after drying for one week in the sun on sheets of paper spread on the ground, are then cleaned, bleached, and packed for export.² North of the Gediz valley slightly cooler and damper sea-breezes have a markedly deleterious effect—the yield per plant falls to one-fifth of that in the favoured central Aegean region. Raisins are also produced from muscat grapes, which are darker in colour; and the inferior grades of grapes are used for wine-making, particularly a spirit flavoured with aniseed, and known as *raki*. The total production of wine and spirits during an average year is over 3 million gallons.

Figs are also grown on a considerable scale for export, and once again the Biiyuk Menderes-Gediz region is the chief centre of production. Turkish figs have a special flavour that is said to be due to the presence in the fruit of numerous seeds, which are fertilised by certain species of insects that occur only under the special climatic conditions of the Aegean coastlands. The figs ripen in August, when

¹ Up till then, the chief buyer was Germany.

² During the last war quality greatly deteriorated, because paper to cover the soil could not be imported into Turkey.

the hot dry Meltemi winds are fully developed. For some weeks previously, during the late spring, westerlies have prevailed, and the succession first of mild damp maritime air swells the fruit, and then later the hot modified monsoonal air of the Meltemi completes the ripening stage. After drying in the sun, packing of the figs takes place at Izmir. Considerable quantities—even as much as 40 to 50 per cent, of the total crop—may be lost during the drying period, when a single slight shower can spoil large numbers ; and as few figs are actually picked (most are allowed to drop off the trees), many are over-ripe. The rejected fruit is used in the manufacture of industrial alcohol.

In the valleys of the Aegean coastlands, there is a well marked sequence of cultivated plants according to altitude. On the lowest parts of all, which are liable to flooding, small fields of rice are found, and elsewhere on the valley bottoms, vines and cereals grow. On the lowest slopes of the valley sides, figs are planted ; then, at slightly higher levels, olives replace figs. Sometimes cereals are also grown among olive plantations. Above this, at slightly varying heights (1,500 feet in the north, 1,800 to 2,000 feet in the south) scrub forest and nut trees occur.

Besides olives, vines, and figs, large quantities of other Mediterranean fruit are grown chiefly for home consumption. Apricots and peaches take the place of figs in the eastern and central provinces; cherries are abundant on the Black Sea coastlands—Gircsun (Ccrasus) is the original home of the cherry—and plums are grown in the northern Aegean (both in European and Asiatic Turkey), and on the damper parts of the central plateau. Some of these plums are dried—prunes from the Edirne (Adrianople) district of European Turkey having a high reputation—and quantities are exported. The cultivation of oranges is increasing (tangerines on the Black Sea coast, and 'jafllfas' on the Aegean) ; and some bananas are now produced in the hot and steamy valleys of the Mediterranean coastlands. Temperate fruits, especially apples, are a feature in Anatolia, and in the east, apple trees outnumber other species of fruit.

Another important export is that of hazel-nuts, of which half the world's marketed supply comes from Turkey. The nuts yield an oil that is of value as a lubricant for aeroplanes (in air-screws), and in the making of varnish. Quantities of nut are also used in confectionery and chocolate making, and as dessert. About 65,000 tons of hazels are gathered annually, and of this total, about two-thirds is exported, the bulk going at present to Switzerland and the U.S.A. Chief

areas of production are the * Pontic ' forests that clothe the ridges of the Black Sea coastlands ; and the nuts are shipped from Giresun, Trabzon, and Samsun. The Aegean region also produces important quantities of both hazel nuts and walnuts. Almonds and pistachios are grown in the south-east, round Maras and Diyarbekir, and also in the central plateau.

PRODUCTION OF FRUIT CROPS IN TURKEY (tons)

	<i>Annual Production (average 1940-46)</i>	<i>Exports 1946</i>
Olives	250,000	nil (a)
Sultana grapes	50,000	60,000 (b)
Other grapes	140,000	nil
Figs	26,000	25,000
Other fruit	180,000	15,000
Nuts	74,000 (c)	30,000 (d)

(a) The export of olive oil was prohibited in 1944.

(b) Part of this total was a carry-over from the previous season.

(c) Unshelled nuts.

(d) Shelled nuts.

Commercial Crops.—Besides cereals and fruit, Turkey produces a number of commercial crops, chief of which are (in order of importance), cotton, sugar-beet, tobacco, valonea, liquorice, oil-seeds (sunflower and sesame), and opium. Cotton is grown chiefly on the Seyhan plain between Adana and Mersin, and in the Izmir region, five-sixths of the total acreage of 600,000 lying in the former region. Small quantities are also produced in south-eastern Turkey, round El Aziz and Diyarbekir. Production has increased considerably during the last twenty years, but at the present time emphasis is increasingly on the production of oil seed, former markets for raw cotton (Germany and Eastern Europe) having declined or disappeared since 1940. Two varieties of the plant are grown, one native and the other American. Irrigation is necessary in many areas, and further development of cotton growing is related to irrigation projects, notably around Adana and in the Biyyik Menderes valley. Up to 1940, Turkey produced about 80,000 tons of raw cotton annually, and of this about one-half was used in modern state-owned mills within the country, about 30,000 tons was used in home or bazaar industries,

leaving a balance of 10,000 tons for export. In 1944 exports virtually ceased and the total produced has declined to less than 60,000 tons. Cotton seed has, however, taken on great importance as a feeding-stuff for cattle, and annual production of seed is over 100,000 tons.

Sugar beet is a recent introduction, and, as in Iran, its development was greatly stimulated by the government as a means of reducing the country's dependence upon imported cane sugar. By 1941 this objective was achieved, and there is now a small export of about 8,000 tons out of a total production of 90,000 tons. The contrast with Iran, where sugar beet has not been introduced with complete success, arises from the difference in elevation, and hence in temperature—the crop is precarious in the warmer uplands of Iran, but well established in Asia Minor. Chief regions of production are on the western and north-western fringes of the central plateau, in the districts of Eskesehir, Afyonkarahissar, and Birejik. There is also some production in European Turkey ; and in both areas the districts selected for beet growing are carefully placed along railway lines so that there is easy transport to refineries. Cane sugar is also grown on a small scale in the plain of Adana, but as yet accounts for only a small proportion of Turkish output of sugar.

Tobacco is a traditional Turkish crop, and because of its high value, ranks as the principal individual export commodity. At one time tobacco was widely grown all over Turkey, but in an effort to improve quality, the government has restricted cultivation during the last twenty or so years to two main regions, the Aegean coastlands (chief centres Izmir, and Bursa, near the Sea of Marmara), and the Black Sea coast with centres at Samsun and Trabzon (the latter producing the strongest Turkish tobacco). Tobacco is an exhausting crop, hence rich soils with a varied mineral content and an adequate water supply are necessary. Heaviest yields are obtained in the Izmir region, but highest quality occurs round Samsun and Bursa. The crop is controlled as a government monopoly, and normally about one-half of the total production is retained for home use, and the rest exported. There has been much fluctuation during the last ten years : up to 1941 the principal customer for Turkish tobacco was Germany ; now America takes the largest proportion, mainly for use in blending with Virginian pipe-tobaccos. Egypt is the next most important buyer. Since the dollar shortage in Europe, there has been some increase in shipments to Britain, and total production, which averaged 60,000 tons annually up to 1942, is now over 70,000 tons.

The valonia oak grows only in the borderlands between the Aegean and western Anatolia, and is for the most part restricted to altitudes exceeding 3,000 feet. From the cup which holds the acorn an extract useful in tanning, and known as valonea, is obtained. The main regions of growth of the valonia oak are the uplands at the head of the Biiyiik Menderes, Gediz, and Simav rivers ; and the inner slopes of the western Taurus and main Taurus. Acorns and cups are picked during the period August to October, then dried in the sun for several weeks, following which some acorns are exported, and some treated at Izmir to obtain the extract. About 50,000 tons of acorns are produced, and of these about two-thirds are exported, the principal buyers being France, Great Britain, and the U.S.A. Liquorice grows wild over much of Asia Minor, but occurs mostly in the drier parts of the south and east, towards the Syrian steppe. No actual cultivation takes place, but some 30,000 tons are gathered annually, and most of this is sent either as dried root or in a concentrated extract, to the United States, where it is used chiefly for flavouring tobacco, and also as a sweetmeat.

Sesame is grown for oil in the lowlands of Antalya and Adana, whilst sunflowers are cultivated on a slightly less extensive scale round the Sea of Marmara. Production of the former averaged 26,000 tons per annum, and of the latter, 25,000 tons. In addition, small amounts of poppy-seed, colza, and linseed are also produced, chiefly from the Aegean region. Attention is now being given to increasing the cultivation of flax for linseed, particularly in the newly irrigated areas round Adana, and soon it is expected that the production of linseed oil will come second after cotton seed.

DUCTION OF OILSEEDS IN TURKEY

(Annual average, 1940-46)

	<i>Tons</i>		
Cotton			120,000
Sesame			26,000
Sunflower			25,000
Poppy			12,000
Linseed			10,000

Opium is also grown on the volcanic soils of the western plateau, especially round Afyonkarahissar (*afyon* = opium), and Konya.

Like tobacco, opium production is a state monopoly, and Turkey produces 225 tons, half of the world's legal supply. Though only 70,000 acres are planted with the opium poppy, the value of the crop is very high, and occasionally, if other crops have failed, farmers may obtain permission to grow a small amount as recompense for other losses. An increase in the cultivation of mulberry trees for silk-worms has recently taken place ; the activity being located in the west and south. Another advance has been the introduction during 1933-35 of tea growing in the Rize area, where conditions are in certain respects comparable with those of Assam. Because of lower temperatures, however, yields of tea are smaller in quantity, though quality is moderate or good, and Turkey is now practically self-sufficient in tea supplies. Other less important agricultural products of Turkey are gum tragacanth, aniseed, hemp, attar of roses, and madder (for dyeing of rugs and carpets). Mention must also be made of the increasing cultivation of vegetables of all kinds.

IV. IRRIGATION

The irrigation problems of Turkey differ in certain respects from those of most other Middle Eastern countries. In the first place, with slightly higher rainfall, river water is actually more abundant; but in the interior, the extremely deeply entrenched river courses make it difficult to raise water to the surrounding agricultural land; whilst closer to the coast, broad alluvium-filled tectonic troughs are most often subjected to floods, and become filled with marsh and swamp. Irrigation in Asia Minor is thus often combined with river control and draining of marshes—particularly in the north and west of the country—and existing works are on a relatively modest scale, hardly comparable with those of the Nile, Euphrates, or Tigris.

The largest irrigated area at present is found in the Seyhan plain, where a barrage just north of the town of Adana allows the watering of 30,000 acres. The output of cotton from this district has doubled since water supplies were increased, and maize and rice growing are expanding. A little further west, extensive swamps are in process of reclamation near Tarsus; and the whole area of the Seyhan lowlands is expected to become one of the most productive agricultural regions of the country.

Irrigation canals and flood-control works are in construction in many parts of the Aegean coastlands, notably the valleys of the Great

and Little Menderes, Gediz, and Simav rivers; and the aggregate acreage of land involved is expected ultimately to exceed that of the Adana irrigation scheme. Improvements are also taking place along the course of the Yesil Irmak, (i) around its headwaters in the central plateau of Anatolia, (ii) in the region of Amasya, and (iii) close to the mouth, just east of Samsun. Marsh reclamation in this latter area will allow increased cultivation of tobacco, cereals, and fruit.

Irrigation from the Euphrates in the region of Malatya is extending the fruit growing activities of the region; here the river is less deeply slotted into the plateau, and small scale canals are being constructed with the aim of bringing 250,000 acres into use. Lastly, mention must be made of developments in the central plateau. A large barrage has been built near Ankara (the third largest in Turkey), partly to secure a good domestic water-supply for the city, and also to allow increased cultivation of cereals and vegetables. Round Eskeshehir, some 10,000 to 20,000 acres have recently been made available for sugar-beet growing.

V. PASTORALISM

The large extent of mountain and semi-arid steppe, too dry or too cold for agriculture, has led to the development of stock rearing on a considerable scale. In many areas considerable seasonal movement from winter to summer pastures takes place, amounting in certain districts of the east and south to semi or full nomadism; whilst in agricultural regions a kind of mixed farming prevails, with stock keeping as an important supplement to cultivation. The importance of animal rearing in Turkish economy is shown by the fact that Turkey comes second only to Great Britain as a European producer of wool, and surpasses all other Mediterranean countries.

Sheep are most numerous, and, though widespread over practically the whole country, greatest concentration occurs in the western districts of the central plateau (centres : Eskeshehir, Afyonkarahissar, and Kayseri); in the provinces bordering Syria and Iraq; and in European Turkey. Milk, wool, and meat are obtained, and there is a considerable trade in live animals with neighbouring countries. In 1946 nearly 250,000 sheep were exported, mainly to Palestine and Syria. Turkish wool is, unfortunately, rather coarse, and cannot be used in the making of good quality cloth; but within recent years, the government has attempted to improve the yield by introducing merino sheep.

Goats are often kept with sheep, since both animals thrive on the limited vegetation of the central plateau. Angora goats are especially valuable as yielding mohair, a soft, fine fibre about 6 inches in length, which is woven into a durable, silky cloth. As the name suggests the Ankara region is the main home of these goats; and elsewhere, the ordinary black goat is most common.

LIVESTOCK IN TURKEY

(In 000's)

Sheep	23,400	Horses	980
Goats (black)	12,000	Water buffaloes	850
Goats (Angora)	4,000	Camels	100
Cattle	9,800	Mules	90
Donkeys	1,600		

Cattle are less important than either sheep or goats, since these animals are much less tolerant of semi-arid conditions, and cannot travel long distances in search of fresh pasture. The main regions of cattle rearing tend, therefore, to occur in the damper coastlands of the north and west; and relatively few are kept in the centre and south-east of Asia Minor. Breeds are poor, and the yield of meat and milk

LAND UTILISATION IN TURKEY

(Official Estimates)

	Area in Hectares		Percentage of Total	
	1934	1944	1934	1944
Land under Cultivation	10,556,000	12,901,000	13*7	16-6
Crops :				
Cereals			7-6	9-0
Commercial crops			0-6	0-8
Vegetables			0-6	0-6
Fallow			4'8	6-2
Grazing Land	44,329,000	39,021,000	57*3	50-2
Market Gardens and Orchards	1,121,000	1,385,000	0-6	i-8
Market gardens			0*2	0*2
Fruit orchards			0-4	0-6
Vineyards			0-5	0-6
Olive groves			0-5	0-4
Rose gardens			0-0i	0-0i
Forests	9,170,000	11,893,000	n-8	15'3
Unproductive	12,058,000	12,499,000	15-6	16-1

low; but as in the case of sheep, the government has made efforts to improve methods and stock by the establishment of model farms, research and breeding institutes, and by the introduction of foreign breeds. Along the Black Sea coast, water buffaloes are important both as a source of milk, and also for transport and ploughing. Elsewhere in Turkey, donkeys, horses, camels and mules are used for transport, and many mules are imported from Cyprus. Camels, once numerous in the south-west, are now steadily declining, as more and more of the caravan traffic is carried in motor lorries.

VI. MINERALS

Asia Minor has long been renowned as a centre of mineral production. The first coins ever to be issued were those of Croesus, king of Lydia, and these were fixed quantities of gold, the purity of which was guaranteed by the personal seal of the monarch. Gold was also an ancient product of the north-east; and in the home of the legendary Golden Fleece, alluvial gold is still obtained from rivers by washing silt against an oily fleece, to which particles of gold adhere. Iron was first developed by the Hittites of Anatolia c. 1250 B.C., and copper was exploited at a much earlier date.

At the present time, however, though a wide variety of minerals are known, actual production is generally very small, because reserves are either limited in quantity, of low grade, scattered in distribution, or difficult of access.

The largest mineral deposits of Turkey are the coal beds of the Eregli (Heraclea)-Zonguldak-Amasra region. The coal, interbedded with carboniferous sandstones, is of very high grade, fully comparable in quality to the best British or German coal. Seams extend for about 100 miles along the Black Sea coast, and are much affected by fracturing, so that individual seams tend to be discontinuous, and difficult to mine. At the present, coal is not worked below a depth of 150 ft., hence there is a possibility of considerable reserves at greater depths.

Production takes place from five centres: Kilimli, Zonguldak, Kozlu, Kandilli, and Camli (Fig. 53); and annual production averages 2 to 3 million tons, of which about 65 per cent, comes from the Kilimli-Zonguldak area. Production in the eastern part of the coalfield is declining. The whole coal region has been worked in a sporadic way since 1828, and immediately prior to 1918, was operated by Italian

interests, production being less than 500,000 tons each year. Much of the coal produced is used by the Turkish railways (20 per cent.), by the metallurgical and chemical industries of Karabuk (15 per cent.), by other industrial concerns (7 per cent.), and for domestic lighting and heating (30 per cent.). In normal years there is an export surplus, which is sold in neighbouring countries, and as bunker coal for ships. Exports were stopped between 1939-45, but in 1946 nearly 200,000 tons were sold, mainly to Switzerland, France, and Cyprus.

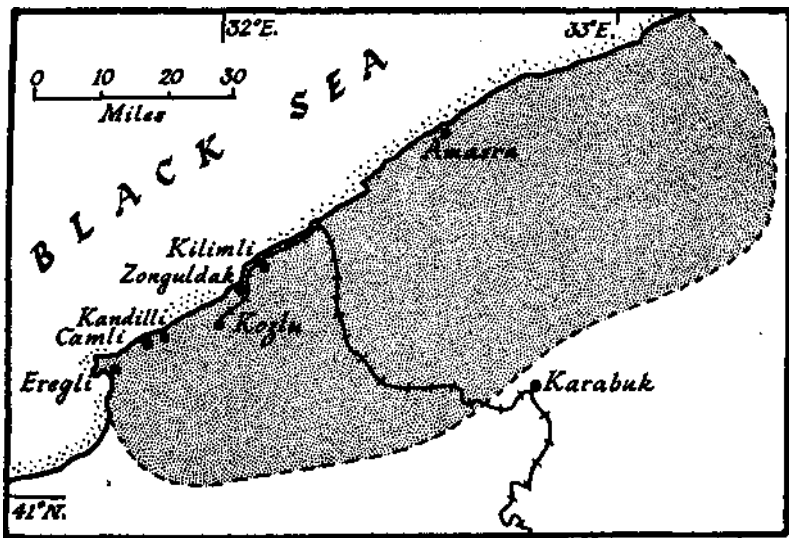


FIG. 53. The Coal Basin of Ereğli-Zonguldak. Stippling indicates the possible extent of coal measures.

There are three considerable disadvantages in the Ereğli coal basin : lack of labour, poor communications, and fragility of the coal itself. Reference to the first factor has previously been made ; as regards the second, the broken, forested nature of the coastal uplands hinders land transport of the coal, which for the most part moves by sea. Aerial ropeways have been constructed to carry coal to the coast, but on the coast itself, as we have noted, harbours are few and poor, so that ships must be off the shore, and cannot load coal in bad weather (this occurs on average for 150 days each year). Fragility of the coal leads to considerable loss in washing and handling—in 1946, 3,831,000 tons were actually raised but the total of saleable coal was only 2,526,000 tons. As a result, the price of coal is high, and the mines have

operated since 1939 at a loss of £T42 million. Plans are, however, announced to improve this state of affairs, and at the same time to raise production to $j\backslash$ million tons per annum.

Lignite occurs in a number of localities, but individual deposits are small. About twenty-five districts each produce about 1,000 tons per annum, and the largest production occurs at Kutahya, west of Ankara, where a reserve of 1,000 million tons exists. The Turkish government has recently initiated a project to generate electricity using Kutahya lignite as fuel.

Iron is produced at Divrik (Divrigi), 300 miles east of Ankara, and at £amdag, close to the head of the Gulf of Izmit. Other deposits, not fully investigated, are believed to occur at Torbali, Hasancelebi, and Elbistan in the eastern plateau region. At Divrik the iron occurs in a mountain range that lies some 5,000 feet above sea-level; and the first ore obtained was of a very high quality. Increasing amounts of sulphides are now found in the ore, and as there are no facilities within Turkey for treating such impure ores, attention is therefore turning to (Jamdag, where a district some 100 square miles in extent has been shown to have a better quality ore. The great obstacle to exploitation is lack of coal close at hand ; £amdag is 200 miles away from the smelting plant at Karabuk, and Divrik over 600 miles distant from coal deposits. Blast furnaces, the only ones in Turkey, were built at Karabuk so as to be near the Zonguldak coal-field, and these were planned before either of the existing iron deposits had been discovered, so that they cannot be said to be well sited in relation to mineral supplies.

Chrome has for long been produced in Turkey, which was at one time the chief world producer ; but Russia now holds first place, with Turkey second. The mineral occurs as lodes or lenses in association with serpentine, and is usually quarried, mined by adit, or even collected from the surface. At Giileman (west of Lake Van) workings developed in 1925 now produce about 60 per cent, of the total Turkish output; and about one-tenth of the total reserves of 2 million tons lie at the surface of the ground. Transport is by lorry to railhead at Ergani Madeni, then 400 miles to tide-water at Mersin, from which the ore is shipped abroad. Production at Giileman is interrupted for about ten weeks each year because of cold weather.

In contrast to conditions at Giileman, where further expansion is probable, output at three other centres of production is declining **because of exhaustion of the chrome ores. These centres are Bursa,**

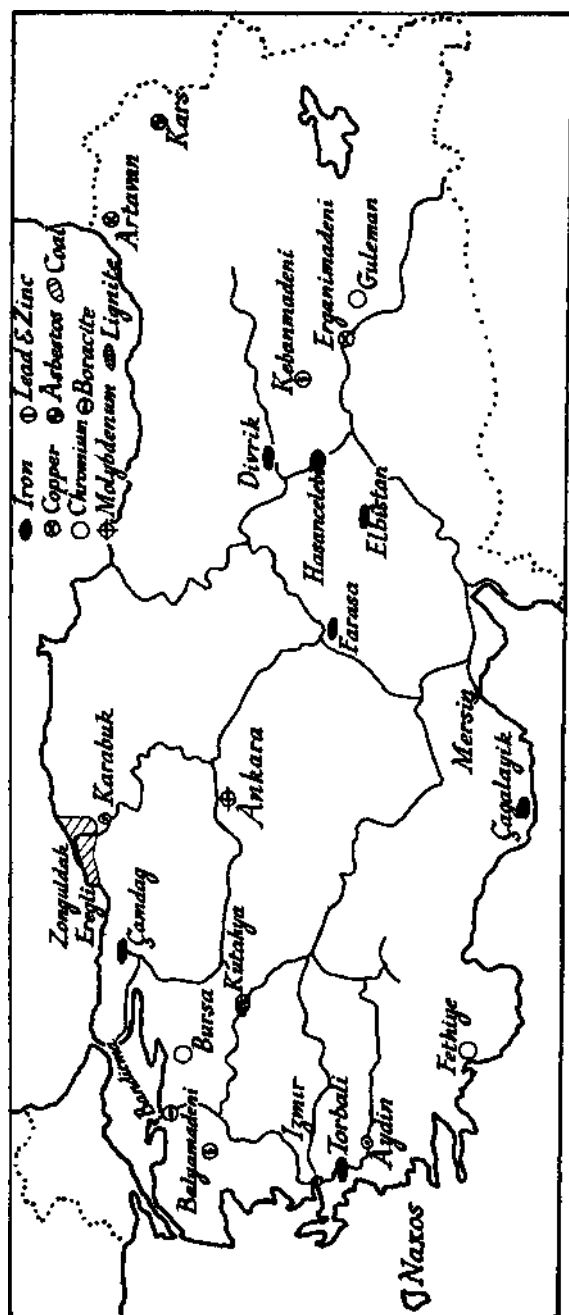


FIG. 54. Mineral distribution in Asia Minor.

which produces about 18 per cent, of Turkish chrome, Fethiye (10 per cent.), and Eskesehir (10 per cent.). Activity is seasonal in all these areas, and poor communications are a further handicap. As all production is for export, mining depends entirely upon world prices. Up to 1947, production tended to decline, but there has recently been some improvement, following the devaluation of the Turkish pound.

Copper is mined at two places, Ergani Madeni (about 60 miles north-west of Diyarbekir), and Hopa, on the Black Sea close to the Russian frontier. At Ergani, a high grade deposit estimated to amount to 3 million tons is worked by open-cast methods, and fair progress has been made since the opening of the railway to Mersin, though the haul is over 350 miles. The Hopa region began production in 1948. Most of the copper produced in Turkey is used within the country chiefly in the manufacture of armaments and electrical equipment. Until 1939 there was some copper mining from the Artavan district in north-east Turkey, but deposits are now worked out.

Lead and zinc, with small quantities of gold and silver, are sometimes found together, or with copper (as at Ergani Madeni), and when all minerals can be extracted, profitable working is possible. Exploitation is, however, on a restricted scale. Balya Madeni and Keban Madeni are the chief centres for lead and zinc blende, and as both of these are ancient mining sites, much of the present remaining ore is low grade. Output from Keban Madeni moves to Mersin, which is well placed for handling the minerals of the south and east of Turkey, and can offer transport rates by sea which are lower than those direct to the north-west by rail.

Other minerals exploited on a very small scale, yet collectively important, are alum (Black Sea region), antimony (Black Sea), arsenic (Izmir), asbestos (Kars), boracite for borax (Bandirma), manganese (various regions), mercury (Izmir), molybdenum (Ankara), and sulphur (central plateau). In the case of certain other minerals, Turkey once held a commanding position in world markets, but changes in fashion or the invention of synthetic substitutes have led to a decline or extinction of production. Such minerals are : meerschau, in which Turkey had a monopoly ; marble (*marmara* = marble) ; and natural emery from the island of Naxos. The latter is an oxide of aluminium occurring in small masses associated with marble, and is dug out in trenches rather than mined. Current output, less than one-fifth of the 1914 level, reaches 8,000 tons, the

competition of artificially produced carborundum having had a restrictive effect.

Mining in Turkey is almost entirely controlled by the state, with immediate supervision in the hands of a government department, the Institute of Mining Research. Finance for exploitation and development is supplied by another state institution, the E.T.I. Bank. Under the Ottomans, minerals were held to be the personal property of the Sultan, and exploitation was almost entirely in the hands of foreign concessionaires, who have now been for the most part bought out by the Republic. Some foreign ownership is, however, still a feature—one-half of the chromium mines of Fethiye are French owned, the boracite deposits are worked by Americans, and British interests control part of the emery production. Germany, too, held a number of concessions up to 1945.

The table below indicates the variety and relative importance of mineral production in Turkey, and demonstrates the position of the country as in many ways a marginal producer : likely to assume some importance in times of scarcity and high world prices, but liable to decline when supplies are more freely available.

PRODUCTION AND EXPORT OF MINERALS IN TURKEY (metric tons)

<i>Year</i>		<i>Antimony</i>	<i>Asbestos</i>	<i>Boracite</i>	<i>Chromium</i>	<i>Copper</i>
1939	Total production	1,258	88	15,170	183,285	5,918
	Exports	1,660			192,843	6,330
1942	Total production	1,449	293	20	130,053	13,778
	Exports	1,565	115	10	116,847	200
1946	Total production	78	55	2,210	163,000	10,050
	Exports	122		3,048	36,330	23,568
<i>Year</i>		<i>Emery</i>	<i>Iron Ore</i>	<i>Lead</i>	<i>Lignite</i>	<i>Zinc</i>
1939	Total production	9,978	—	9,821	160,763	13,616
	Exports	9,550	—	10,392	—	20,524
1942	Total production	10,715	93,454	—	391,072	
	Exports	10,525	—	—	500	
1946	Total Production	8,451	112,200	—	604,000	
	Exports	10,341	—	—	—	73

(Annual totals do not always agree with exports because of carry-over from a previous year.)

VII. INDUSTRY

Like Iran, modern Turkey has attempted to approach self-sufficiency in manufactures by direct state intervention. Two Five-year Plans, launched in 1934 and 1936 had the aims (1) of fostering closer integration of agriculture, mining, and industry, so that the country would be less dependent on imports, and (2) of bringing about a degree of industrial development in central and eastern Anatolia, where geographical conditions are less favourable for agriculture than in the west. This latter aim was also conditioned by strategic and political considerations : it was felt that the manufacturing centres of Istanbul and Izmir were somewhat accessible to possible attack ; and also that difficulties might arise in maintaining political balance between a relatively prosperous and developed west, with both agriculture and manufacturing, and the poorer semi-nomadic, and sparsely peopled centre and east. It was thus held as desirable that any future development of Turkish industry should take place in Anatolia, leaving the Aegean region for intensive agriculture, for which, of all regions of Asia Minor, it is the most suited.

The first Five-year Plan^x gave chief attention to stimulation of the textile industry, with mineral exploitation and chemical industries (producing artificial silk, paper, glass, pottery, and fertilisers) as secondary adjuncts. Much machinery was imported, mainly from Russia, Britain, and Germany, and rapid developments occurred. With considerable internal production of textile fibres (wool, cotton, silk, and mohair), Turkey is relatively well placed for textile manufacturing, though the scale of the industry cannot be compared with that of western Europe or the U.S.A. There are some 12 cotton mills (5 state owned), 11 woollen mills (5 state owned), 2 modern silk mills, and a much larger number of smaller and older factories making silk and carpets. The privately owned cotton mills are well placed near cotton growing areas (at Izmir—2 mills, Adana, Tarsus, Mersin, and Istanbul), whilst the state mills are further inland, on the plateau (at Kayseri, Nazilli, Eregli, Malatya, and Bakirkoy). Bursa, Istanbul, and Izmir are the chief woollen manufacturing towns. Carpet making has been carried on for centuries as a bazaar trade in many towns, especially those on the steppes of Anatolia. As in Iran, there are traditional patterns and colours associated with particular districts.

Bursa is also a centre of mohair and silk weaving (both natural and artificial silk), and smaller factories exist at Istanbul and Izmir.

A recent development has been the creation of an iron and steel industry at Karabuk, the equipment used being British. Coking plant has been built at Zonguldak, and the Karabuk installations include blast furnaces, open hearth furnaces, and a foundry, from which rails and steel plate are produced. It is planned to develop light engineering at Karabuk, mainly for the manufacture of agricultural machinery. Current production of iron and steel is under 100,000 tons of finished products, but a third Five-year Plan inaugurated in 1946 aims at increasing output. Beyond a few small repair shops and one automobile assembly plant that uses imported parts, there are no other engineering activities in Turkey, and most machinery is imported.

A noteworthy feature of Turkish economy has been the development of 'agricultural' industries : flour milling, sugar refining, packing and canning of fruit and meat, soap boiling and distilling. Here the distribution of factories is very wide, and individual establishments are small in size. Six sugar refineries are located in the north-west; fruit canning is carried on at Istanbul, Bursa, Malatya, and Adana. Izmir is the centre of the wine trade. In order to develop the north and east, food packing factories (meat, fish, and cheese) have been established at Kars, Samsun, and Trabzon ; and the two latter handle an increasing lumber trade that is based on the rich Pontic forests of the coastal ranges. Attar of roses is distilled at Istanbul and Isparta. Though the output is only about 250 lb. of attar annually, over 400 tons of rose petals are needed for this.

Other industries are chemical production (chiefly associated with the coking plant at Zonguldak) ; cement manufacturing (6 factories) ; and glass and pottery making. A deposit of good glass-sand occurs near Istanbul, and Kutahya is the centre of the pottery trade.

When the scale of industrial achievement during the last 15 to 20 years is set alongside the previous low stage of development, it will be apparent that considerable progress has been achieved. A start has been made in attaining balanced exploitation of the varied resources of the country, and this, following so soon on the collapse of 1918, is a measure of the strength and stability of the new Republic. The first Five-year Plan realised most of its aims ; and the second Plan had also gone far in the same direction when it was overtaken by the war of 1939, and Turkey was forced to direct much of her slender industry into armament making, and the improvisation of supplies which no

longer came from outside. Nevertheless, it is equally necessary to preserve a perspective, and it will be clear from the facts given above that even with recent expansion, industry plays only a restricted part in the economic life of Turkey. Less than 20 per cent, of the working population is engaged in manufacturing, and agriculture and herding still occupy the overwhelming bulk of the people.

VIII. COMMUNICATIONS

The great size and difficult topography of Asia Minor, together with the scanty population and limited natural resources, have proved great obstacles to the construction of means of communications, and it may be said that only in times of marked prosperity and stable government have transport systems been satisfactory. In spite of efforts by the Republic since 1923, leading to a doubling of mileage of good roads, Turkey still has only 12,000 miles of surfaced roads—1 mile per 1640 inhabitants, or 1 mile per 25 square miles of territory¹—and many regions^ especially the east and south-west, are accessible only by tracks.

Railways.—At the fall of the Empire in 1918 there was only a skeleton railway system consisting of disconnected lines operated by various non-Turkish companies, and suffering greatly from war damage. These lines had been laid without any general overall plan in districts where the prospect of immediate financial return seemed greatest, and in some cases there was an onerous monetary guarantee from the state to the operating company.² The most important of these pre-1923 lines were (1) the Eastern Railway (Austrian owned) that linked Istanbul to the main European system, (2) the Anatolian Railway (German) from Haydarpasa on the Asiatic shore opposite Istanbul to Konya, with a branch to Ankara, (3) the Baghdad Railway (German) from Konya to Nisibin, on the Syrian frontier, with a branch to Aleppo and Damascus, (4) shorter lines (one British, one French), running inland from Izmir via the valleys of the Büyük Menderes and lower Gediz, and (5) a line built by the Russians during the war of 1914, and of narrow gauge from Ezerum eastwards to within 100 miles of the Russian frontier, then of Russian broad gauge

¹ Cf. 1 mile per 256 inhabitants (Britain) and 401 (Spain) ; and 1 mile per 0.4 sq. mile (Britain) and 3*0 sq. miles (Spain).

² I.e. either a guarantee of dividends up to 5 or 10 per cent., or a payment per length of line laid.

as far as the frontier. The Baghdad line played an important part in the campaigns of 1916-18, and was completed as far as Nisibin by British prisoners of war.

It was the policy of the new Turkish Republic (i) to repair existing railway lines which were badly damaged, (ii) to secure national ownership by buying out foreign concessionaires—a process that was virtually completed by 1940, (iii) to develop a network of new lines that would link the older isolated sections, and also open up new

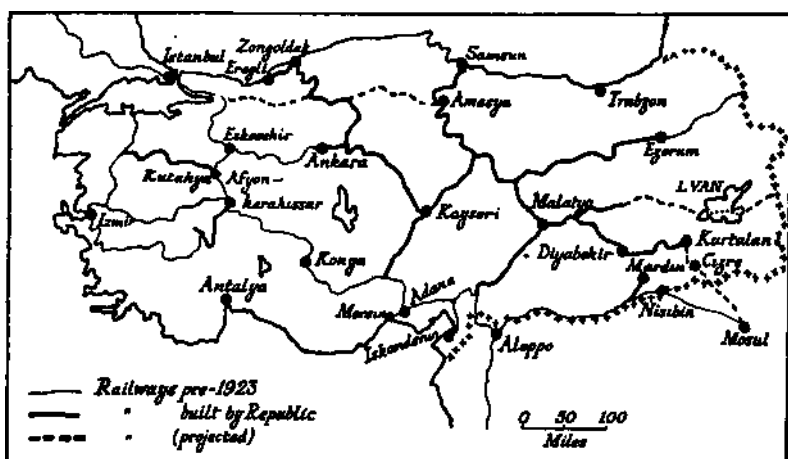


FIG. 55. Railway Construction in Asia Minor since 1923.

districts hitherto untouched by rail transport, and (iv) following the shift of political influence from Istanbul to Ankara, to bring northern Anatolia more fully into the rail network of Turkey.

Fig. 55 shows modern construction by the Turkish Republic. Future plans include an extension from Kurtalan to Mosul via Cizre (Jeziret ibn Omar), which will give a more direct route from Ankara to the Persian Gulf*; a branch from the same line starting in the Diyarbekir region, and reaching Lake Van, where a rail ferry across the lake will connect with Iran and Russia; finally, a direct link between Amasya and the Gulf of Ismir via Bolii, using the longitudinal valley of the Black Sea coastlands.

Shipping.—With a coastline some 3,000 miles long, and difficult relief inland, it is not surprising that communications by sea play an

¹ This route was considered as a possible alternative to the Konya-Adana-Nisibin section when the Berlin-Baghdad scheme was first developed in 1902.

important part in the life of Turkey. Under the Ottomans, sea traffic was mostly in the hands of the Greeks, though Turkish-manned craft were found in the Black Sea; but since 1923 a Turkish merchant marine has been built up, and Turkey now has an important share in the trade of the Aegean and Mediterranean ports. Since 1940 more than half the tonnage using all Turkish ports has been of Turkish nationality. Handling 64 per cent, of the total trade of the country (average 1940-47), Istanbul is easily the leading port of the country. Izmir stands next, with 19 per cent., then Samsun (9 per cent.), and Trabzon (6 per cent.).

NATIONALITY OF SHIPS USING THE PORT OF ISTANBUL

	1938			1946	
	<i>No. of</i>			<i>No. of</i>	
	<i>Vessels</i>	<i>Tonnage</i>		<i>Vessels</i>	<i>Tonnage</i>
Turkish	17,539	4,075,233	Turkish	12,909	4,098,688
British	511	1,949,409	American	206	1,512,436
Italian	390	1,234,119	Russian	176	782,851
Rumania	187	736,151	British	57	289,995
German	215	597,214	Greek	273	278,309
Total	19,963	7,370,476	Total	13,897	7,740,160

IX. TOWNS

Only four cities in Turkey have a population exceeding 100,000 ; and of these Istanbul (former name, Constantinople) is still by far the largest. The city was founded in 658 B.C. by Greek colonists, who established a settlement on the low plateau formed by the promontory lying between the Sea of Marmara and the drowned valley of the Golden Horn. This site, dropping steeply to the water, was easily defensible by the construction of fortifications on the western (landward) side; and in the centre of the promontory there grew up a succession of fortresses, one of which, the headquarters of the Ottoman rule, came to be known as the Sublime Porte.¹

From this ancient nucleus, the city gradually developed; but it was not until the Middle Ages that the opposite (northern) bank of the Golden Horn was occupied and made part of the city. This district, called Galata, is now the modern business quarter, with the residential

Hence the use of the term to denote the Ottoman Caliphs.

district of Pera occupying a ridge well above the city on the north. Uskudar, on the eastern (Asiatic) side of the Bosphorus, was the ferry-point facing Istanbul, and thus the terminal for routes leading east-

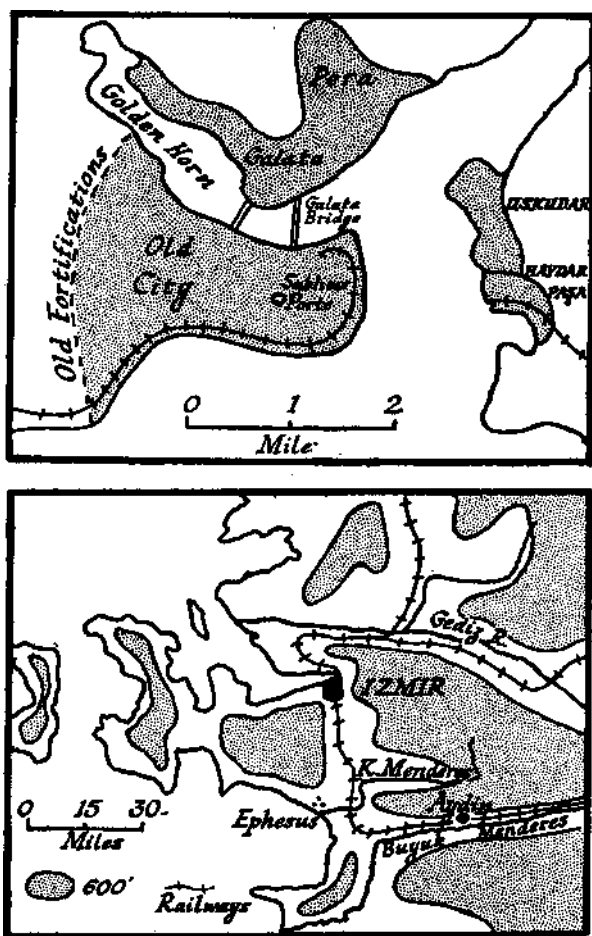


FIG. 56. The sites of Istanbul and Izmir. Built-up areas of Istanbul stippled.

wards into Asia Minor and the Levant (Uskudar = courier); but in the last two centuries its importance has greatly declined in favour of nearby Haydarpasa, which, with a better harbour, has now become the port of entry into Asia Minor, and the terminus of the Anatolian railway system.

The importance of Istanbul derives from a number of factors. Firstly, the Golden Horn is the only good harbour in the entire region of the southern Black Sea, the coastline of which is, as we have seen, straight, sheer, and abrupt, and devoid of shelter during the bad weather that is frequently a feature. Secondly, Istanbul has an important natural resource in the good fishing of the Straits, which is due to the seasonal migration of fish from and into the Black Sea.¹ Thirdly, easy communications by land and sea make it the natural outlet for the relatively fertile Marmara region and its hinterland : though European Turkey is not outstandingly rich, regional differences in land utilisation give rise to a variety of products, mainly foodstuffs and animal produce, which are marketed at Istanbul. In addition, however, to this local traffic there were for long two major routes that intersected in the region of the Straits : one by sea from Russia and the Black Sea towards the Mediterranean, the other the land route from south-east Europe to Asia Minor. Whereas the importance of the latter route has declined since the Middle Ages, the sea route is likely to develop further with the rise of Russia, hence Istanbul will remain a port of call for shipping using the Black Sea (see table, p. 332).

Central position in relation to Ottoman territories made Istanbul a natural choice for a capital, and it may be noted that as compared with the bleak uplands of south-east Europe and the arid, 'continental' steppes of Asia Minor, the city has an extremely agreeable climate. Its function as capital attracted many secondary activities—military and naval construction, and administration, so that, like Vienna, Istanbul took on importance as a cultural and economic centre that transcended the limits of a single geographical region. In 1914, Istanbul had over 1 million inhabitants, but since the decision to transfer the capital of modern Turkey to Ankara, population has fallen by a quarter, and is now about 850,000. It is the one remaining town in Turkey with large Greek and Armenian minorities, who work as artisans : these were allowed to remain in the country because of their importance to the national economy. At the present time Istanbul is a market centre for exchange of local* produce; a manufacturing centre (textiles, metals, pottery, glassware, brewing, and leather); and a fishing and commercial port.

Izmir, the second city of Turkey (pop. 200,000), has also a fine natural harbour, formed by the head of a drowned estuary. A

¹ The name ' Golden ' Horn is supposed to refer to the abundance of fish in its waters.

right-angled bend in the lower part of the estuary (due to cross-faulting) provides complete shelter for shipping ; but in order to avoid rapid silting up of the port, a feature very common in the Aegean region, the river has been diverted to a new channel away from the town. Izmir is the natural centre for the Aegean coastlands, which are the richest part of Asia Minor; and its position midway between the two largest valleys of the region—those of the Gediz and Büyük Menderes—gives it special advantages from the point of view of communications with the interior. There is a choice of easy routes inland as far as the plateau of western Anatolia.

Chief activity is the export of fruit and vegetable products : raisins, figs, olives, tobacco, wheat, barley, opium, and vegetable oils are the most important. In addition to these cultivated products of the lowlands, liquorice, valonia acorns, gum tragacanth, and nuts are collected from the forested uplands, and Izmir is also the outlet for the pastoral districts of the central plateau. Wool, hides, meat, carpets, and woollen cloth are exported, with a return traffic of machinery and cotton goods. There is some fishing and boatbuilding—a speciality is sponges, which are exported in some quantity. A fourth activity is the shipping of untreated minerals that are produced in small quantities from the immediate hinterland: chrome, iron, manganese, sulphur, emery, and salt. Local manufacturing of soap, spirits, and textiles is carried on; and the importance of the city is likely to increase with the greater development of the Aegean coastlands, potentially far the richest of all the agricultural regions of Turkey. Plans are in hand to expand harbour facilities so as to accommodate a larger number of ships: though one minor adverse factor is liability to moderately severe earthquakes—an indication of the site of the city in a region of tectonic disturbance.

Ankara was for long the chief regional capital of the northern half of the central plateau, a district formerly known as Galatia. The town had some importance as a Hittite capital; but until 1923 was surpassed in influence by Konya, which, as the centre of the richer southern plateau region, could rightly be termed the metropolis of the entire Anatolian plateau.¹ When, however, the founders of modern

¹ This is shown by the choice of Konya as the terminus of the Baghdad Railway—Ankara was merely a station connected by branch line to the main trunk route. Another indication of the importance of Konya was the strong religious associations of the city, which became the centre of the Dervish order, and still has some of the finest mosques in Turkey.

Turkey wished to develop Turkish nationalism, and break away from the 'pernicious' cosmopolitan atmosphere of Istanbul, Ankara, because of its Hittite associations which have been made much of as the basis of modern nationalist feeling, was chosen as the new capital.

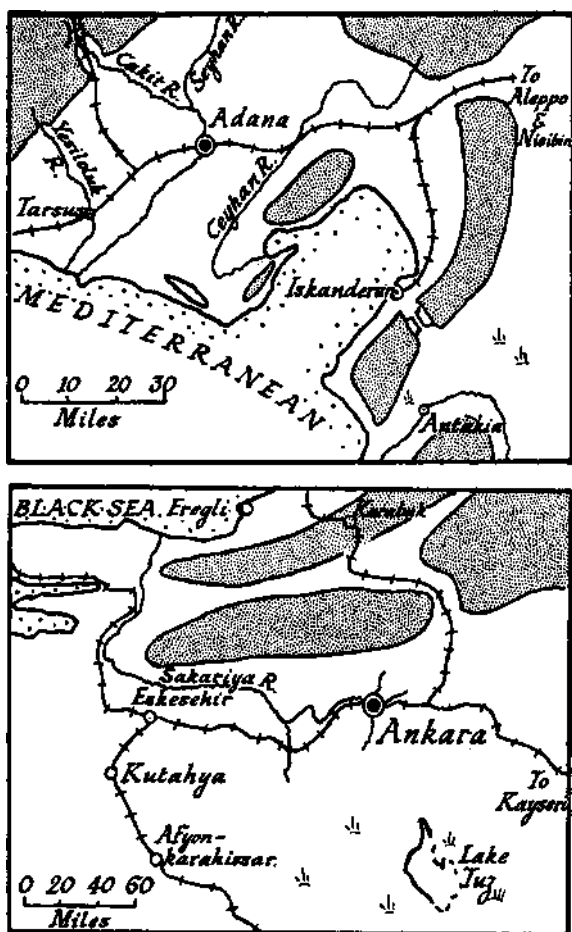


FIG. 57. The sites of Ankara and Adana. Highland stippled.

The city lies at the confluence of a number of streams which are deeply incised into the plateau surface, and the centre portion of the town is placed on a residual ridge surrounded by steep slopes. The surrounding country is open, and relatively easy of access, so that it lies on the ancient routeway from east to west that follows the northern

rim of the inner plateau of Anatolia. Ankara is a market for the products of three sub-regions—the forests of the north, and the steppes and cultivated lands of the southern interior—but there is no tiling to parallel the richness of the Izmir region. Chief products are pastoral in origin—wool, mohair, hides, and carpets ; there is some production of cereals, of temperate fruits (mainly apples) and of charcoal, the principal domestic fuel of the plateau. Ankara has of course profited greatly from the industrial development undertaken by the Republic, and textile mills (using wool and mohair), light engineering establishments (making armaments), and tobacco and printing works have been created. Population has increased from 50,000 in 1923 to 180,000 (1948).

THE FOREIGN TRADE OF TURKEY

Year 1946-47

Total Value of Trade in £ Sterling : £111 million

Amount per head of population : £6

<i>Imports</i>		<i>Exports</i>	
	<i>Percentage of Total</i>		<i>Percentage of Total</i>
Machinery	27	Tobacco	21
Cotton textiles	17	Cereals	20
Vehicles	6	Fruit	18
Total Imports, ^55 million		Total Exports, ^56 million	

Suppliers :

- (1) U.S.A.
- (2) U.K.
- (3) India

Buyers :

- (1) U.S.A.
- (2) U.K.
- (3) Italy

Adana is the natural centre of the Seyhan lowlands, and lies on the ancient highway from Asia Minor through the Cilician Gates to Syria and Mesopotamia. The city is in a sense a second Izmir, for it handles the produce of a rich agricultural region ; but Adana, lying 25 miles from the coast, must ship her products through the port of Mersin, because the river Seyhan is navigable only by small boats up to Adana. Cotton is the main crop of the district; and other commodities produced are cereals (including some rice and maize), citrus fruits, and sugar cane. The Adana plain, one of the most extensive lowlands in Turkey, is, unlike much of Asia Minor, well adapted to the

use of modern agricultural machinery ; and at the present time, considerable development is taking place in this direction, parallel with the improvement of irrigation. Malaria is a handicap, but control of streams for irrigation is likely to reduce the incidence of this disease ; and with the opening up of south-eastern Turkey—both to agriculture and as a supplier of minerals—Adana is likely to gain further in importance.

CHAPTER XV

THE TIGRIS-EUPHRATES LOWLANDS

IN the regions so far considered, political boundaries coincide to a large degree with natural geographical limits. Further to the south and west, however, this concordance is much less a feature, and there arises the problem of deciding on what basis to proceed to a discussion of the geography of the area. Two possibilities present themselves: (i) an examination, country by country, as is most usual in geographical literature, and thus taking political frontiers as a criterion of division;

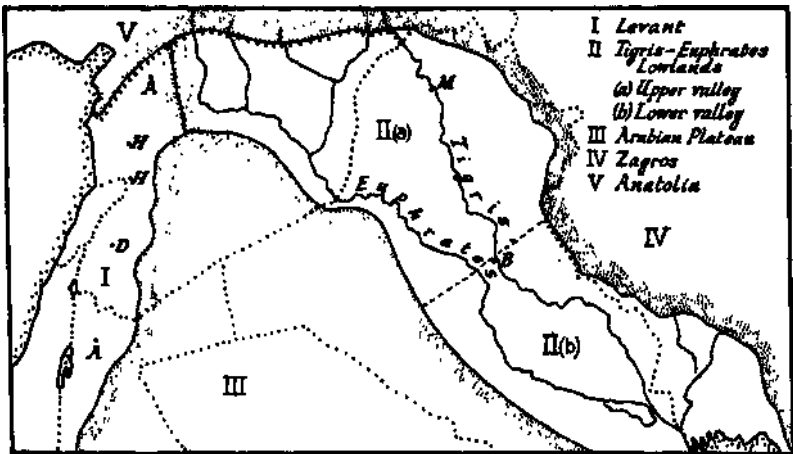


FIG. 58. Natural physical units.

or (ii) discussion on a basis of natural physical units, ignoring political boundaries. Of the two alternatives, it has been thought preferable to adopt the second, since, as we have seen, certain national frontiers in the Middle East are of very recent creation, and also in some respects artificial—therefore, liable to change. The solution proposed is not ideal, particularly as concerning economic matters, since trade statistics are grouped by countries ; but in using purely geographical limits it is nevertheless felt that a clearer and more reasoned picture can be presented.

The following major natural regions have been recognised :

- (a) The valleys of the Tigris and the Euphrates between the plateau of Asia Minor and the Persian Gulf—i.e. chiefly the state of Iraq, but also including parts of northern and eastern Syria.
- (h) The Levant coastlands—western Syria, the Lebanon, Palestine, western Transjordan, and Cyprus.
- (c) The plateau of Arabia, comprising the whole of the peninsula, together with the interior desert regions of Syria, Transjordan, and Iraq.
- (d) The plateau of north-east Africa, including Libya, the Nile valley, and the Sinai.

The origin of the Tigris-Euphrates valley is highly unusual. Its lower part, extending over some 300 miles between Baghdad and Basra, has been built up from the sea almost within historic time ; and equally if not more than in the case of Egypt, the land of Mesopotamia is the gift of its rivers. Hence, in beginning an examination of the region, it is first useful to consider the regime of the two streams.

I. REGIME OF THE TIGRIS AND EUPHRATES

Both rivers rise in the Armenian highlands of Asia Minor, and are fed chiefly by melt from snowfall that occurs in winter. In general, both streams can be said to thread an irregular and tortuous way round the east-west running folds of the Anatolian system, following a course towards the south-east. At times, however, quite large folds are directly cut across by deep gorges, suggesting that in some parts, at least, the rivers existed before the mountain ranges were uplifted to their present height, and that drainage is therefore antecedent. Another interesting feature has been the blocking of parts of the Euphrates and Tigris by lava flows, with consequent deviation of the rivers. This is well shown south-east of Malatya, where the Euphrates makes a sudden bend south-westwards, because of the presence of lava erupted from the Karacali volcano.

Leaving behind the tangled ridges of Asia Minor, both rivers emerge on to the lower plateau uplands of northern Syria and Kurdistan, and make their way directly south-eastwards to the Persian Gulf. During its crossing of the north Syrian steppe, the Euphrates receives two important left-bank tributaries—the Balikh and the Khabour, both

of which also rise amongst the hills of Asia Minor. No tributaries of any size are received from the Syrian and Arabian deserts (the last right-bank tributary joining the main-stream at Carchemish in Turkey) but a number of large empty wadis indicate that in earlier times there was substantial right-bank entry of tributaries. The Khabour is the last tributary of any kind to enter the Euphrates, and so for the rest of its course across the hot plains of Iraq, there is considerable evaporation, which reduces the volume of water in the river. In this respect, a parallel with the Nile will be noticed.

The Tigris, on the other hand, lies much closer to the Zagros Ranges, and along the whole length of its course from Asia Minor to the Persian Gulf, receives many affluents, some quite large, like the Great and Little Zab, the Diyala, and the Karun ; others small, though collectively important in the aggregate volume of water that they supply. The entry of tributaries has important consequences, since the Euphrates, being dependent on rainfall that occurs in a single and relatively restricted catchment area, does not fluctuate rapidly in volume in its middle and lower courses ; whereas the Tigris draws its waters from a much wider catchment zone extending from south-east Anatolia to the northern coast of the Persian Gulf, and local rain in one district can soon affect the height of the river. Sudden floods are, therefore, a feature. Much of the water of the Euphrates comes from slow percolation of melt-water or rainfall through porous rock strata—i.e., temperature conditions in Asia Minor exert considerable control—but a large part, though not all, of the Tigris effluent is due to direct surface run-off from mountain torrents. A local rain-storm in the Zagros can thus produce marked changes in river-level within a few hours, and a rise of 8 to 12 feet during 24 hours is not unusual.

For streams of such large size, the slope of both river-beds towards the sea is distinctly steep. This is the result of oscillation of the land surface during Tertiary and Quaternary times. Most of the fall occurs in the portion between Anatolia and the Baghdad region : the Euphrates drops 800 feet between Jerablus and Ramadi (1 in 3,000), and hence its current is swift, precluding up-stream navigation to all but highly powered boats. The gradient of the Tigris is even sharper, the river falling nearly 1,000 feet between the Turkish frontier and Baghdad (1 in 1,750) ; and though the width of the Tigris is less than that of the Euphrates, the volume of water carried is far greater. The speed of the current in both rivers means also that their erosive action

is considerable, hence much sediment is carried at all seasons; and all the year round, the Tigris and Euphrates appear as turbid, rapidly moving streams, in strong contrast to the Nile, which for seven or eight months of the year is clear and placid.

Because of the swift current, sudden fluctuation, and great volume of the Tigris, this river is especially subject to devastating floods. An

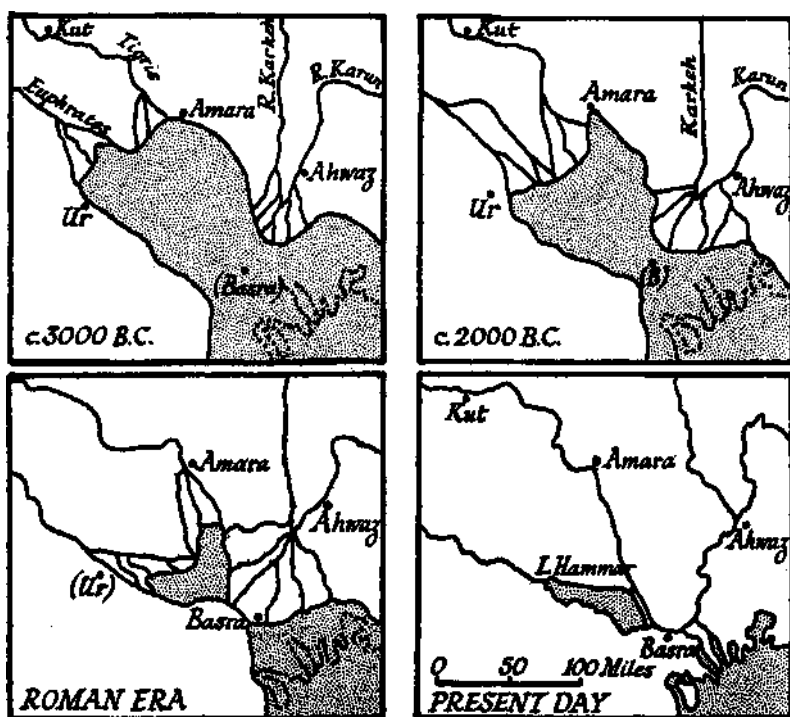


FIG. 59. Stages in the Recession of the Persian Gulf (after de Morgan).

exceptional rise in level may sweep away existing channels, and inundate many hundreds of square miles of territory, with the river ultimately carving for itself an entirely new course. Several old channels, still occupied by distributaries, or else used as irrigation canals, are still to be seen: one for example at Hilla, on the Euphrates, and another east of Baghdad, between Samarra and Ctesiphon.

Annual Regime.—Both rivers are at their lowest in September and October. Decreased evaporation as the result of a fall in temperature during autumn causes a slight but perceptible rise in the Euphrates

during November (a feature that does not occur in the Tigris); but the effects of the first onset of winter rainfall, which are clearly to be seen in the Tigris, are almost entirely masked in the Euphrates owing to percolation of rain into the porous subsoil. From December onwards, both rivers begin to rise considerably, because of heavier rainfall over the whole region; yet differences once again become apparent in later spring.

The maximum flood of the Tigris takes place during April, but owing to slower melting, and the effect of percolation, high water in the Euphrates does not occur until May. It is also interesting to compare the volume of the two rivers. At Hit, the Euphrates discharges an average of 8,800 cubic feet of water per second in September, and 64,300 cubic feet per second in May, with a flood level *n* feet above low water. At Baghdad the Tigris discharges a minimum of 11,900 cubic feet per second in September, and a maximum of 106,650 cubic feet in April, with a rise in level of 18 feet—this though the Tigris at Baghdad is narrower than the Euphrates at Hit.

II. RECESSION OF THE HEAD OF THE PERSIAN GULF

Within relatively recent times (*c.* 10,000-5000 B.C.) both the Tigris and the Euphrates followed entirely separate courses, and entered the Persian Gulf by distinct mouths. At this period the shoreline of the Gulf was situated much further to the north-west, and lay only a few miles below Baghdad. The two rivers built up separate deltas, which gradually extended towards the south-east, into the waters of the Gulf. Besides the Euphrates and the Tigris, other rivers also emptied into the Persian Gulf; and two of these, the Karun and the Karkeh, rose in the relatively humid uplands of the Zagros where evaporation was less than on the plain. By reason of their rapid descent from the hills, both these latter streams had enormous erosive power.

Large quantities of silt brought down by the Karun and Karkeh were deposited as deltas along the northern shore of the Persian Gulf, and these latter deltas grew in size more quickly than those of the Tigris and Euphrates further to the north-west. Hence a platform of alluvial material was pushed southwards across the head of the Persian Gulf, ultimately forming a barrier behind which the waters of the Tigris and Euphrates were ponded back in a series of enormous lagoons and swamps. By the commencement of the Christian era the

Karun and Karkeh deltas had joined together and reached the Arabian shore on the southern side of the Gulf, thus partially cutting off the Tigris and Euphrates from the sea. This meant that the latter rivers were slowed down, and their burden of silt, which would normally have been carried away by sea currents, was deposited inland. Vast mud swamps intersected by drainage channels have hence come to be

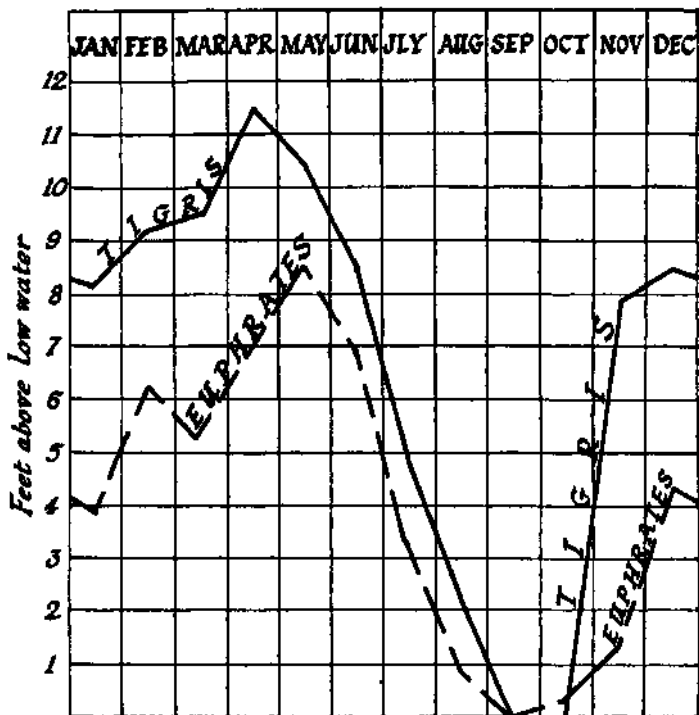


FIG. 60. The Regimes of the Tigris and Euphrates (data by Ionides). The datum for low water on the Euphrates is given by the lowest level at Ramadi (151 ft. above m s l) , and for the Tigris by lowest level at Baghdad (95 ft. above m.s.l.).

characteristic of much of Mesopotamia south of Baghdad, and the whole region may be considered as a low platform of alluvium built up by the coalescence of a number of river deltas. The higher parts are now dry and firm, but the intervening stretches are still water- or marsh-covered, with a great number of distributary channels of varying width that are constantly shifting. From the latitude of Baghdad southwards the braided channels of the Euphrates and Tigris have altered considerably within historic time; and at the present day, the

south-eastward advance of the head of the Persian Gulf, which has proceeded during several millennia at the rate of one mile per fifty years, is still in progress. As the coastline advances, due to the increasing deposition of sediment, the land behind it slowly dries out in certain places, though by no means everywhere. As a result, marshland and braided river drainage, which are found only in the last 100 miles of the course of the Nile, occupy approximately one-third to one-half of the lowlands of Mesopotamia, and cover several hundred thousands of square miles.

It is hence possible to subdivide the lowlands of the Euphrates-Tigris into two contrasting regions: (a) the southern, or lower valley, which has only recently emerged from the sea, and where land-forms associated with fluvial deposition—marshland, braided channels, and embanked river-courses (levees)—are the chief features; and (b) the upper Mesopotamian region, a somewhat more complex area, where features due to erosion predominate. In this latter area there are the two distinct river basins (with smaller tributary valleys) separated by a broad stretch of upland and plateau. The line of division between the upper and lower regions of the Euphrates-Tigris lowlands can be taken at the prehistoric coastline of the Persian Gulf, which is to-day apparent as a low ridge or shelf some 250 feet above the flood-plain, running eastwards from Ramadi to a point a little to the south of Baghdad.

III. GEOGRAPHICAL SUB-REGIONS

Lower Valley.—Topographically, this region consists of an alternation of marshland and low mud plain, diversified by sluggish drainage channels. The whole area is extremely flat, with a fall of only 1 inch per mile over the last 100 miles of the Euphrates, and about 2 inches per mile along the Tigris. This means that over a stretch extending for 100 miles north-west of Qurna, which lies at the head of the Shatt el Arab, the Euphrates drops only 8 feet in base-level, so that annual flooding, which may be of the order of 5 to 10 feet, regularly inundates immense areas of country (highest flood-level recorded was 25 feet—on the Tigris—in 1926). As a result, much of the region is undisturbed swamp, and parts are still entirely uninhabited and unsurveyed. The Shatt el Arab, formed by confluence of the Tigris and Euphrates, is a broad navigable waterway, fringed by

a belt of palms for a depth of 1 to 2 miles, behind which occur

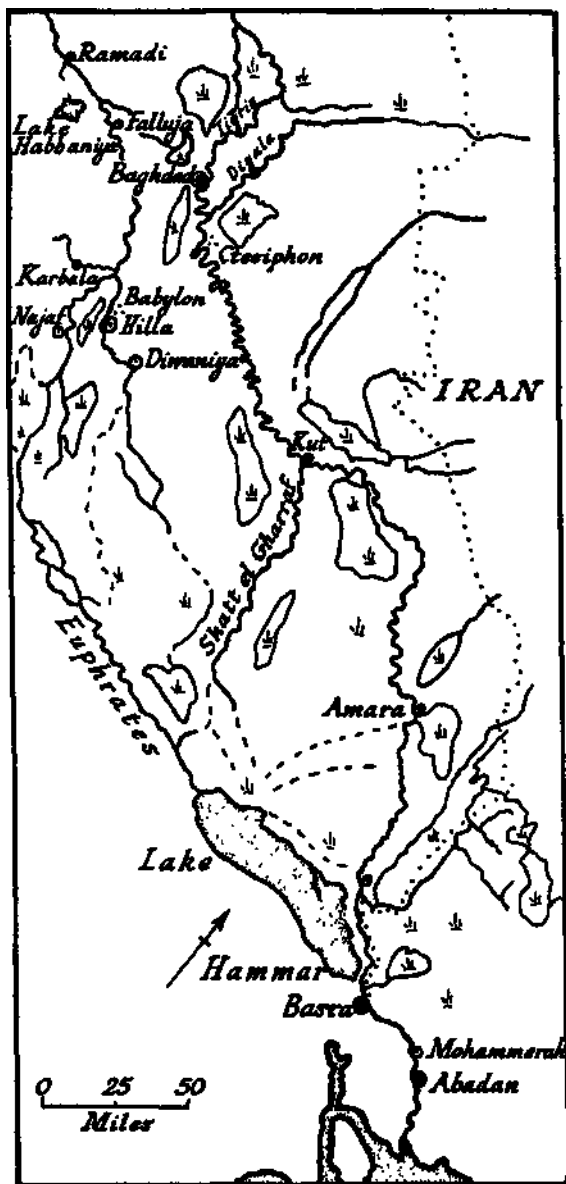


FIG. 61. Lower Mesopotamia. Water surfaces stippled. that of their countrymen further north. Dwellings are built of bundles of reeds

masses of tall reeds sometimes more than 20 feet in height. The Euphrates joins the Tigris through an outflow from a large sheet of water, Lake Hammar, which is really an old lagoon now fed by the Euphrates. Here the fringe of palm trees gives place to reeds and aquatic vegetation that form a canopy over sluggish creeks and sand or mud spits. In spring, the season of flood, virtually all the country in the triangle Basra-Amara-Nasiriya is one expanse of continuous marshland.

The inhabitants of these districts follow a mode of life different from

fastened by ropes made of the same plant, and are set either on thick bundles of brushwood as a foundation, or else on the few sand-spits that stand above the water. Rice is a staple, and diet is varied by fish, salted or dried, and by a species of edible rush known as *ageyL*. Water-buffalo are almost the only animals kept, and these provide curds, butter, and cheese, together with dung which is the only fuel available.

Further north, the zone of marshland decreases in extent, though remaining a ubiquitous feature. Numerous old drainage channels occur, and whilst a good many of these are occupied by swamps or lakes (e.g. Lakes Habbaniya and Aqaquf), others are dry. An important feature is the variation in level between the main streams of the Tigris and Euphrates. From Baghdad as far as Qurna, the bed of the Tigris lies at a slightly higher altitude than that of the Euphrates, allowing the easy construction of free-flow irrigation channels. In the region of Baghdad, the position is reversed, with the Euphrates lying higher than the Tigris. This circumstance has for centuries been utilised with much effect by irrigation engineers.

Upper Valley.—Above the latitude of Ramadi, both the Tigris and Euphrates flow in well-defined valleys comparable in certain respects with that of the Nile. In parts, the rivers meander over extensive flood plains; at others, they have cut deeply into soft, horizontally bedded rock measures, and lie in a trench or shallow gorge. Here and there, though less frequently than on the Nile, outcrops of harder rock have resisted erosion, and stretches of rapids or 'narrows' occur. A special feature of the Tigris (and not the Euphrates), is that because of the meandering course of the river, and the presence of natural levees, tributaries enter only with difficulty. This is the case on the eastern bank of the Tigris between Baghdad and Mosul, where numerous small streams descend from the Zagros Ranges. At their junctions with the Tigris there is sometimes an area of poorly drained marshland.

Relief in parts of the Euphrates and Tigris valleys strongly suggests that the regime of both rivers was at one time markedly different than that occurring now. Much of the river bed even in the plains area is deeply incised, with the river flowing in a notch well below the level of the surrounding plain, and bounded by cliffs sometimes 200 to 300 feet in height. Incised meanders are a common feature on the middle Euphrates, recalling on a larger scale the land-forms of the Seine valley below Paris. River rejuvenation at no very distant date would

seem to be the causative factor, and this would appear to have taken place as the result of one or more of the following : (i) the possible sinking of the floor of the Persian Gulf, due to the accumulation of masses of sediment, (ii) the rise of the fold ranges of Anatolia. It is also possible that a temporary climatic phase of increased humidity in Tertiary or early Quaternary times, could have produced a greatly increased volume of water in the rivers.

At the present time, this slotted drainage in upper Mesopotamia has certain disadvantages. Irrigation is difficult in regions where the river is well below the level of the surrounding plain; and miniature gorges and rapids hinder navigation. Thus in some parts the banks of both rivers are entirely isolated from the streams themselves, and wide stretches remain uninhabited.

Between the upper Tigris and Euphrates lies the region known as the Jezirch (Arabic — *island*), which is bounded on two sides by the rivers, and on the north by the fold ranges of Asia Minor. For the most part, the Jezirch consists of an undulating plain or low plateau, lying at an altitude of 500 to 1,000 feet above sea level, with a number of small closed basins from which there is no drainage outlet. The largest of these basins is a long, narrow trench cut deeply into the plateau and known as the Wadi Tharthar. Streams enter the Wadi from the north, but terminate towards the southern end in a salt marsh. The Wadi Tharthar may be a tectonic feature, or even an old river valley now dried out. In earlier historic periods it provided a route-way from north to south, but is now used only for grazing by nomads.

To the north-west of the Wadi Tharthar lies the Jebel Sinjar, a prolongation of the Syrian fold structures. As the highest parts reach 3,000 feet, there is a heavier rainfall on the upper slopes, and some settled cultivation is therefore possible. The Yezidi, who inhabit the Jebel, practise mixed arable and pastoral farming. Another important feature of the Jezireh is the Khabour valley, the ancient region of Mitanni, where irrigation was formerly developed on an extensive scale, and a relatively dense population maintained. Though nowadays the river is malarial, and its waters charged with sulphur, improvement is once more taking place. Modern pumps for irrigation are being installed, and colonies of immigrants—chiefly Armenians, Assyrians, and Arabs—are slowly being absorbed into new agricultural settlements.

The region on the eastern bank of the Tigris is known as Assyria. Here the land rises in steps from the Tigris towards the north-east, each step being marked by increasingly prominent ridges that are

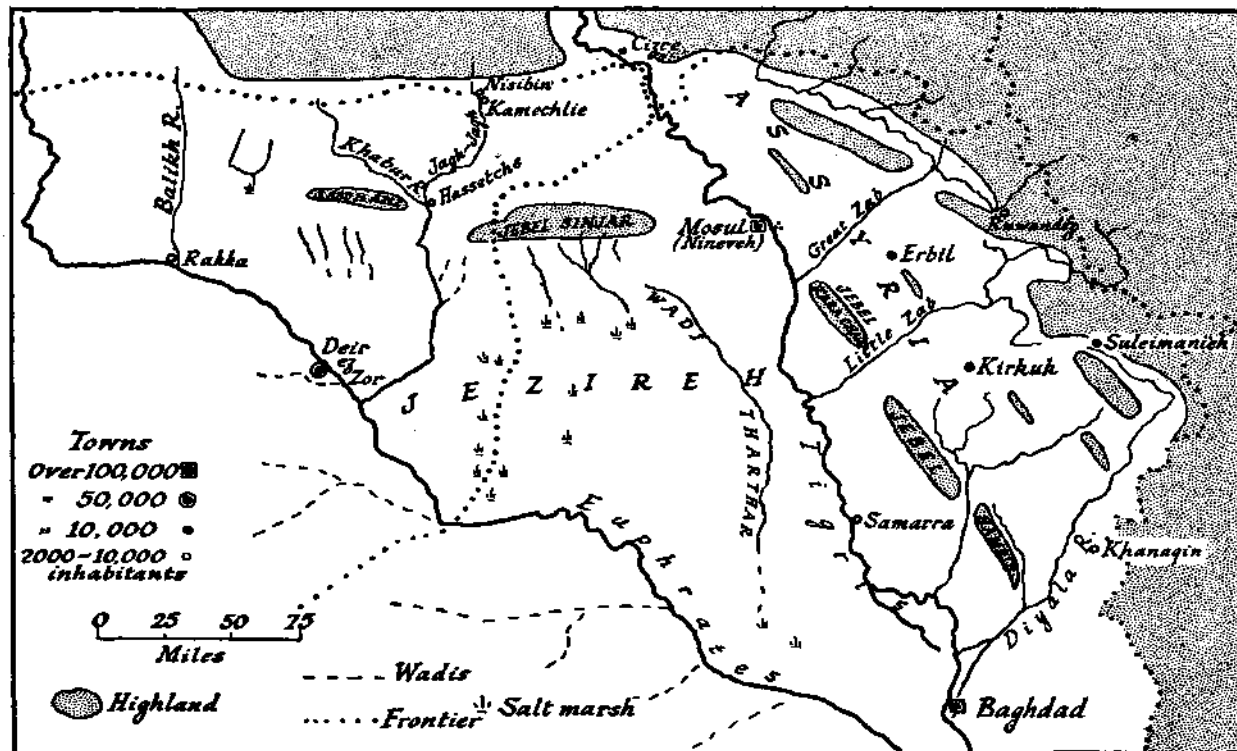


FIG. 62. The Upper Valley region.

aligned generally from north-west to south-east. The first of these ranges is the Jebel Hamrin (max. height 1,600 feet), which fronts the Tigris along a part of its course. Numerous tributaries of the Tigris have broken through the ridges, forming gaps or gorges, so that the whole region of Assyria has been dissected, giving on the south-west a fairly broad open plain with occasional higher ridges. This passes towards the north-east into an increasingly broken and mountainous country with scattered lowland basins shut in by hills. Ultimately, the main Zagros Ranges are reached on the east, and the Anatolian arcs on the north. Both of these higher upland regions are occupied by Kurds, hence the name Iraqi Kurdistan is sometimes applied to the parts of the mountain massifs that lie within the Iraqi state.

IV. CLIMATE

The lowland region has two marked seasons—a dry and intensely hot summer, lasting from May to October; and a relatively cold, damp winter from December to March, with spring and autumn as short transition periods between the two.

With the development of summer monsoonal low pressure conditions over the Persian Gulf and north-west India, air is drawn towards the south-west, giving remarkably regular and constant north-westerly winds over the whole of Iraq. These are known as *Shamal*, and blow without interruption during the summer. The air is dry; no cloud forms, and the sun beats down uninterruptedly over the lowland, giving rise to shade temperatures that exceed 95° F. on most days, and not infrequently reach 120° F. Some relief is obtained during the night, as diurnal variation of temperature is marked: and near the rivers and marshes, intense evaporation may lower the day temperature by a few degrees. Lacking the possibility of moving to nearby hill regions, most Iraqis are driven to constructing underground shelters (*sirdab*) in which to pass the hottest part of the day. A further unpleasant feature is blowing dust, raised by the strong *Shamal*, which reaches a climax in late afternoon, and drops at night.

With the wind blowing towards the Persian Gulf during the summer season, there is little mitigating effect from the presence of the sea—temperatures for Basra, Baghdad, and Mosul show a remarkable uniformity, though it may be noted that nights are cooler inland, and the length of the summer is somewhat shorter in the north. It is

also noteworthy that over much of the Mesopotamian lowlands, the maximum of temperature tends to occur in August—an unusual feature for an inland region, but possibly due to the development of the monsoonal circulation which takes some time to become established.

In winter, temperatures generally lower than might be expected can be explained by the presence of snow-covered mountains to the east and north. Differences are apparent between the north or upper basin, and the south; the former region experiencing something approaching a continental regime, the latter a milder climate, due to latitude and the influence of the sea. A comparison between Mosul and Basra shows that for the coldest month (January) there is 8° F. difference of temperature.

Another significant fact is that the absolute maximum of temperature recorded at Shaiba in January is 81° F., and at Mosul, 66° F.—i.e. 'hot' spells can occur during the winter in the south, but not in the north. Diurnal variation is again of great importance, and somewhat remarkably, this is smaller in the north during winter than elsewhere (e.g. Mosul 16° F., as compared with 20° F. for the rest of the region). Despite its low altitude, the whole of the riverine lowlands may experience spells of frost of some severity (absolute minimum temps, at Deir ez Zor, 16° F., Mosul 12° F., Baghdad 19° F., Basra 30° F.), though the worst effects naturally occur in the north.¹ Cold weather usually occurs when the Siberian anticyclone extends beyond the south-west of Central Asia, and cold, stagnant Polar Continental air covers Iran and adjacent regions.

Because of the predominating off-shore wind, the high air humidities characteristic of the Persian Gulf do not occur on such a wide scale in the Euphrates-Tigris region. Nevertheless, as we have seen, evaporation close to rivers and lakes is high, and the air over a short distance becomes very humid—on the actual banks of rivers, wet-bulb temperatures of over 80° F. are common, though a mile or two away, there is a sharp drop. This fact, which does not always appear in climatological records, is responsible for a difficult 'physiological' climate, in which heat stroke and exhaustion can easily occur; and this goes far to explain the notorious reputation of southern Iraq—a reputation which does not at first sight seem justified until one takes into account the local variation of humidity.

¹ Cf. the contrast with coastal Syria, at a similar latitude, but where frost is unknown.

Rainfall occurs only during winter, and is almost entirely due to the arrival of moist maritime air from the Mediterranean, in the form of shallow and somewhat degenerate depressions. The damp air has previously passed over the mountainous country of Anatolia or the

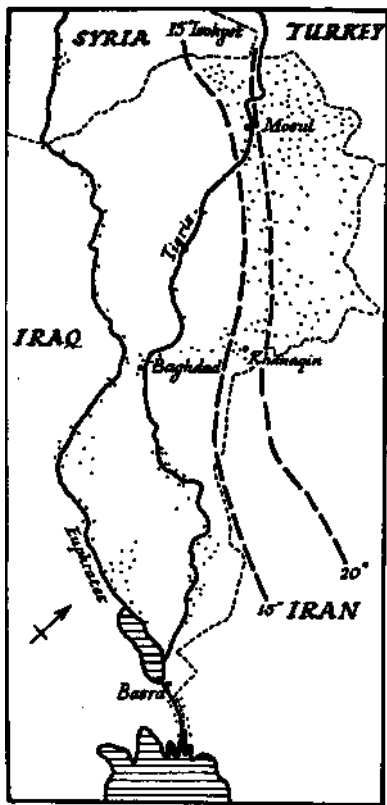


FIG. 63. The relation between Rainfall and Settlement in Iraq. (Settled villages shown as dots.) Rainfall increases eastwards towards the Zagros Range.

Levant, there depositing much of its moisture, so that on arrival in the Tigris-Euphrates basin, only a reduced rainfall occurs, with annual totals ranging in the lowlands from 1 to 20 inches. On uplift over the Zagros ranges, however, considerable precipitation, exceeding 40 inches, occurs—a figure rather higher than at one time believed—and, in order to explain this apparent anomaly of abundant rainfall from weakened and dried-out depressions, it is necessary to recall that all rainfall in Iraq is of the instability type (Chapter III), and is therefore intensified by a mountainous topography. There may also be a further factor: rejuvenation of the depressions by absorption of water vapour from the vast tracts of swamp and lake in lower Mesopotamia, or, more distantly, from the waters of the Persian Gulf. A strong south-easterly air current, cold

and relatively damp, and known as a *Sharki*, usually develops in front of an advancing depression, and this may bring moisture northward from the Gulf.

Because of the regularity of land forms, the distribution of rainfall follows a simple pattern. Late January or early February is the wettest period, and normally no rain falls between the end of May and the end of September. Over most of the country annual falls do not exceed

5 inches, but towards the mountains on the east and north there is a rapid increase. The foothills of the Zagros stand out as relatively well-watered, and the Assyrian region receives over 15 inches, an amount sufficient to allow cultivation without irrigation. The 15-inch isohyet is of extreme importance in Iraq and northern Syria, since it marks the effective limit between desert and cultivated land¹ (Fig. 63). With less than 15 inches annual rainfall agriculture is dependent on irrigation, and settlement is confined to the neighbourhood of rivers—away from water supplies, the population is nomadic.

	J	F	M	A	M	J	J	A	S	O	N	D	
<i>Temperatures (°F.)</i>													
DeirezZor	45	48	52	66	77	85	92	89	83	71	59	48	
Mosul	41	48	55	63	75	84	95	95	82	72	59	47	
Baghdad													
(Hinaidi)	48	52	61	71	82	90	94	94	87	76	63	52	
Basra													
(Shaiba)	52	57	65	75	86	91	96	97	90	80	68	55	
<i>Rainfall (ins.)</i>													<i>Rainy</i>
													<i>Total Days</i>
DeirezZori	6	1.0	0.3	0.6	0.1	0	0	0	0	0.2	1.5	1.0	6.3 29
Mosul	2.1	3.0	1.6	1.8	0	5	0	0	0	0.2	1.8	2.0	13.0 60
Baghdad													
(Hinaidi)	1.2	1.1	0.3	0.4	0	4	0	0	0	0.1	1.0	1.0	5.5 28
Basra													
(Shaiba)	1.3	1.2	0.4	0.5	0.1	0	0	0	0	0.1	1.1	1.0	5.7 21

V. OCCUPATIONS

(a) *Agriculture*.—This is overwhelmingly the most important occupation of the people since industry can scarcely be said to exist on any significant scale. Nevertheless, only about one-sixth of the land suited to cultivation is actually used, and of this a large part lies fallow for one or more years, particularly in regions dependent on irrigation, where increasing salinity of the soil, due to over-watering, is an ever-present danger. Generally speaking, despite the extent of fertile alluvium, agricultural yields in this area are lower than in many other parts of the Middle East, and the reasons are to be found in a

¹ Ten inches of rainfall is normally regarded as the boundary between arid and moist regions, but in the Middle East, because of high temperatures, the 15-inch isohyet is a better criterion.

blend of natural, social, and economic factors. Besides the difficulties of climate, and the river system with its shifting banks, marshland, and rapid floods, insect pests occur on a considerable scale. Archaic methods of land tenure and exploitation are a further obstacle.¹ Yet another difficulty—uncommon in the Middle East—is a lack of manpower, as the result of which potentially fertile regions are left unexploited.

The division into two climatic provinces—a wetter (rain watered) region and an arid (irrigated) region, with the 15-inch isohyet as a boundary—has very great significance not only in relation to settlement, but also in relation to the crops grown, because it coincides roughly with another important line of demarcation, that of the northern limit of the date palm. Thus to the south, barley, rice, and dates are staples, all being grown under irrigation; whilst in the north barley, wheat, and Mediterranean fruits are the chief crops.

Barley is the most widely grown, since it thrives best of all cereals under Mesopotamian conditions, being more tolerant than wheat of aridity and of soil salinity, and also growing in a shorter time, a feature which reduces loss by the sunna insect pest. As a result, the yield per acre of barley is double that of wheat. Most barley is of native varieties, which are of poor quality; but within the last 20 years better strains have been introduced from Morocco and California. The main regions of production are the plains of Assyria (Mosul, Erbil, and Kirkuk districts), the lower Tigris valley (districts of Kut and the Shatt el Gharraf, an old drainage channel) and the middle Euphrates (Nasiriya district). Besides being consumed in the country, partly in bread, and partly as fodder, there is an export of the better varieties in normal times. Barley from the Tigris-Euphrates lowlands is, however, of indifferent quality, and suffers from the competition of American and Russian products in the world markets. There is much fluctuation in demand, and during the 1930's, when world prices were low, exports from Iraq greatly diminished. The opposite occurred during the second World War, but now there is again a period of falling prices, and declining exports.

Wheat, like barley, is grown as a winter crop, but its occurrence tends to be restricted to the wetter area, and even there, dry farming methods are often necessary. Native varieties are once again poor,

¹ Most Iraqi fellahin are metayers who receive less than 40 per cent, of the crops they cultivate. (See p. 185.)

but efforts at improvement are being made, and wheat stocks from the Punjab have been introduced. These have, amongst other advantages, a quicker cycle of growing, so that sunna infestation is reduced. About 80 per cent, of the Iraqi production of wheat is from Assyria, where the cereal is grown together with, or as an alternative to, barley. Other productive areas are scattered along the middle and upper courses of the two rivers—on the Tigris between Baghdad and Amara, and on the Euphrates round Deir ez Zor, Ramadi, and Hilla.

Rice is the most important crop in much of the lower valley, but is naturally restricted to districts which are regularly inundated, or where irrigation is easy. The quality of the rice is higher than that of either wheat or barley, and with heavy irrigation, a yield four times as great is obtained. Thus though the area of cultivation is relatively small, rice-growing plays an important part in the economy of the region. Extension of rice growing is, however, limited by law, because of the heavy demands on available water supplies, and also because of the liability to extend malarial infestation.

The chief regions of rice-growing are (1) the marshes of the Amara district (Tigris river), (2) the Shamiya district, between Najaf and Diwaniya, on the Euphrates, and (3) the lower Euphrates from Nasiriya as far as the head of Lake Hammar. Minor regions of production are the upper part of the Shatt el Gharraf, the district of Samarra, and the lower Khabour valley. Small scale paddy fields are also a feature of the river banks of Assyria—chiefly round Suhmanieh and Kirkuk. The crop has greatly increased in importance during the last 15 years, and almost all of the rice is for home consumption, with little or no export.

Millet is a summer crop, and thus wherever it is grown, irrigation is essential in the later stages of its development. As a result, distribution is sharply restricted, even in the wetter zone, to the vicinity of rivers. Chief region of production is obviously the south, where irrigation water is more abundant. Though less important than either barley or wheat, millet is widely used as an ingredient for bread, and for animal fodder. A small quantity is also exported, mainly to Turkey and Syria.

Maize, another summer crop, is grown in increasing quantities, chiefly in the middle and upper parts of both river valleys; but as it is only a recent introduction, present output is still very small.

Commercial Crops.—Iraq produces about 80 per cent, of the total

world supply of dates—that is, of the proportion of dates that form an article of commerce, because most dates are eaten directly by the growers, or else bartered. The general conditions under which date palms thrive have already been touched upon, and it is sufficient to recall that the palms can flourish in dry, saline, sandy, loamy, or even water-logged soils, although the maximum yield of fruit is obtained when abundant water is available.

The region of the Shatt el Arab is pre-eminently suited to date-production, and both banks are lined with date groves extending inland for about a mile and a half. Some 25 to 30 million palms are cultivated throughout the region, and of these, one-half are found close to the Shatt el Arab, the rest occurring along the river banks as far north as Latitude 33° N. A curious feature is the rise of the river under the influence of the incoming tide. Fresh water is ponded back in the Shatt el Arab, and floods the banks to a depth of as much as 3 feet to provide natural and regular irrigation of the groves—a phenomenon that from the point of view of the native farmer is wholly estimable.

In order to ensure a good crop, the land is dug over once every four years; and because of the frequent presence of creeks and water-courses, this must be done by hand. Artificial pollination is, as we have already seen, highly necessary; and though most groves include 3 per cent, of male palms, the district of Fao has developed a special trade in male pollen dust, from which other date-growing regions are supplied.

About 130 varieties of date are known, but three are most widely grown. The *Halawi* palm produces the finest fruit, but gives only a moderate yield (44 lb. per tree) (Dowson), whilst the *Sayir* produces slightly less, but is more tolerant of inferior growing conditions, and is probably the most widely grown. The *Zahidi* does not give a fruit of high quality, but the yield is over 120 lb. per tree, and this compensates for the low price obtained. Fertilisation of the female palm takes place in April, and picking begins in August, when large numbers of nomadic tribesmen move into the date-growing areas to work as seasonal harvesters.

Besides forming an extremely important part of local diet, dates are used in the distilling of *arak*—the chief fermented beverage outside the vine-growing areas, and one thought to have value as a prophylactic against malaria. The crushed stones are fed to cattle, and both leaves and trunk of the palm are used in light constructional work (houses, boats, even bridges), and also in the manufacture of

paper. About one-half of the crop is retained **for home consumption**, the rest exported.¹

Cotton is the second commercial crop of the riverine lowlands, but in strong contrast to the successful development of date growing, cotton has experienced many vicissitudes. Some cotton has for long been grown to meet the needs of local craft industry; but large-scale production for export (Iraq has as yet no modern spinning or weaving machinery) began after 1920. There are a number of handicaps, chief of which are liability to insect pests and soil salinity, which tends to develop when much irrigation is employed. Invasion by locusts from the Nejd in 1928 caused great damage, and in succeeding years the price of cotton fell because of the world slump of 1929-31. Some improvement then occurred, and a market was found in Japan, which absorbed most Iraqi production between 1937 and 1940. With the war of 1939 this trade eventually disappeared, and most of the land was replanted with food crops. Dollar shortages in Europe after 1945 may possibly result in a revival of cotton growing in Iraq, but prospects are doubtful.

Minor Crops.—Tobacco is widely grown in the foothills of the north-east, particularly in Kurdistan, but the product is consumed only within the country. Though some improvement has recently taken place following the introduction of new stocks from the Balkans and Turkey, the crop is still of indifferent quality, and unlikely to compete in outside markets. Vines are also an important feature in the north-eastern foothills, and in some districts of Kurdistan may be said to be a principal crop. Numerous varieties of other fruit and vegetables are also grown, more especially in the wetter zone of the north, though Baghdad is increasingly important for figs and vegetables. As elsewhere in the Middle East, market gardening associated with growing urban centres is a recent development of increasing significance.

An ancient silk industry still survives on a small scale, with mulberry trees grown chiefly in gardens or small enclosures in the Baghdad district. Output is not large—insufficient even for local demand—and

¹ It should be noted that dates are one of the few products of the Middle East which hold a commanding position in world markets. The situation of the date groves adjacent to tide water allows an unusually low cost of transport, so that competitors in North Africa—especially in Biskra, which has slow and difficult land communications with the Mediterranean—are at a disadvantage. The chief drawbacks to Iraqi dates are: poor packing methods, and variation in quality of the fruit, due to lack of grading and breeding control.

there is strong competition from foreign produced and artificial silks. Other reasons for the backwardness of this industry are a lack of modern machinery, and the absence of a skilled artisan population.

Besides the cultivated plants mentioned above, three others grow wild, and have a place in the economy of the region. Liquorice is found along the banks of both rivers as far south as the Shatt el Arab. The root is dug up and then dried for a period of 12 to 18 months, after which it is ready for use. Some is retained locally, but most is exported to the U.S.A. and to Great Britain. Another product is gum tragacanth, which is collected from bushes that are natives of the semi-arid steppe or desert. Most of the world's supply comes from the Tigris-Euphrates lowlands and from Iran, and is used in the manufacture of pharmaceutical products, and sauces and pickles. In the northwest the valonia oak is important. Clumps of these trees grow on the higher, damper patches of the Zagros and Anatolian Ranges, and from these districts leather industries located in Aleppo, Mosul, and Baghdad are supplied. Small quantities of the gall-nut are also exported.

VI. IRRIGATION

Control of river waters for irrigation presents an unusual problem : because of the occurrence of floods in spring, at a time when all crops except rice are partly grown, cultivated areas cannot simply be inundated, as in Egypt; and water must be impounded as far as possible within the banks of the rivers themselves. This is achieved by the construction of large artificial embankments or levees; but at times when the river is dangerously high, breaches are deliberately made in the levees to allow flooding to take place in areas where damage will be least.

Another problem is to drain off stagnant flood water, which, if left on the land, is very prone to induce soil salinity. In ancient times a simple but effective system of canals was created with the dual functions of watering arid areas and draining waterlogged zones, and to achieve this, skilful use was made of the variation in relative level between the Tigris and the Euphrates. A large number of canals were constructed on both sides of the Tigris from Tikrit southwards, and five major channels also led water from the Euphrates to the Tigris in the region of Baghdad and Babylon. Irrigation reached its highest development in the early Abbasid period (c. A.D. 850-1000); and

from that time onwards there was a prolonged decline. Since about 1880, however, a major revival has occurred. Old channels have been cleared and repaired, and a system of new barrages and canals built.

At the present time there are three large modern barrages, and one weir, all of which serve to raise the river level. The older of the barrages are at Hindiya on the Euphrates, and at Daghgara. The former was constructed in 1913, with additions in 1922. Its functions are (i) to divert water from the Euphrates into a canal that was once an old channel of the Euphrates, and which runs parallel to the modern river through Hilla; and (ii) to raise the general level of the Euphrates and thus allow irrigation in the region of Karbala (on the right bank of the river opposite Hilla), and also upstream on the left bank as far as Ramadi. It was originally proposed, as part of the Hindiya scheme, to use Lake Habbaniya as an extra storage for river water—spring floods would be retained in the lake basin, and could then be released later in the year. So far, however, Lake Habbaniya is not used, except to absorb excess flood water, because the bed of the lake is covered by saline deposits, and until these are cleared, water held in the lake becomes useless for agriculture.

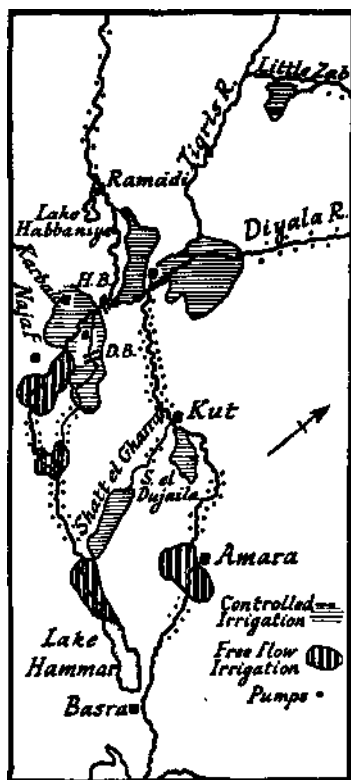


FIG. 64 Irrigation in Iraq (data partly from Dowson). Euphrates barrages indicated (H B & D B.)

The newest barrage is at Kut, on the Tigris, and was completed in 1943. Some 2,100 feet in length (over three times the size of the Hindiya dam), it will eventually bring under cultivation two extensive areas that lie south and south-east of Kut; respectively the region of the Shatt el Gharraf, and the region of the Shatt el Dujaila, both of which are braided distributaries of the Tigris, but have no outlet at their lower end. Water is not available all the year round in these

areas : it can only be supplied during the winter, since the summer flow is required for rice cultivation downstream at Amara.

The Diyala weir feeds six canals which irrigate an extensive area north and north-east of Baghdad. Altogether, about 330,000 acres are watered, as compared with 925,000 acres in the Hilla region of the Euphrates, 380,000 acres (Ramadi region), and a potential estimate of 750,000 acres round the Shatt el Gharraf and 230,000 acres round the Shatt el Dujaila. In the Kirkuk plain, a canal has recently been constructed to tap the waters of the Little Zab, and 125,000 acres are irrigated. Other than this latter project, there are no large scale irrigation works throughout the northern part of the riverine stretches of Iraq or Syria.

In the south of the Tigris-Euphrates valley, the river has raised its bed in places above the level of the surrounding land, and here there is sometimes no need to build barrages, since river water can be led off directly to the fields. Areas of such * uncontrolled ' irrigation are found along the lower Euphrates from the region of Najaf as far as the head of Lake Hammar, and along the Tigris south of Amara. About 300,000 acres are watered in this way; but the system tends to be precarious, as any slight change in the water-level of the rivers—produced by the formation of a new distributary, or by artificial control of waters upstream—may result in a cessation of flow. There is, too, the possibility, during the flood season, of receiving far more water than is really required.

Finally, reference must be made to the extensive lifting of water by mechanical means—by modern pumps with diesel engines, and also by more primitive norias, sakiyas, and shadufs. About 53 per cent, of the irrigated land of Iraq is still watered by lift, and one-half of the total number of pumps is found on the banks of the Tigris round Baghdad and Kut, with about one-quarter on the middle and upper Euphrates, and the rest (just under one-quarter) along the Shatt el Arab. The inhabitants of the region consider that irrigation by lift produces more valuable and better cultivated land, as compared with irrigation by flow, since amounts of water can be adjusted closely to crop needs, and the chances of inducing soil salinity are less.

VII. STOCK REARING

This forms a considerable supplement to agriculture in most of the Tigris-Euphrates lowlands, and predominates in the Jezireh and parts

of Kurdistan, so that on balance stock rearing is more widespread than in many other countries of the Middle East. The reason would seem to be the close proximity of semi-arid or unirrigable land to cultivable stretches ; and even in the lower riverine zones one may come across small expanses of higher ground perhaps only half a mile from a watercourse, yet too elevated for irrigation, and hence fit only for grazing. In Egypt there is a single sharply defined boundary between desert and sown, and in Syria there are broad zones of steppe, but in Mesopotamia the intermingling and close alternation of marsh, alluvial tract, and upland ridge provides special inducement to the keeping of animals alongside cultivated areas.

Sheep predominate, being most numerous in the Jezirch and on the right (southern) bank of the Euphrates. Other pastoral regions are the southern margins of the Assyrian plains, between the Jebel Hamrin and the first foothills of the Zagros, and the Gharraf region between Kut and Hilla-Daghgara. Generally speaking, the sheep are bred for wool, which, though coarse, is exported in considerable quantities. Some is retained at home for the weaving of carpets and cloaks; most of the remainder goes to Britain, where it is regarded as equal in quality to the coarser Australian wools.

Goats tend to be more restricted to the north and east of the region, since they prefer a hillier habitat, and a 1947 estimate gave a total for Iraq of 2½ million to 3 million goats, as compared with 7 million to 8 million sheep. Milk is the most important product, forming a large part of the diet of tribesmen; some meat is also eaten, and goat hair is used in the making of tents.

In contrast to goats, which are associated with nomadism, cattle are kept mainly by settled and semi-settled cultivators living near rivers and marshes, where green fodder is available throughout the year. Cattle are valuable in two ways: as draught animals (for ploughing, for transport, and for the operation of irrigation wheels), and as producers of milk. Little meat is eaten.

* There is some export of live sheep and cattle from the region, mainly to Syria and Palestine. This trade is of long standing : up to 20 years ago the main route followed was via the steppelands of the Fertile Crescent, and the animals were driven on foot towards the markets of the west by way of Rakka and Aleppo. One handicap was the variable rainfall of the region, which might result in a dearth of pasture along the route, and hence restrict or prevent the movement of animals. Construction of a railway between Iraq, Turkey, and

Syria altered the position, and Aleppo and Rayak are now the principal terminals for the unloading of Iraqi cattle. An even more recent innovation is motor transport for sheep : it has been found that these latter animals can be moved most economically by road, whilst the larger beasts are best moved by rail. Small numbers of cattle are kept by the marsh Arabs of the south, though water-buffaloes are by far the more important. Over 80 per cent, of the total for the riverine areas are found in the four southern provinces of Amara, Diwaniya, Muntafiq, and Basra.

Camels are bred in large numbers in the deserts of the south-west, but in many parts of the alluvial lowlands, terrain is too soft and swampy, so that these animals are few outside the steppes. In recent years, with the growth of motor transport across the desert, camels for transport purposes have been much less in demand, and more and more are now bred for sale in the towns as food. In riverine regions the donkey is the chief beast of burden; horses, as is usual in the Middle East, being an exotic and costly rarity. Mule breeding is carried on by the Kurds.

The importance of stock-raising in the economy of the Tigris-Euphrates lowlands is shown by the fact that in 1948 exports of animal produce amounted in Iraq to 7 million Dinars^x as compared with exports of agricultural produce totalling 4 million Dinars. The scale of animal exports could be further increased were better methods of breeding practised and more attention given to feeding and maintaining the animals themselves—as it is, current methods are backward and unenlightened. The importance of stock-rearing also serves to emphasise the fact that a prosperous pastoral industry might contribute considerably to raising the standard of living of the farmer; and many authorities believe that the answer to economic problems in much of the region lies in an extension of mixed farming. Too often the legend of an agricultural prosperity in past ages had caused modern governments to develop irrigation and cultivation, without regard for the potentialities offered by a thriving pastoral industry.

VIII. MINERALS AND MANUFACTURES

Apart from oil, the mineral wealth of the Tigris-Euphrates lowlands is extremely scanty. A small deposit of lignite is worked at

¹ 1 Iraqi Dinar = £1. 1947-8 was, however, a very bad year because of drought.

Kifri (on the edge of the Zagros foothills, south-east of Kirkuk), but annual production over the period 1940-45 averaged only 2,000 tons. Salt and gypsum are the only other minerals produced in any significant quantity.

Industry is on an equally restricted scale. There are small craft industries chiefly concerned with textiles, building, food processing, metal work, and tanning, but most products are of indifferent quality, and none but home markets are supplied. Textile products include rugs, carpets, and materials for Arab style of dress, using wool, cotton, silk, and a little mohair; and it is significant that the better quality carpets sold in Iraq are imported from Iran and Turkey.

A few modern factories and installations have come into existence during the past 20 years, but the number is exceedingly small. Brick and tile making machinery accounted for almost one-third of all modern plant, and three spinning and weaving mills (for wool only, none for cotton), three cotton ginning factories, and one rayon factory represent all the modern textile plant in the country.

Over 90 per cent, of Iraqi industry (craft and modern) is located in Baghdad, and the only other * industrial' centre is Mosul, with a distillery and the rayon factory already alluded to. It will thus be clearly apparent that industry plays an exceedingly small part in the general life of the region—smaller, on average, than in most Middle Eastern countries, and considerably smaller than in the neighbouring region of the Levant.

VIII. COMMUNICATIONS

Unlike Iran, where mountain ranges and deserts have proved severe obstacles to movement, the riverine lowlands stand out as a region of easy access. On either side of the two rivers the undulating plains are not entirely without water and vegetation, and have for many centuries furnished a variety of easy routes from the Indian Ocean to the Mediterranean. Though in the lower valley routes must avoid the lakes and marshland, keeping to the steppes on either side, the rivers themselves are navigable for hundreds of miles, even though with some difficulty at certain seasons of the year. Here is a considerable contrast with Iran, where a short stretch of the Karun river below Ahwaz is the only navigable waterway in the country.

In the upper parts of both the Euphrates and Tigris and their larger tributaries, a special form of water transport has for long been a

feature. This is by *kelek*—a raft made of brushwood and small pieces of timber, supported by inflated animal skins. The usual number of skins in one raft is 50 to 100, but keleks of 250 skins are known* and these can carry loads of 50 tons. These rafts are almost unsinkable, and carry timber, hides, and charcoal from the forests of Asia Minor to the practically treeless lowland region. Because of the numerous rapids and gorges on the headstreams of the rivers, transport by any other craft is impossible. An extra hazard to a journey by kelek is the possibility of attack by Kurds, who for centuries have been accustomed to take toll of river traffic by wrecking occasional keleks and appropriating the cargo.

Because of the swiftness of the current, upstream navigation is not possible, and on arrival at their downstream terminus the kelek is broken up; the brushwood sold, and the timber framework and deflated skins carried by pack animal back to the starting point, where they are used again to construct another kelek.

Further downstream where the waters are quieter, numerous types of boat are found, ranging from *mashufs*—small canoes for use in the marshes—to sailing craft large enough to carry 40 to 70 tons of cargo. Below Baghdad there are river steamers that tow barges between the capital and Basra; but these are small, since the Tigris has no more than 4 feet of water in winter, and only 3 feet in summer. Navigation on the Euphrates is less easy, since the average depth of water in the regions of Hindiya and Lake Hammar is only 2 feet 6 inches, and motor launches or small sailing craft replace the steamers of the Tigris.

Besides the waterways, which carry the greatest traffic, railways and roads must be considered. The first railway to be laid was a short section between Baghdad and Samarra, built by German engineers as part of the projected Berlin-Baghdad system. This was of standard gauge. During the war of 1914, the British laid a number of lines, of metre and 2 feet 6 inches gauge, using material and stock from India. The disposition of the lines was governed by immediate strategic and economic considerations, so considerable alteration became necessary when the war ended. The 2 feet 6 inches lines were relaid to a metre gauge, but there are still two gauges in use—standard and metre, with the break at Baghdad. Metre gauge lines connect Baghdad and Basra via Hilla, Samarra, Nasiriya, and the Euphrates valley; and another branch runs from Baghdad to Kirkuk and Khanaqin. The former line was routed via the Euphrates partly because of the denser

population and greater productivity of the lower Euphrates, and partly because of the restricted possibility of river navigation on this river as compared with the Tigris.

A line of standard gauge links Baghdad and Mosul, with an extension to Tel Kotchek on the Syrian frontier, whence direct communication exists with Aleppo, Ankara, and the Bosphorus. Construction of the northern part of this line was much delayed by political difficulties in the vilayet of Mosul, and was not completed until 1940.

During the war of 1939-45, further development occurred as the result of increased demand for oil, the enhanced strategic importance of the region, and the necessity to furnish military supplies to Russia. Much of this activity has proved ephemeral, but two permanent improvements may be cited; the provision of numerous passing loops on the railway system (most of which is single track) and the building of a rail link across the Shatt el Arab, giving direct access to the Iranian Railway system.

Roads.—There are only about 500 miles of good roads in the whole region, and most of these occur in the immediate vicinity of large towns, or in the mountainous parts, where stone is available. In the plains, road metal is absent, but a surface capable of bearing light traffic is made by levelling large quantities of moist alluvium and allowing it to dry. In the wet season, these tracks degenerate into mud, especially near the rivers, where inundation occurs, and so road communications in many parts of lower Iraq are poor or non-existent. This explains the importance of river traffic, even though, as we have seen, the rivers are not conspicuously favourable to navigation.

In the north, conditions are better. The hardness and flatness of the surface allows light traffic, and motors can be driven at surprisingly high speeds over many parts of the steppe. Routes are indicated by beacons, and there is no attempt to use a single track—in fact, tracks are often rutted, and it is better to drive on the empty land on either side. Both rivers are followed by roads starting from Basra. The Tigris road is bitumenised for the first 4 miles, and again at Baghdad, and again at Mosul. The Euphrates road makes a wide detour to the south of the Hammar lake, then continues through Abu Kemal to Deir ez Zor and Aleppo. Both roads are impassable for a period of weeks during the rainy season. A third road—better termed a track, since none of it is maintained—crosses the desert, and is used by a motor service from Damascus to Baghdad.

Population.—It is estimated that the population of the Tigris-Euphrates lowlands numbers about 4½ million, of which almost 4 million live in the state of Iraq. Distribution is extremely unequal, with large numbers crowded into a few—but not all—of the riverine areas, and most of the steppe inhabited only by nomads. An important exception to this occurs in the north-east, where, because of higher rainfall, the population is much more evenly scattered over the entire lowlands, and concentration near rivers is much less a feature. In broad aspect, two fairly extensive regions of relatively dense population can be discerned : (a) the riverine district centred on Baghdad, and bounded roughly by the towns of Ramadi, Diwaniya, Kut, and Samarra. Here the extent of cultivable land is large, extending to considerable distances away from the actual river channels. Farther south, the alluvial stretches are increasingly interspersed with arid ridges that carry only a sparse population, (b) The wetter zone of the north which may be said to include the provinces of Erbil, Kirkuk, and Suleimanieh together with the northern half of the province of Mosul.

It is customary to regard the Tigris-Euphrates lowlands as closely similar in physiography to Egypt, and, therefore, it has come to be thought that the population situation in both countries must be again somewhat similar. This is far from being the case. In the first place, there is little correspondence in physical features or in river regime; and whereas the cultivable parts of the Nile valley are sharply limited to the floor of the valley, which for most of its length is no more than 6 miles wide, we have seen that potentially cultivable land extends for many miles on both sides of the Tigris and Euphrates. The feature of close concentration of population on actual river banks that is so marked in Egypt, is much less a feature in Iraq; and the only instances are regions where the rivers are deeply entrenched, e.g. on the Euphrates above Hit, and on the Tigris near Samarra. Moreover, the enormous densities in Egypt, amounting to 1,500 or 6,000 persons per square mile, are not found in Iraq, where, a few urban centres excepted, the highest density is 825 persons per square mile. In the light of this, one may recall the statement in an earlier chapter, that much of the Tigris-Euphrates region is under-populated, and in need of increased manpower to develop natural resources.

We may next consider the urban population of the region. Generally speaking, the importance of towns is small, and in comparison with the rest of the Middle East, urban life is not strongly developed.

Only three cities, Baghdad, Mosul, and Basra, have a total population exceeding 100,000. *Baghdad* (population 1943, 300,000) lies on the Tigris at the head of navigation of the river, and in the 'waist' of the lowlands, where the Tigris and Euphrates approach closely to each other, and hence give the best possibility of constructing irrigation canals. This narrow inter-riverine zone also provides a convenient crossing-place, since the marshland is reduced in extent and the firmer platform of steppeland provides a useful east-west route between the Mediterranean and Iran. The region of Baghdad thus has an important nodal position at the junction of routes from east and west across the desert, and from north, north-east, and south along the river valleys. It should be noted that all the factors mentioned above apply to a region and not to an actual site.

It is easy to see why a town should have grown up within the district of Baghdad, but the extra smaller scale features that usually fix the site of a town in one particular spot are less in evidence. Local changes in topography due to the shifting of drainage channels have led to the growth of three separate cities at various periods, and so within the Baghdad region there has arisen first Babylon, the ancient capital that lay closer to the Euphrates, some 60 miles to the south of modern Baghdad. Babylon was in turn succeeded by Ctesiphon, only a few miles from Baghdad, and this city remained the nodal centre until superseded by Baghdad in the early Muhammadan era. Baghdad itself dates only from the 8th century A.D., and a 'golden age' occurred when its Abbasid rulers supplanted the Omeyyads of Damascus and made it the capital of the Moslem world. Baghdad suffered greatly from Mongol invasion, and most of the older buildings have disappeared. The modern city is sprawling and undistinguished—in fact, an extreme disappointment to visitors who may wish to evoke the 'Arabian Nights'. Many of the poorer houses are of mud, and flooding is a frequent feature (Fig. 65).

Baghdad is the commercial centre of the region, with numerous, but small workshops and distributing houses. Industry is, as we have seen, mainly confined to bazaar crafts—textiles, metals, food-stuffs—and to the production of pottery and building materials. Trade is for the most part in the hands of Europeans, Jews, and Armenians, with Iraqi Christians as clerks and supervisors. An upper class—mainly Sunni Moslems—carries on the administration of the country; and a third element in the life of the city is a large group of absentee landlords.

Mosul, like Baghdad, dates only from the early Muhammadan era, though on the opposite bank of the river Tigris the ruins of Nineveh go back to the second millennium B.C. Like many other sites in the

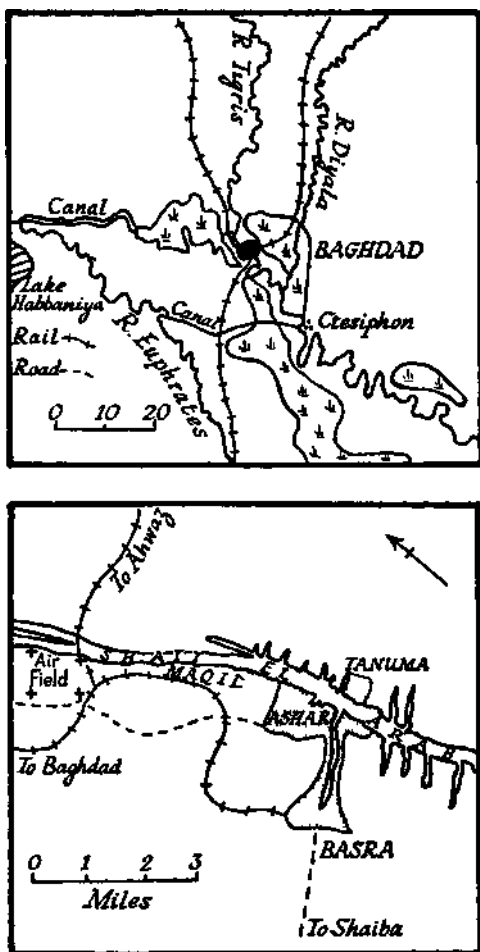


FIG. 65. The sites of Baghdad and Basra.

Middle East, the fallen clay walls of the ancient city form an enormous *tell* or mound. Here, again, is an example of regional factors outweighing local influences in determining the growth of a city. The importance of the city arises from its position in the centre of the upper basin of the Tigris, at the junction of four contrasting geographical

regions for which it acts as commercial outlet and exchange centre. These regions are :

(a) The plains of northern Assyria, where there is a dense agricultural population.

(b) The hills of Kurdistan, occupied by shepherds practising transhumance.

(c) The steppes of the Jezireh, where there is a mixed population of true nomads rearing sheep, cattle and draught animals ; and sedentary farmers.

(d) The uplands of the Jebel Sinjar, where pastoralism and agriculture are carried on by the Yezidi.

As a result, there is extreme heterogeneity of peoples within the city. Arabs are in the majority, with smaller groups of Kurds, Christians, Jews, and Yezidi, most of whom speak their own languages. An important mediaeval textile industry (note the word *muslin*) has now disappeared, though coarser textiles using wool as a raw material are still produced in the bazaars, and a recent feature has been the introduction of artificial silk weaving. Mosul is also important for leather working—a reflexion of its position on the edge of the steppe. Manufacturing is, however, less important than trade : grain, timber, hides, and manufactured goods are exchanged, and there are long distance communications with Baghdad and south-east Turkey. Much of the produce from Turkey comes by kelek (page 364).

Basra is an agglomeration of small sites grouped along the western bank of the Shatt el Arab some 70 miles upstream from the Persian Gulf. *Basra* proper is situated on a small creek 2 miles distant from the Shatt el Arab, and the principal port is at Ashar, on the main river. Modern docks have also been constructed at Maqil, 4 miles upstream from Ashar, and since 1939, further development has taken place at Tanuma on the eastern bank of the Shatt el Arab, opposite Ashar. Because of the recession of the head of the Persian Gulf, the growth of the port is relatively recent, and dredging on a considerable scale is necessary to prevent silting of the channel. *Basra* handles the greater proportion of the foreign trade of Iraq, and is the centre of the date-growing region, being itself surrounded by date-groves. Dates form the chief item in its export trade. Second in importance amongst exports is grain, with wool, liquorice root, and hides as subsidiaries. Imports consist chiefly of manufactured goods (cement, cotton and woollen textiles, machinery), tea, and sugar. *Basra* can be reached by large ocean going ships, but about 10 per cent, of its commerce is still carried on in small native craft.

THE FOREIGN TRADE OF IRAQ

(Year 1946-47)

Total Value of Trade in £ Sterling : £67 million

Amount per head of population : £14

<i>Imports</i>	<i>Percentage of Total</i>	<i>Exports</i>	<i>Percentage of Total</i>
Cotton Goods	14	Crude Oil	48
Iron & Steel	11	Barley	23
Vehicles	10	Dates	18
Total imports, £40 million		Total exports, £27 million	
Suppliers :		Buyers :	
(1) United Kingdom		(1) United Kingdom	
(2) India		(2) India	
(3) U.S.A.		(3) U.S.A.	

CHAPTER XVI

THE COASTLANDS OF THE LEVANT

THE region lying between the Mediterranean Sea and the deserts of Syria and Arabia, sometimes spoken of—particularly by the French—as the Levant, has a strong geographical unity. Structurally, it is a zone of junction, where sediments laid down into the Tethys are folded on to the buckled and broken edge of the Arabian platform; climatically, there is a striking 'Mediterranean' rhythm of abundant winter rainfall and absolute summer drought; one can observe a special economy based on intensive 'garden' cultivation, with commerce and craft industries as important adjuncts; and finally, in the sphere of human relations, the concept of a boundary zone occurs once more, since the Levant has in a unique way acted throughout historic time as an intermediary between east and west. This fundamental unity both from the physical and human standpoints, has to a certain extent been obscured by political developments since 1919; but it will be recalled that for centuries before the Versailles settlement the name * Syria ' was held to apply to the whole of the coastal region between Asia Minor and the Sinai desert—and, moreover, as an indication of the essential unity of the Levant we may recall that only when the region was organised as a single unit did periods of greatest advance and prosperity occur. There is hence abundant justification for discussing the Levant as a single grouping, with boundaries that transcend existing political divisions, which at the time of writing are showing themselves to be fluid and liable to alteration.

Structural Features.—As has been stated, the main feature is the junction of ancient and recent rocks. In the east and south, younger sediments lie thinly, sometimes discontinuously, upon the mass of the Archaean basement, which is exposed in a few places; but towards the north and west, the basement rocks can no longer be traced, and the sedimentary rocks are thicker and more varied. Thus in Palestine and Transjordan, Archaean strata lie close to the surface, providing a core to the hills of Judaea and western Transjordan; but in northern Syria, the oldest series occurring is of Jurassic age. From this a number of significant features arise: in the south, rock types are fewer, and, because of the rigidity of the underlying mass, less disturbed, whilst

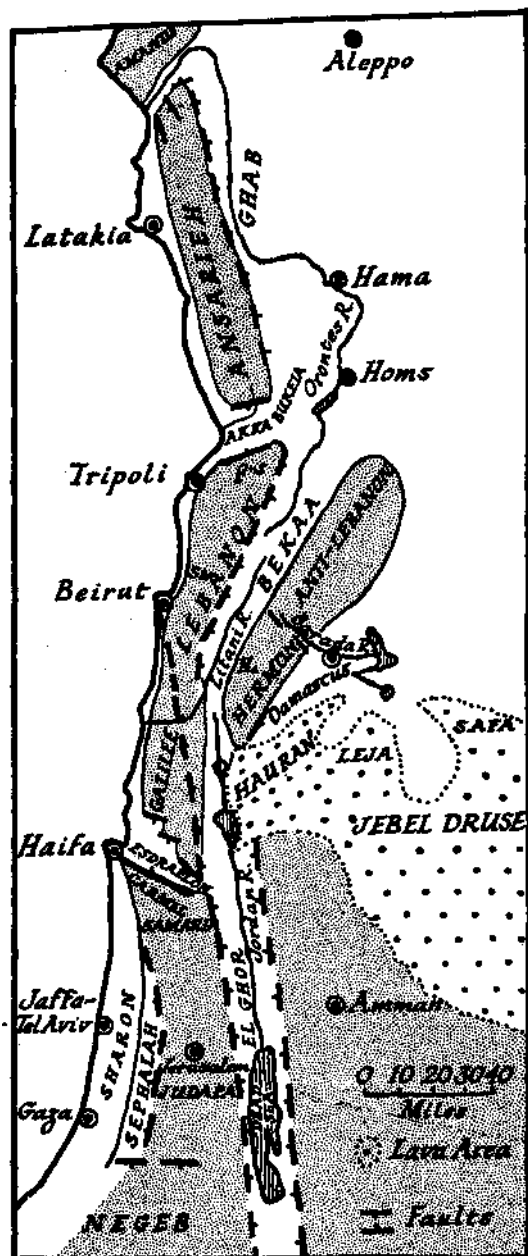


FIG. 66. The Geographical Sub-regions of the Levant.

in the north, strata are more varied, and folding is a conspicuous feature.

Fracturing along a generally north-south direction, with minor cross faults at intervals, has given rise to a series of detached upland masses separated from each other by small lowland areas arranged in a roughly rectangular pattern. We can thus recognise a considerable number of separate sub-regions, each somewhat distinct from its neighbours; and writers on the geography of the region have suggested various schemes of division, ranging from a simple outline of coastal plain, mountain ranges, and interior lowlands, to a more elaborate classification recognising some forty separate sub-regions within Palestine alone. In the present instance it would seem preferable to pursue a

middle course, and Fig. 66 attempts to delimit the geographical sub-regions in a manner sufficiently detailed to indicate the real complexity and variety of the whole area, and yet to preserve a measure of simplicity.

I. GEOGRAPHICAL SUB-REGIONS

Beginning in the north-west, we may first discuss the Jebel Ansarieh, which consists of a broad, gently folded anticline, with Jurassic limestone rock as the core, and later series (chiefly limestone and sandstone) on the flanks. The average height of the Ansarieh crest is just over 4,000 feet, and the highest peak, Nebi Yuness, reaches 5,200 feet. In the north, where the range is folded against the Amanus, fracturing has taken place, so that the anticlinal structure is somewhat broken up, and fault-valleys alternate with irregular horsts of higher ground. The most important fault structure is the Ghab, a lowland rift 50 miles long by 10 miles wide, that is now occupied by the middle Orontes river. The valley floor lies 3,000 feet below the summits of the Jebel Ansarieh, with a steep, almost precipitous western boundary. In winter, the floor is covered by flood waters from the Orontes, and in summer, by a malarial swamp.

On the western (Mediterranean) side of the Ansarieh range, oscillation of sea-level has given rise to a number of broad wave-cut terraces covered by marine deposits that tend to be less porous than the limestone substratum. Thus these western slopes of the Ansarieh offer greater possibilities of cultivation, and are the most densely peopled part of the region. Elsewhere, extreme permeability of the limestone reduces surface water to a minimum, and although annual rainfall exceeds 30 inches, many parts are karstic, with vegetation restricted to a stunted garrigue. Only in the extreme north (Slenfeh district) are trees at all numerous; and much of the south and east is thinly populated.

East of the Ghab, the land rises gradually to form an irregular plateau, of which the highest parts are the Jebel Zaouieh between Idlib and Hama, and the heights just east of Hama, where there is a maximum elevation of 1,500 to 2,000 feet. Much of this plateau is open, fertile, and easily cultivable, giving the impression of a plain rather than an upland; but, because of its altitude, streams are entrenched in narrow, steep-sided valleys, and the raising of irrigation water to the fields is a matter of difficulty.

Adjacent to the Ansarieh range in the south is the lowland corridor sometimes spoken of as the Tripoli-Horns gap, and sometimes as two separate districts, the Plain of Akkar (Tripoli region) and the Bukeia (Horns region). The gap is occupied by a small river, the Nahr el Kebir, which has laid down rich alluvium derived from the varied sedimentary rocks and numerous basalt intrusions of the district. As a result, parts of the gap are closely settled by a farming population, but the full agricultural potentialities are not developed, because of the prevalence of malaria, which is especially prevalent in the north of the plain of Akkar.

The Lebanon Range.—This is the highest of the mountain massifs of the Levant. The culminating peak, Qornet es Sauda (lying east-south-east of Tripoli) is just over 10,000 feet, whilst Mount Sannin (east-north-east of Beirut) is only a thousand feet lower. The entire range consists of a single up-fold, open in the north, more arched and constricted in the south, and intersected by numerous faults, along some of which there have been intrusions by basalt. A feature of great importance, peculiar to the Lebanon, is the occurrence of a complex of impermeable rocks of Cretaceous age, consisting of sandstone, marl, and lignite. These rocks are exposed only on the western slopes of the range, where they overlie massive Jurassic limestone. Above the impermeable Cretaceous strata comes a cap-rock of porous Cretaceous limestone that forms the highest parts of the mountains. At the line of junction of the two differing series there occur many springs of water, where rainfall that has been absorbed in the porous rocks is forced to the surface. The occurrence of these springs at the unusual altitude of 3,000 to 5,000 feet above sea level is one of the curiosities of the Middle East, and as many of the springs are large—sometimes rivers rather than streams—extensive districts can be irrigated from them (Fig. 67).

Because of the occurrence of abundant water supplies, and a varied, fertile soil derived from different rock outcrops, the middle slopes of the Lebanon Range are intensely cultivated, and provide much of the wealth of the Lebanese state. Another interesting feature of human occupation related to the occurrence of these impermeable beds has been the refuge offered to persecuted religious minorities. The soft underlying Jurassic series has weathered into deep ravines, with forbidding cliffs often several thousand feet in height—a considerable obstacle to penetration inland from the coastal plain. At higher levels, where the more resistant Mesozoic strata are reached, erosion

has been less active, and there is a piedmont zone that is at once more fertile, and less difficult topographically. Here refugees have been able to settle in comparative safety, and gain a living by agriculture.

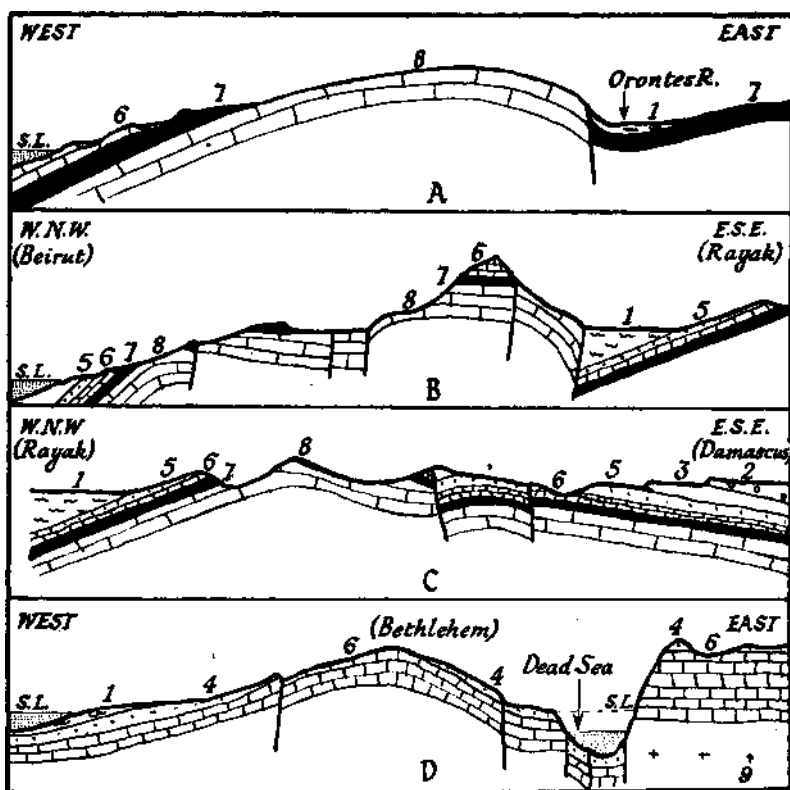


FIG. 67. Sections, Ansarich, Lebanon, Anti-Lebanon, and Judacan Ranges. A—Jebel Ansarieh; B—Lebanon; C—Anti-Lebanon; D—Judacan hills. Key to Geological Strata: 1. Recent Alluvium; 2. Miocene and later; 3. Eocene (permeable); 4. Upper Cretaceous (calcareous marl); 5. Upper Cretaceous (impermeable); 6. Upper Cretaceous (permeable); 7. Middle and Lower Cretaceous (impermeable); 8. Jurassic (permeable); 9. Pre-Cambrian base-rocks. Contrast conditions in Judaea and the Lebanon.

At the present time, the region is occupied by small tourist centres, and by monasteries and schools, which are especially numerous in the Lebanon.

As in the Jebel Ansarieh, the eastern limit of the Lebanon massif is marked by a great fault-line, with a downthrow to the east of 3,000 to 5,000 feet. This is a single fault rather than a true rift, though superficially at least the presence of the valley of the Bekaa, lying

between the Lebanon and Anti-Lebanon Ranges, suggests that the Jordan trough is continued northwards. This is not entirely the case : the Bekaa fault is distinct from the two Jordan faults, the westernmost of which can be traced north from the Sea of Galilee as far as Beirut, where it would seem to have played some part in the formation of the headland and bay on which the city stands. The Bekaa fault has a different trend, and is quite separate from the Jordan system.¹

Much of the Bekaa valley has been filled by recent (Quaternary) sedimentation, and there is a gently sloping floor that rises very gradually towards the centre, where Baalbek, its highest point, lies on the watershed between the Orontes and Litani rivers, at an altitude of over 3,000 feet. To east and west, mountain walls that rise some 5,000 to 7,000 feet higher still, and are covered in snow for a substantial part of the year, provide a remarkable panorama; and it is easy to see why Baalbek should have been chosen as the site of one of the largest temples of the Roman Empire.

Though the Bekaa floor is generally fertile (except in the extreme north, towards Horns, where the soil is stony and porous, and where a large part of the rainfall is absorbed by underlying limestone rocks), settlement is sparse. Considerable development might, however, be achieved by the creation of an irrigation system.

The Anti-Lebanon.—To the east of the Bekaa rises a steeply inclined but much less faulted anticline that comprises the Anti-Lebanon Range. In contrast to conditions further west, tectonic disturbance has been on a reduced scale, and the up-fold is almost undisturbed, with the youngest (i.e. uppermost) rock series exposed over most of the range. This overlying series is once again limestone, and hence the springs characteristic of the Lebanon hills are only rarely found in the Anti-Lebanon. Only one village—Aarsal—possesses a good water supply, and the greater part of the range consists of vast karstic uplands, uninhabited or given over to nomadic shepherds, except in the very few places where springs occur. The rainfall of the Anti-Lebanon is almost entirely absorbed into the ground, but water re-appears along the eastern base of the range, in a number of small streams that drain eastwards into the Syrian desert, and ultimately

¹ This is indicated by the existence of a broken mass of high ground at the head of the Jordan trough, north of Lake Huleh. The high ground was for long a barrier to communications, and a through road from the Bekaa to the Jordan was not opened until 1943. Further evidence is furnished by seismological records made at Ksara, in the Bekaa, from which it would seem that earth movements along the Jordan faults are not directly transmitted to the Bekaa region.

terminate in salt basins. Of this kind are the Maraba, Awaj, and Barada (Abana) rivers.

The Hermon Range (Jebel esh Sheikh) is a continuation of the Anti-Lebanon, but there are slight differences of structure (e.g. a slightly greater degree of folding in the Hermon uplands); and a cross-fault enlarged by water action into a narrow defile, and occupied by the Barada river, separates the two massifs. Mount Hermon reaches 9,200 feet, 2000 feet more than the highest peak of the Anti-Lebanon, and like its northern neighbour, is composed chiefly of limestone. All but the lowest slopes are uninhabited, save by wild bears and hyenas.

The Anti-Lebanon system may be taken as a prototype of most of the other fold ranges of central Syria, which consist essentially of a simple anticlinal structure, trending from south-west to north-east, and dying out towards the Euphrates. Such are the Jebel Kalamun, north of Damascus, the Jebel esh Sharki, die Jebel et Tar, and Jebel Bishri of Palmyra. The upper slopes of these ranges are bare of soil and vegetation, the lower slopes carry grass for a few weeks each year, and nomadism is the predominant way of life. Permanent settlement is limited to a few oases such as Nebek, Qariatein, and Palmyra, where springs occur in association with faults.

The Hauran, Jebel Druse, and Leja.—South of Damascus, topography is dominated by, lava flows formed by very recent upwelling in the fractured edge of the Arabian platform. It has been noted that small scale intrusions are common in north and west Syria (the largest being in the neighbourhood of Horns, where the marshy course of the Orontes is the last stage in the drainage of a lake impounded by a basalt sill), but in south-west Syria and northern Transjordan much wider areas are entirely buried under igneous material. The whole region as far as central Transjordan forms an irregular plateau, lying at an altitude of 1,000 to 2,000 feet. In the west, towards the Jordan valley, the landscape is open and rolling, with level stretches and broad valleys interspersed with occasional basaltic ridges or volcanic cones, some of which reach 3,000 feet in height. This open region, termed the Hauran, can, with a good water supply, be extremely productive, since the soil, being derived from lava, is very fertile. In Roman times the Hauran was one of the main granaries of the Empire, but at the present, cultivation is on a very much smaller scale.

Further east, the plateau becomes higher and more rugged. Vast numbers of boulders scattered over the surface become an increasing

obstacle to cultivation, and the highest part of the plateau is reached in the Jebel Druse, an irregular dome of basalt, capped by low volcanic cones, the largest of which, Tel Guineh, is just under 5,000 feet above sea-level. Adjacent to the Jebel Druse on the north-west and north-east lie two barren and desolate expanses of lava, El Leja and Es Safa. El Leja is probably the more forbidding of the two : here the lava crust has hardened quickly, and then been cracked and broken up by later upwelling from below, giving the impression of rough chaotic vaulting. The lava flows are too recent for much soil to have formed; hence there are few inhabitants apart from a number of outlaws and bandits who live in the caves formed in the lava-sheet.¹

The Uplands of Galilee and Judaea.—Towards the south, the Lebanon Range becomes less imposing, and ultimately passes without break into the plateau of Galilee, the average height of which is 1,000 to 2,000 feet, although several minor peaks top 3,000 feet. The precipitous cliffs, deep ravines, and rocky slopes of the Lebanon proper are replaced by low rounded hills, smooth outlines and grass-covered uplands, reminiscent in a few places of parts of the English Pennines. The whole upland system, which may be termed the Lebano-Galilean massif, comes to a somewhat abrupt end at the Plain of Esdraelon, which is a tectonic trough formed by subsidence along west-north-west-east-south-east running fault-lines. The northern fault-line is irregular, and consists of a number of steps, with a detached part of the Galilean massif, Mount Tabor, interrupting the continuity of the plain on the south-east. The southern edge, formed by the ridge of Mount Carmel, is much more clearly defined, with a steep rise along a single fault-line.

Because of the irregular nature of its northern boundary, the Plain of Esdraelon varies in width; where it reaches the sea, at Acre, there is a wide bay some 20 miles across; but further inland the plain shrinks to a mere corridor only 1 or 2 miles wide, ultimately widening once again towards the Jordan to an expanse of 5 to 10 miles. The floor of the plain is flat, and formed of a rich, deep black soil weathered from the limestone and basalt dykes of the Galilee plateau. A small river, the Kishon, drains the western part of the plain, reaching the Mediterranean just north of Haifa. Like the Plain of Akkar, much of this lowland is malarial.

South of the Plain of Esdraelon lies the upland block of Judaea,

¹ Even in the days of the French Mandate, travellers or government officials found it advisable to take with them an armed guard when visiting these districts.

which may be subdivided into three component areas : Samaria, the Judaeen plateau, and the Sephalah. Samaria is a deeply dissected upland region, slightly lower in average altitude than Galilee, and with only one peak of 3,000 feet. The Carmel ridge, which forms part of Samaria, appears imposing, since it rises from a low coastal plain, but its maximum height is only 1,800 feet. Active weathering has hollowed out many valleys, some of which are narrow and gorge-like, others broad and fertile, and in the latter cultivation is usually possible. As compared, however, with Galilee, Samaria is definitely less favoured in natural resources. Limestone and chalky marl are practically the only rock types exposed, and basalt dykes are fewer, so that the soil is poorer, and springs far less numerous. Settlement is largely confined to the bigger valleys, with the uplands given over to pastoralism.

Samaria merges gradually into the plateau proper of Judaea, which can be said to commence south of Nablus (i.e. about the latitude of Tel Aviv). Much of Judaea lies between 1,500 and 3,000 feet above sea level, and, because of diminished rainfall, erosion has been far less active, so that the deep valleys and irregular topography of Samaria are much less a feature. Judaea remains an unbroken upland plateau, with few diversifying elements. The general impression is one of a karst country : limestone and chalky marl are still the predominant rock series, and these outcrop frequently at the surface without any soil cover. Wide expanses of bare rock, numerous scattered boulders and scree, and occasional small valleys etched in the hill slopes, often dry and waterless, with caves and underground drainage, are characteristic of the Judaeen landscape. Vegetation is rarely more than patches of scrub and thorns. In regions where marl predominates, a different, but equally inhospitable type of scenery is found—a series of greyish white or yellow hillocks, unrelieved by touches of green or brown vegetation. This is the Wilderness of Judaea, a bare, dusty, and repelling region. Cultivation in Judaea is limited to occasional patches of alluvium occurring in the deeper valleys where water is obtainable; and only five settlements of importance are found in this region : Jerusalem, Bethlehem (4 miles away), Ramallah, Hebron, and Beersheba.

South of Hebron there is yet another east-west running fault, which serves to differentiate the main Judaeen plateau from the Negeb, an irregular upland region only slightly lower than Judaea, and which from the structural aspect is closer to the Arabian foreland than any

region of the Levant yet considered. The covering of sedimentary rocks is generally thin, and often absent towards the east and south, where Archaean basement rocks are exposed. For the greater part, the Negeb consists of a tableland lying between 1,000 and 2,000 feet above sea level; but occasional wrinkling of the sedimentary cover in the centre and east has given rise to scattered fold ranges some diousand feet higher than the surrounding plateau. Wide areas of the northern and central Negeb are buried under a deep mantle of potentially fertile loess, and of late much interest has centred in schemes of development sponsored chiefly by Zionist organisations. The limiting factor is, however, water supplies, and as practically no rainfall occurs, artesian wells or large-scale irrigation canals to bring water from the north, will be an essential to development. So far, little has been done in the way of irrigation, and with the exception of a small group of cultivators settled since 1900 at the oasis of Beersheba, almost all of the population of the Negeb is nomadic. *

The Sephalah is really an intermediate zone between the uplands of Samaria and Judaea and the Mediterranean coastal plain, and its origin is due to faulting, which has produced a series of downthrow basins or terraces on the western slopes of the Judaeian hills. Towards the Mediterranean there is an upland ridge 700 to 1,000 feet above sea-level that serves to divide off the Sephalah from the coastal plain. The chief rock series exposed is the same chalky marl as was described in the section on the Judaeian Wilderness, but because of the wetter climate of the Sephalah, there has been considerably more erosion, with the formation of gently sloping hills and broad shallow valleys, covered by a moderately deep layer of rich soil. Hence the Sephalah, though an upland region, lends itself to cultivation, and in contrast to the higher plateaus of which it is an outlier, carries a dense population.

Coastal Plain of the Mediterranean.—This is narrow and discontinuous in the north, but increasingly wide and extensive towards the south. In north-west Syria, fronting the Jebel Ansarieh, the plain consists merely of a series of enclaves interrupted at frequent intervals by mountain spurs that reach the sea. Something of the same aspect persists in the Lebanon, where the coastal plain, at its maximum near Beirut, is only 4 miles wide. At such places as Shekkah and Ras en Nakura, foothills again rise directly out of the sea. Road and railway must tunnel through the spurs, or cling precariously to ledges cut in the cliff-face.

At Haifa a terrace only 200 yards wide between the sea and Mount Carmel is sufficient to carry the road and railway southwards; but a short distance to the south the plain then widens to 10 to 15 miles in extent, and is here known as the Plain of Sharon. Further south still the coastal lowlands are even more extensive, with a width of 20 miles. This section, with Gaza as its centre, is the ancient region of Philistia.

The Plain of Sharon is formed of alluvium brought down from the hills of Samaria and Judea—hence, where water is available, the land is extremely fertile. Close to the coast, sand dunes occur and these sometimes block the lower courses of streams that cross the plain, giving rise to swamps and marshland at a short distance inland from the sea. The varied nature of the soils allows specialist cultivation: citrus fruit on the sandy soils close to the coast, other fruit trees and vegetables on the heavier, damper alluvium further inland, then, as the ground rises towards the Sephalah, and soils are drier, cereals and fodder crops, with olives and nut-trees (almond, etc.) on the ridges that define the western limit of the Sephalah. In the region of Gaza, dunes become increasingly prominent, and the coastal lowlands of the extreme south are far less productive than the Plain of Sharon, because of the prevalence of blown sand. A slow battle, which man cannot as yet be said to be winning, has for centuries been waged against encroaching dunes in the south of Palestine.

The Jordan Trough.—From the 1,000 feet contour (just north of the Palestine-Lebanon frontier), which may be taken as the effective northern limit of the trough, the Jordan Rift extends for 250 miles to the head of the Gulf of Akaba. The floor of the depression is not uniform, and the lowest part occurs in the region of the northern Dead Sea, where the lake bottom is 2,598 feet below sea level. Southwards of this point the floor rises, and reaches sea level some 80 miles to the south of the Dead Sea. The name El Ghor is sometimes applied to the whole depression, but the term is more usually held to apply only to the part from Lake Tiberias to the Dead Sea—a region lying entirely below sea-level. The rift varies in width from 2 to 15 miles, and almost throughout its entire length it is bounded by the steep-sided, faulted edges of the Arabian platform to the east, and the massifs of Galilee, Samaria, and Judaea to the west. As the Judaeian and Transjordanian plateaus rise some 3,000 feet above sea level, there is a precipitous descent to the Jordan floor, which lies 1,300 feet below sea level at the Dead Sea shore. A number of small streams plunge down

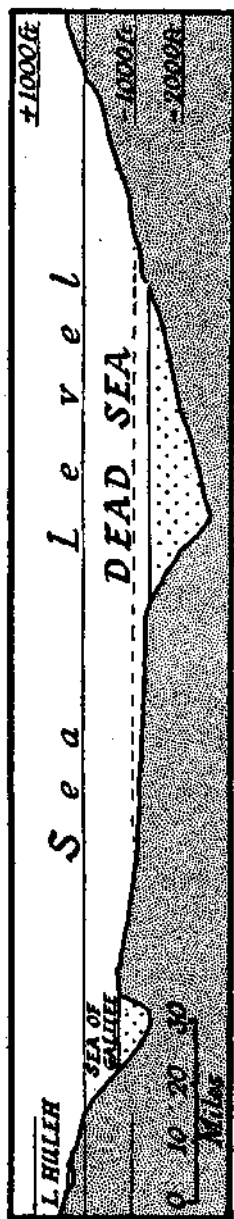


FIG. 68. Profile of the Jordan Depression.

the valley sides, and have carved deep notches in the plateau-edge, a few of which are used by roads. In many places, however, the descent is too steep, and direct communication, even by track, is impossible.

In the north, basalt flows across the valley at two points have resulted in the formation of lakes. The smaller and northernmost is Lake Huleh, extremely shallow, and overgrown by dense papyrus swamps that are a breeding ground for mosquitoes.¹ Further south, a second barrier is responsible for the existence of Lake Tiberias. This lake is 13 miles long, and 5 to 8 miles wide, with the surface of the water 686 feet below sea-level, and deepest part 700 feet lower still. The waters of the Jordan emerge through a narrow channel cut in the basalt dam, and are used for the generation of electricity. Below Tiberias, the Jordan meanders extensively across the floor of the Ghor, in which it has incised its bed some 150 feet, giving rise to shallow bluffs. A dense jungle of willow trees, tamarisk, and aquatic plants covers the banks of the river, which after winter floods carry an unpleasant mass of rank, decaying vegetation. Lower still in its course, the river becomes strongly saline, and intense evaporation leads to the formation of slimy colloidal compounds near the river, and to extensive multi-coloured mineral deposits at some distance away, giving the impression of a chemical slag-heap in an industrial area. The whole of the lower Jordan, whether jungle or saline 'badlands' is extremely uninviting. Tracks are difficult to construct because of the rapidly shifting meanders, sticky slimy soil, or dense vegetation, and few settlements exist. The shore of the Dead Sea itself consists of salt marsh interspersed with areas of salt-encrusted steppe.

Some villages near Lake Huleh have a malarial incidence of 98 per cent.

The fault-lines of the Levant are of such recent origin (Oligocene) that adjustment along them has not completely ceased. From time to time minor displacements occur, giving small-scale earth tremors. These are not on a scale comparable with the earthquakes of the great east-west tectonic zone of northern Asia Minor, though the effects are seen, for example, in the minor earthquake of 1929, which destroyed buildings in Jerusalem, in the shock of 1758 which wrecked the pagan temple at Baalbek, and in the cracking of the floor of the Cave of the Nativity at Bethlehem.^x

II. DRAINAGE

Little need be added to the survey given in Chapter II. The largest river in the Levant is the Orontes, which rises in the northern Bekaa, and is fed by springs from both the Lebanon and Anti-Lebanon Ranges. Over much of its course, the Orontes is shallow and marshy, being ponded back by basalt dykes; but in northern Syria it has cut deep meanders in the soft rocks, and lies well below the level of the surrounding plains. A special type of irrigation machine has been evolved to lift the river water to the level of the plain. This is the *noria*, a large wooden wheel some 20 to 70 feet in diameter, with paddles and buckets round the circumference. The wheel is turned by the force of the current only, like a water mill² and thus, unlike most irrigation machines, requires no motive power.

Close to the headstreams of the Orontes is the source of the Litani river (classical Leontes), which flows southwards through the Bekaa towards the upper Jordan valley. A downward warping on the coast of the Lebanon strengthened a short consequent torrent flowing to the Mediterranean, and this torrent was able to cut back through the main Lebanon ranges, finally capturing the lower waters of the Litani, which now make a sharp bend westwards and plunge through the mountains in a deep gorge. Because of this, the river cannot be used for irrigation, and its valley does not even furnish an easy route to the interior.

¹ Also, in certain of the events at the time of the Crucifixion ('And the veil of the temple was rent in twain, and the earth did quake, and the rocks rent, and the graves were opened' Matt. 27, h.)

² Many *norias* are of considerable age, and show great skill in their construction. As they turn on wooden axles, the noise of a *noria* in operation can be almost deafening.

A number of streams feed the upper and middle Jordan. Most of these rise in Transjordan, where rainfall is appreciably heavier than on the eastern side of the Judæan plateau. Torrents in winter, and trickles in summer, these tributaries he for the most part in narrow gorges, with frequent cascades and rapids. Two somewhat larger streams, the Yarmuk and the Zerka, have cut large valleys, the former being used by the railway from Haifa to Damascus via Deraa, the latter by the main road from Jerusalem to Amman. The waters of the Yarmuk are also developed for hydro-electric power.

The remaining rivers of the Levant consist either of streams that drain into closed, salt basins, or of small consequent torrents flowing directly from the coastal ranges to the sea. Towards the south, these short streams cease to be perennial, and the Yarkon (Auja) which enters the Mediterranean just north of Tel Aviv, is the most southerly of the rivers that flow all the year round.

III. CLIMATE

The outstanding feature in the climate of the Levant is the rapidity with which conditions alter away from the coast. This is due to the presence of well-developed mountain massifs running parallel to the coast-line, which has the effect of restricting maritime influences to a narrow littoral zone. Continental influences hence approach closely to the Mediterranean, and, in addition, because of the height and continuity of the coastal ranges, there is a special * mountain' regime characterised by lower temperature and a higher rainfall.

Besides this well-marked gradation from west to east, climatic differences are also apparent as between north and south. For all seasons of the year, the dominant prevailing wind is from west-south-west : hence in the north, winds are moister than in the south, since they have a long sea ' fetch'. In the south, air is drier, because winds blow from the land mass of north Africa and the Sinai. This is shown by the fact that the extreme north-west of Syria and the Hatay of Turkey have rain all the year round, with a slight, but perceptible fall in July and August. In the Lebanon and Palestine, on the other hand, there is no summer rainfall, and aridity increases southward until, beyond Gaza, true desert conditions are reached.

Coastal Zone.—In this region, winters are mild and summers only moderately hot, and rainfall is relatively abundant. Frost is almost

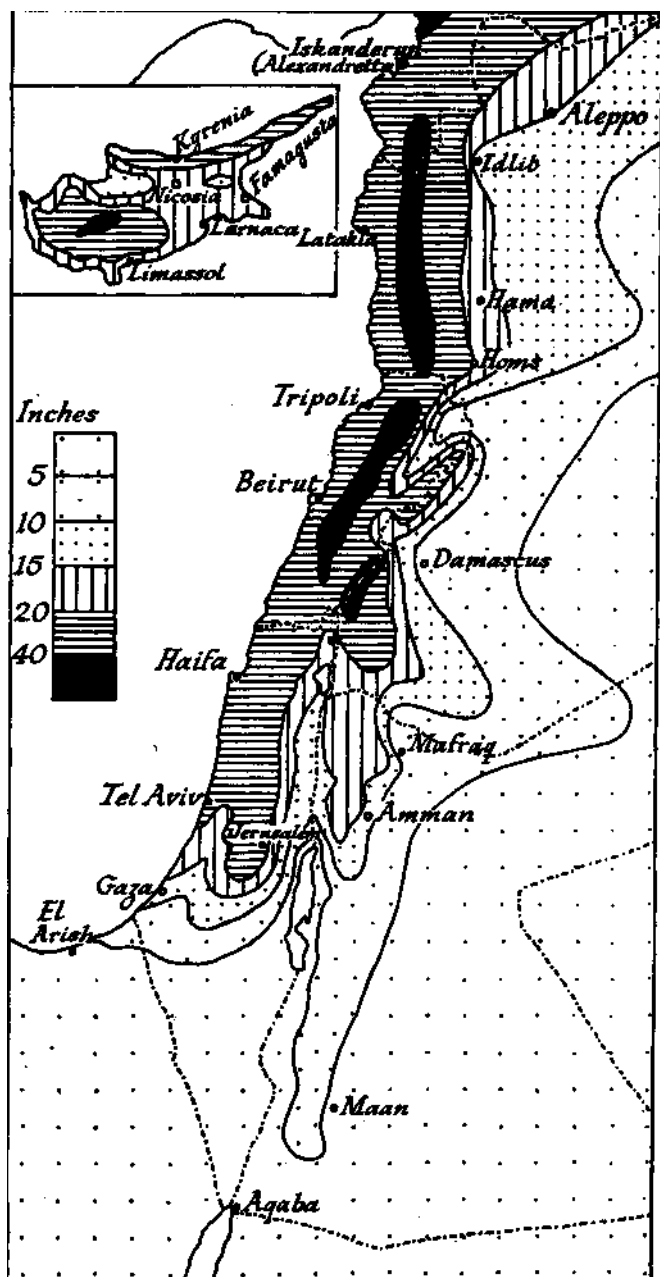


FIG. 69. Rainfall in the Levant.

unknown, though slight falls of snow may occur at long intervals—once in 10 or 20 years being the normal for Haifa and Beirut. The coldest period of the year is late January and February, when temperatures average 54° to 57° F. There is a fairly pronounced diurnal variation of temperature, with bright sunshine on about half the days of winter, giving a daily maximum temperature of 63° to 65° F., and a night minimum of 50° F. (Jan.). In March, a rapid change to warmer conditions begins. A feature of spring—and, indeed, winter—is the occurrence of *shlouq* (khamsin) conditions, shown by figures of absolute temperature : Beirut has recorded a temperature of 79° F. in January, and Gaza one of 84° F.

August is everywhere the hottest month—an indication of maritime influence—and although there is considerable uniformity in conditions over the whole zone, there is the rather curious feature that the north is warmer than the south (August monthly means : Iskanderun 82° F., Beirut 84° F., Tel Aviv 81° F., Gaza 78° F.). This is probably due to the sheltering effect of the mountain ranges, which are higher in the north.

In summer diurnal variation is smaller than in winter, being everywhere less than 15° F., and in many parts less than 10° F. This means that nights are unduly oppressive, though actual temperatures are not particularly high. Summer conditions are prolonged until October, and temperatures do not usually fall much below 70° F. until the latter part of November. December too is usually markedly warmer than January or February, and open-air festivities at Christmas are often possible.

Rainfall is for the most part adequate, though great differences are apparent between north and south. The coast of Syria and the Lebanon receives over 30 inches, and Gaza only 14 inches. January is the wettest month, and, except for the extreme north, rainfall has ceased entirely by the middle of June, so that, until the middle of September, aridity is absolute. The fact that much of the coastal zone receives as much rainfall as many parts of Europe, yet in far fewer rainy days (January, the rainiest month, has only 10 to 14 days of actual rain) indicates that falls are very heavy, but not prolonged.¹ An unpleasant feature is the high humidity prevailing in summer, which, as we have seen, is actually at a maximum in some parts : cf. Iskanderun max. 74 per cent. (July), Beirut max. 73 per cent. (June),

¹ For example, Beirut has an annual rainfall greater than that of Manchester, England, and this falls during 73 rainy days, as compared with 194 in Manchester.

Haifa max. 73 per cent. (June), Gaza max. 77 per cent. (Jan.), and 72 per cent. (July). Dew is as a result extremely heavy, and in the words of C. Combier, 'Roofs in the early morning stream with moisture as though there had been a downpour of rain during the night \ It has been calculated that dew accounts for as much as 25 per cent, of the total precipitation recorded in certain districts.

High summer humidity, together with slight diurnal variation of temperatures, makes the summer season more unpleasant than figures of climate would appear to indicate, and large numbers of town dwellers, particularly in the Lebanon, migrate into the hills for the summer months.

Mountain Zone.—A remarkable change is found, even in 5 miles, as one leaves the coastal plain for the mountains. Winters are cold, and snow is of regular occurrence each winter. In the Lebanon Range, snow may lie for 2 to 4 months, and the three peaks, Qornet es Sauda, Sannin, and Hermon are white for at least half the year.¹ Jerusalem, at 3,000 feet, has short falls in most winters. Climatic statistics are fewer for this upland region, but it would seem that average January temperatures are some 10° to 15° lower in the north than on the adjoining coastal plain, and 8° to 10° lower in the south (El Kareya-Lebanon—41° F., Nazareth 49° F., Jerusalem 47° F.). Summer temperatures are again rather lower (by 10° in the north, and 5° to 10° in the south), but a special feature is wide diurnal variation in summer, so that the daytime is moderately hot, and the night cool. During summer there is thus a most pleasant change at night; and although afternoon temperatures may be very little different from those of the plain, the nights are more restful. This is well shown at Aley, a summer resort only 5 miles from Beirut, but 2,500 feet above sea-level.

TEMPERATURES IN AUGUST

	<i>Beirut</i>	<i>Aley</i>
Mean daily maximum	87	85
Mean daily minimum	73	64

Considerable diurnal variation of temperature during the summer months is one of the underlying factors in the development of summer stations and holiday resorts in the Lebanon.

¹ The name Lebanon is said to be derived from the Aramaic *Leben* (whiteness) in reference to the vista of snow clad peaks seen from December to June.

As would be expected, rainfall, which is of the instability type, is abundant, even heavy. On the Ansarieh and Lebanon mountains, there are annual falls of 40 to 50 inches, though the figure drops to under 30 inches in Galilee, and to 15 to 25 inches in Samaria and Judaea. The number of rainy days, however, remains low, despite increased precipitation, averaging 80 to 85 per annum in Syria and the Lebanon, and 40 to 60 in Palestine; i.e. only 5 to 10 more than in the corresponding coastal areas, so that rainfall can be termed really intense. This has important effects on the soil cover, which, unless held by a retaining wall, can be soon swept away and lost. Hence terracing on a considerable scale is a feature of all parts of the mountain zone; and in certain districts it is possible to observe hillsides terraced continuously at intervals of 3 or 4 feet over 2,000 to 3,000 feet of altitude.

Steppe Zone.—Immediately east of the crest of the coastal ranges, rainfall diminishes sharply in amount, though the season of onset remains the same. This affords striking indication of the control of rainfall by relief, and D. Ashbel has gone so far as to construct a rainfall map of the Levant in which isohyets are directly related to contours. Whether or not one is willing to accept this rather extreme correspondence, there can be no doubt that the relationship is much closer than is usually the case in cool temperate regions.

Under such circumstances, the lowland troughs of the Ghab, Bekaa, and Ghor display a climatic regime markedly different from that of the highlands to the east and west. Though none of the troughs greatly exceeds 10 miles in width—being often much less—we can distinguish a separate regime approximating to steppe conditions. De Martonne has given the name 'Syrian' to this type of climate, which is characterised by moderate or somewhat deficient rainfall, with a fairly cold winter and a hot summer. Ksara, on the floor of the Bekaa, is one example: coldest month (Jan.) 41° F., hottest (Aug.) 81° F.; diurnal variation 17° in winter, 20° in summer, annual rainfall 25 inches.

The great depth of the Jordan Rift, and its openness to the direct rays of the sun, give rise to higher temperatures and to a greatly diminished rainfall (Jericho—coldest month (Jan.) 57° F., hottest (July) 88° F., diurnal variation 18° in winter, 28° in summer, annual rainfall 5 inches). Evaporation from the lakes is high, especially from the Dead Sea, where it attains half an inch daily,¹ and heavy mists are of frequent

¹ Total evaporation from the surface of the Dead Sea during one year has been estimated at 159 inches (Piche method).

occurrence in the lower Jordan and, to a slightly less extent, further north. Dew is, therefore, again an important feature, and at Horns, it is estimated that at least one-quarter of the precipitation recorded is from this source (page 387).

Eastward, there is a heavier rainfall on the uplands of the Anti-Lebanon and north-west Transjordan, but further inland still, a rapid diminution once more occurs, and we arrive again in the steppe regime. Temperatures are more extreme, both in annual and diurnal range (Aleppo : coldest month 42° F., warmest month 88° F.; diurnal range 17° in winter, and 30° in summer), and annual rainfall is less, varying from 10 to 17 inches.

In this steppe zone, no more than a narrow strip between the western mountains and inner deserts of Arabia, lie a large number of towns and villages, in which life continues only by the ingenious utilisation of a limited water-supply. Qanats of up to 10 miles in length, water channels hacked out of abrupt hillsides, and water lifts of many kinds ranging from small hand machines to petrol driven *sakias*, are all methods by which man has adapted to his occupation an increasingly hostile environment. It may also be noted that south of a line joining Gaza, Hebron, Beisan, and Maan, where the Levant lies within the 'rainshadow' of north-east Africa and the Sinai peninsula, conditions pass into true desert, and Arabian influences reach the coast of the Mediterranean, interrupting the north-south alignment of the climatic zones of the Levant.

At Aleppo, frost and snow are common in winter, but summer temperatures regularly exceed 100° F. on most days in July and August. Because, however, of much lower relative humidity in the interior, these higher summer temperatures are much more tolerable than the sultry heat of the littoral, and the traveller finds it difficult to credit that the interior is some 10° to 15° F. warmer than the coast.

CLIMATIC DATA

REPRESENTATIVE STATIONS IN THE LEVANT

(Temperatures (°F.), and Rainfall (inches))

	J	F	M	A	M	J	J	A	S	O	N	D	Total
1. Coast (Beirut)													
Temp.	51	58	61	66	72	78	82	84	81	76	68	61	
Rainfall	7.8	8.3	3.7	2.1	0.6	0.2	0	0	0.4	2.0	5.1	7.7	37.9
Rainy days	15	14	11	6	3	1	0	0	1	4	9	13	77

Climatic Data—contd.

2. Mountain (El Kareya)

	J	F	M	A	M	J	J	A	S	O	N	D	Total
Temp.	41	45	48	56	65	68	71	72	67	63	53	46	
Rainfall	11.1	13*7	7.7	3.7	1.4	0.3	0	0	0.3	2.0	6.5	10.0	56.7
Rainy days	15	12	14	7	5	2	0	0	1	6	10	12	84

3. Steppe (Aleppo)

Temperature	42	45	51	61	70	78	88	89	77	67	51	49	
Rainfall	2.9	3.0	1.3	1.3	0.4	tr	0	0	tr	0.9	1.6	3.1	14.6
Rainy days	1	0	1	0	8	5	2	1	0	0	1	4	54

PERCENTAGE RELATIVE HUMIDITY

	J	F	M	A	M	J	J	A	S	O	N	D
1. Beirut	70	71	71	72	71	70	70	72	68	67	69	69
Haifa	72	71	69	69	70	72	71	68	67	66	69	72
Gaza	77	75	69	65	63	67	72	72	71	70	69	73
2. Ksara	78	75	63	55	49	46	45	46	49	54	65	76
3. Jericho	70	68	56	48	43	44	45	4.5	5^	54	59	66
Aleppo	82	78	70	61	48	42	45	52	60	65	70	80

IV. AGRICULTURE

Because of the varied environment, with rapid topographical and climatic changes, agriculture in the Levant can best be viewed as a mosaic, in which intensively cultivated patches alternate with barren or neglected areas, and where one crop quickly gives place to another, as environmental conditions alter. Over most of the area there is, however, the normal pattern of self subsistence, with wheat and barley as the chief crops, fruit and vegetables as important adjuncts, and occasional specialisation in cash crops. Only in the lowlands of Esdraelon and Sharon is there considerable deviation from this scheme: near the coast, large-scale citrus fruit growing has become the chief activity, and in many Jewish agricultural colonies mixed farming, with emphasis on dairy cattle and the growing of fodder (maize, lucerne), is now a feature.

Wheat predominates, as a winter crop, over the whole region. Native varieties (i.e. emmer) are chiefly grown, but the French introduced softer species of north-western European bread wheats, and other varieties adapted to warm and semi-arid conditions have been introduced mostly by Jewish colonists. Wheat is grown up to an altitude of 5,000 feet, and it is difficult to distinguish any regions of

especially heavy production, since it is a staple in most districts. An interesting feature is, however, that whilst Palestine and Transjordan may be self-sufficient in wheat supplies, this is not the case in Syria and the Lebanon, both of which must import a certain quantity. Considerable extension of wheat-growing is possible in Syria in the region of the Ghab, now unused, and, with irrigation, in the Hauran and on the steppes between Horns and Aleppo. Given such a development, Syria could certainly feed herself.

Barley is the second in importance, and being more tolerant of heat and aridity, is favoured in regions bordering the steppe. In Palestine and Transjordan acreage amounts to 60 to 80 per cent, of the area under wheat; further north, this proportion is much less. Some of the barley is used as an adulterant for bread, some as fodder, and a small quantity is exported for malting purposes. Maize is still grown only on a small scale, at present chiefly by Jewish settlers, in the coastal plain and in the upper Jordan valley. Here maize now takes second place to wheat. Cultivation of the plant in the north is limited to the oasis of Damascus, and the Tripoli-Horns lowland. Another summer crop is sorghum, the cultivation of which has greatly developed in Palestine, but hardly exists in Syria. Oats are grown in a few highland areas where especially cool and damp conditions obtain, but output is very small. Rice is greatly esteemed as a delicacy, but, most is imported, small quantities (under 6,000 tons) being produced on the Plain of Esdraelon and round Damascus.

Vegetables are increasing in importance as communications develop, and a growing urban population stimulates demand. Large market gardening areas have come into existence on the coastal plains, near big inland towns, and also in the middle Orontes region between Horns, Hama, and Idlib. A very wide range of plants is grown, but squashes (gourds), pumpkin, marrows, tomatoes, cucumbers, and aubergines are the chief favourites. The emphasis on 'succulent' vegetables will be noted. Potatoes are also greatly increasing in quantity, but tend to be somewhat restricted, like oats, to higher, damper regions. The Bekaa is a large producer, and the Galilee uplands supply Palestine, whilst increasing amounts are grown in the Ansarieh region. In warmer, drier regions, the sweet potato sometimes replaces the ordinary variety, but the importance of the latter is much less. It may be noted that agricultural statistics, even though fragmentary and incomplete, suggest that vegetable growing is in some parts the principal agricultural activity. Although the extent of land

given over to vegetables is very small, the high yields obtained per acre as compared with cereals make market gardening an increasingly attractive proposition. On a basis of actual production by weight, the yield of vegetables in Palestine exceeds at least in some years the total production of wheat, or even all cereals.

PALESTINE : TOTAL YIELDS

(In metric tons)

	<i>Wheat</i>	<i>Barley</i>	<i>Vegetables</i>
1937	127,000	75,000	120,000
1941	90,000	69,000	190,000

Fruit growing is another very important activity. The olive is probably the most widespread, since it occurs in all parts of the west

from the dry uplands of Judaea to the alluvial lowlands of the lower Orontes. Three regions of especially intensive production can be distinguished : (1) the lower Orontes valley and its borderlands, stretching between Latakia, Idlib, and Antioch, (2) the coastal plain immediately south of Beirut, including the villages of Shweifat and Damur, (3) the oasis of Damascus. About 80 per cent, of the olives produced are for local consumption, and by far the greater part is pressed for oil, though many fresh olives are eaten. Production methods are not of the best: the olive trees are sometimes left without much fertilisation, and the boughs are beaten with sticks to cause ripe fruit to fall.

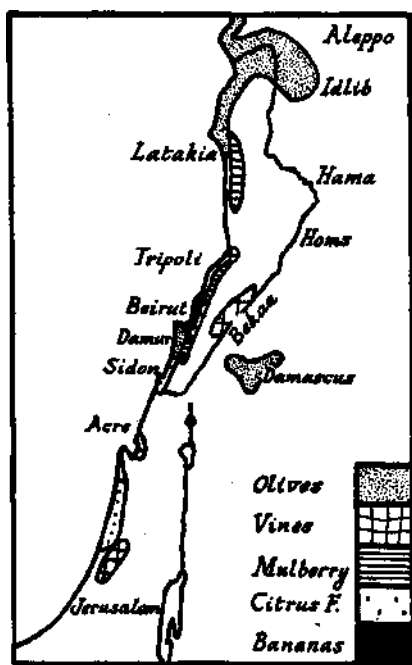


FIG. 70. Fruit-growing in the Levant.

Oil presses, too, are primitive, hence much Syrian oil was until 1940 exported to Italy, where it was refined and then re-sold as Italian produce.

In the coastal plain, oranges are grown, and though there is an important production in the Lebanon—tangerines from Saida, oranges from Beirut and Tripoli—the Plain of Sharon and the Acre district are the outstanding regions. Oranges have been grown in Palestine for over 200 years, but great expansion took place following the immigration of Jewish settlers after 1880. During the 1930^s oranges were one of the most important productions of Palestine, accounting for 70 to 80 per cent, of total exports. In 1938 citrus fruit groves occupied 75,000 acres * (as compared with 10,000 acres in the Lebanon) but serious signs of over-production had developed, and competition from South Africa, California and Brazil led to a reduction by 5,000 acres during the next two years. In 1940 the principal outlet—the British market—was entirely closed, because of the impossibility of sending cargo ships through the Mediterranean. This was a catastrophe for Palestine, where fruit rotted on the trees and accumulated in piles on the streets.

EXPORTS OF CITRUS FRUIT FROM PALESTINE

(In cases)

1937-38	1938-39	1939-40	1940-41	1941-42	1947-48
11,500,000	15,300,000	7,600,000	100,000	nil	3,000,000

The government of Palestine was forced to grant subsidies and remission of taxes to orange growers, both Arabs and Jews, but despite this, acreage has fallen to less than half of its pre-war figure, and it is doubtful whether citrus fruit growing will ever again regain its former scale, though it still remains one of the chief activities of the coastal plain. Growers have turned in large measure to mixed farming, i.e. the growing of fodder crops for dairy cattle, together with cereal production.

Oranges thrive in the fairly light sandy areas, whilst grapefruit and lemons tend to be limited to heavier soils. Detailed export figures for 1937-38 indicate the relative proportion of the various fruit-trees.

EXPORTS 1937-38 (In cases)

<i>Oranges</i>	<i>Grapefruit</i>	<i>Lemons</i>	<i>Limes</i>
9,500,000	1,800,000	700,000	200,000

A third fruit is the vine, which is cultivated on the lower foothills up to 3,000 feet. Most grapes are eaten fresh, or else made into

Approximately 55 per cent, of this area was owned by Arabs.

varieties of local wine, often with a flavouring of aniseed. In certain parts, however, a large-scale wine industry has developed, the chief centres being the central Bekaa (Ksara and Zahleh) and the Lydda district of Palestine (Rishon le Zion and Latrun). At one time, Palestinian wine had a sale amongst Jews all over the world for sacramental purposes, but exports have fallen to a quarter of the total of forty years ago. There is a restricted local market for wine chiefly among Christians and Jews, and increasingly, among Moslems, who are somewhat less strict than formerly. The wines are generally not of a quality comparable with those of western Mediterranean countries, and a large export trade is unlikely to develop.

Other fruits grown in the Levant are apricots, bananas, figs, peaches, and pomegranates. Bananas thrive best in the Lebanon, where they are grown on small alluvial terraces on the floors of deep river gorges. Here the air is hot, steamy, and calm, being sheltered by the high cliffs. Abundant water is available, though it must be led to the plantations in irrigation channels. Conditions in Palestine are less suitable, though there is some production. Banana growing (main centres, Beirut, Amelias, and Damur) is increasing in the Lebanon, particularly since the outbreak of scale disease amongst oranges. Many citrus fruit groves have been replanted with bananas. In the Lebanon it is possible to observe a zonal arrangement of crops. On the flat coastal plain, wheat, vegetables and citrus fruits are grown, with bananas in the sheltered river gorges. On the lowest slopes of the hills, olives, figs, and cereals occur, then, at 1,000 to 3,000 feet, vines. Apricots, peaches, and plums occupy the middle slopes (2,000 to 4,000 feet), with potatoes, apples, and pears on the highest parts above 3,000 feet. This succession is also a feature in Palestine, though less clearly defined because of lower relief.

A number of cash crops are grown to a relatively small degree. Mulberry growing is a feature of the north and central Lebanon (Qartaba, Ehden, and Bsharreh) and the Ansarieh uplands; and at one time silk production was the principal occupation of Tripoli and Latakia. The industry has undergone many vicissitudes, the latest phase (1940-46) being one of expansion. The silk worms are reared on large wicker trays in special huts, and fed on mulberry leaves for about six weeks, during which a cocoon is spun. The cocoon is then dried and sent to a reeling mill, where it is unravelled, nearly 3,000 feet of silk thread being obtained from a single cocoon.

Cotton growing was widespread in Syria during the Middle Ages,

but is now restricted to the districts of Homs, Idlib-Aleppo, and Latakia. Production has tended to increase, as Syria develops her own textile industry. In Palestine there is scarcely any production of raw cotton, and local industry is entirely dependent on imports of yarn and raw material. Tobacco is produced round Latakia; in the Lebanon; and in the upper Jordan (Galilee) region; and there is a

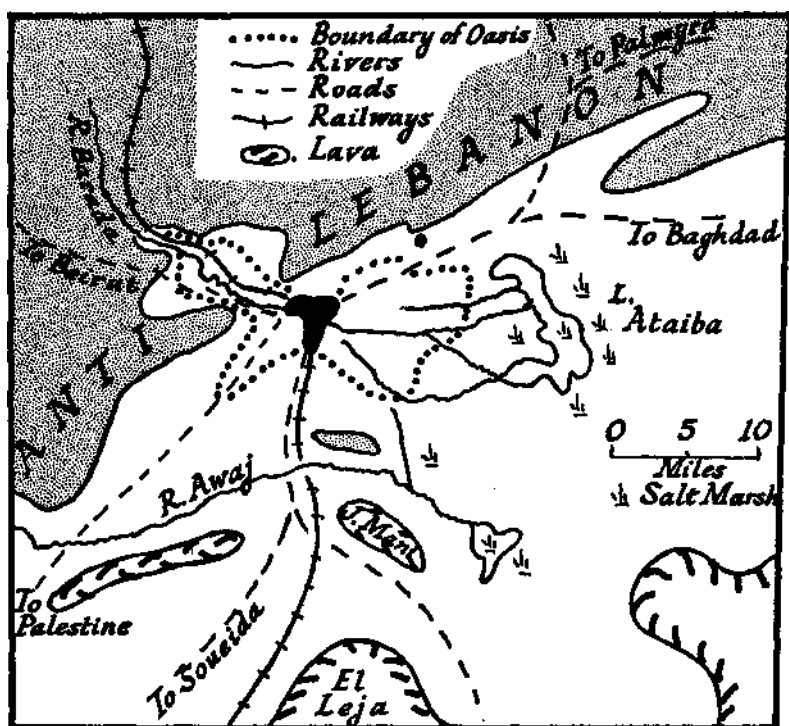


FIG. 71. The Oasis of Damascus.

certain parallel with the wine trade, in that quality is not high, and a former overseas market has declined, so that production is now almost entirely for home use. Tobacco production is controlled in all three countries by a state monopoly.

It will be seen from the foregoing that the degree of land utilisation varies considerably throughout the Levant. Only the western coastal plain can be said to be considerably in use, and even there stretches of unreclaimed marsh, dunes, and mountain spurs are to be found. Further eastwards, cultivation becomes more and more sporadic,

because of increasingly unfavourable topography and climate, and is in effect confined to isolated patches or 'oases *'. In the extreme north-east, the Aleppo region, centred on the small middle Qwieq basin, is separated from the fertile lower Orontes (Idlib region) by an interval of salt marsh; further south, the districts of Hama and Horns are isolated by the swampy expanse of the Ghor; and the Bekaa, hemmed between the sterile Anti-Lebanon and the bleak, precipitous eastern slopes of the Lebanon Ranges is very productive in parts where water is available. Much of it is, however, empty and unused. Only the immediate western shores of Lake Tiberias are cultivated, and in the lower Jordan there cannot be said to be any real degree of agricultural occupation. In the extreme east there are a few favoured localities, outstanding among which is the Ghuta (Plain of Damascus) where, over an area some 15 to 20 miles square, the presence of the Barada and its six tributaries allows extensive irrigation. For the most part, however, the countryside is given over to pastoralism and agriculture takes on very markedly the characteristics of oasis occupation or of a 'pioneer fringe' in an increasingly difficult environment.

Such is particularly the case in Transjordan, where the 15-inch isohyet marks the effective limit of normal cultivation, and the 8-inch isohyet the absolute margin even of dry farming, with the population living on the lowest subsistence level. This means that cultivable land in Transjordan is restricted to the extreme north-west, to the area lying between the western frontier and the railway line from Damascus to Amman. Between Amman and Petra the semi-arid steppe is reached, and so over most of the country nomadic pastoralism is the only activity.

Irrigation.—In view of the foregoing, it will be appreciated that irrigation plays a most important part in the economic life of the Levant, even in the north and west, where rainfall is moderately heavy. In ancient times, much of Syria, especially the north and east, had a highly developed system of irrigation, but most of this has decayed through war and misrule, so that now the only region with an extensive canal system is the Damascus area, where about 400 square miles are watered from the small streams draining into the Syrian desert from the eastern Anti-Lebanon. Chief of these is the Barada, which has also been harnessed, where it leaves the uplands for the plain, to provide electric power for the city. The irrigation canals of Damascus are small but of very great age—some pre-Roman—

and in summer practically all the available water is used up. At other seasons a small quantity flows eastwards to the salt basin of the Bahr el Ataiba, 10 miles east of the city (Fig. 71).

Small scale canal systems, using *norias*, are in existence along the banks of the Orontes between Horns and Hama, and the large springs of the upper Lebanon Range are used to water fields in the immediate vicinity; but, generally speaking, there is nothing to parallel the extensive schemes of Egypt or even Iraq. Modern practice has made little headway in Syria: a recent proposal to raise the level of the Lake of Horns by building an artificial barrier above the natural basalt dam has not yet been realised, and the same can be said about a scheme to utilise the waters of the Yammuneh lake to irrigate the Baalbek district. It has been estimated that only one-third or one-half of Syria's potentially irrigable land is actually developed.

Conditions in the south are more complex. Rainfall is markedly lower, rivers deeply entrenched, and the greater extent of porous limestone outcrops—more extensive even than in the Lebanon—results in much loss of surface water. There is also the political and economic background: in order to absorb large numbers of immigrants and provide them with a reasonable standard of living, continued development of natural resources is essential, hence irrigation, as one of the controlling factors, has become a burning question, with a strong political flavour. For what would seem to be a carefully balanced and sober viewpoint, reference may be made to a survey of irrigation possibilities made by the former Water Commission of Palestine, and to an admirable commentary on this survey by Dr. E. C. Willatts.

It is stated that the total rainfall over the whole of Palestine may be taken as 7,500 million cubic metres per annum, of which one-third falls on the eastern (Jordan) side of the hills. Of the proportion received on the east (2,500 mill. cu. metres), 69 per cent, is returned to the atmosphere by evaporation from the surface, and transpiration by plants; and a further 7 per cent, is storm water, which drains rapidly to the Dead Sea and cannot be used for irrigation. The remaining 24 per cent, goes to feed rivers, springs, etc., but is in part lost through percolation into porous rock, or by contamination with saline strata, so that only 16 per cent, is estimated to remain for effective use. Of this 16 per cent, between one-quarter and one-half (i.e. 4 to 8 per cent, of the total rainfall) is already in use, leaving only a very limited possibility of future expansion.

For the precipitation received on the western slopes, the corresponding figures are :

	<i>Per cent.</i>
Loss by evaporation and transpiration	70
Storm water.	6
Underground penetration	.16
Avadable at surface	.8

Because of the high degree of underground penetration, a Royal Commission stated that 'Irrigation from wells is, and is likely always to remain, the chief source of irrigation water in Palestine \ Dams to retain surface water have been constructed, but experiences at Beersheba illustrate the difficulties in the way of successful development. It was found that only 7 per cent, of the rainfall of the catchment area reached the reservoir, the remaining 93 per cent, percolating into the soil, or undergoing evaporation. Of this 7 per cent., only one-fourteenth part (i.e. 0*5 per cent, of the total rainfall) remained in the reservoir at the end of a few weeks, the rest undergoing evaporation or absorption into the porous substrata. Another difficulty in the west of Palestine is that unless a 'head' of fresh water is maintained in the porous underground rocks, salt water from the Mediterranean percolates inland. Near Haifa and Tel Aviv, over-pumping from wells has lowered the water-table below the level of the sea, and a number of wells are now invaded by salt water. Thus in the words of Dr. Willatts, * In spite of the claims of propagandists, Palestine is very badly placed for irrigation. . . . Whereas Egypt has 5,000 cubic metres of Nile water per inhabitant, and Iraq twice as much, Palestine has only 1,000 cubic metres from all of its streams, many of which are quite unusable/

There have been a number of proposals for large-scale irrigation schemes in Palestine. Probably the best known is that of Lowdermilk, who suggested using the upper Jordan for irrigation purposes in north Palestine, and replacing the loss of water to the Dead Sea by introducing sea water by means of a canal from the Mediterranean. A drop in level of some 1,200 feet between the Mediterranean and the Dead Sea would allow generation of hydro-electric power. A second plan, due to Savage and Hays, also of America, envisages even more elaborate developments, to take place in stages. The first stage would be the damming of certain headstreams of the Jordan—the Hasbani, within the present Lebanese state, and the Yarmuk, within

Transjordan; part of the latter being used for irrigation, and part diverted directly into Lake Tiberias. Existing hydro-electric stations on the Yarmuk would become redundant, and would have to be replaced by other stations using water introduced from the Mediterranean as in the Lowdermilk scheme. Later, a high-level irrigation canal would be constructed from the Lebanese frontier through western Galilee and Samaria to Gaza and the Negeb. Water for this

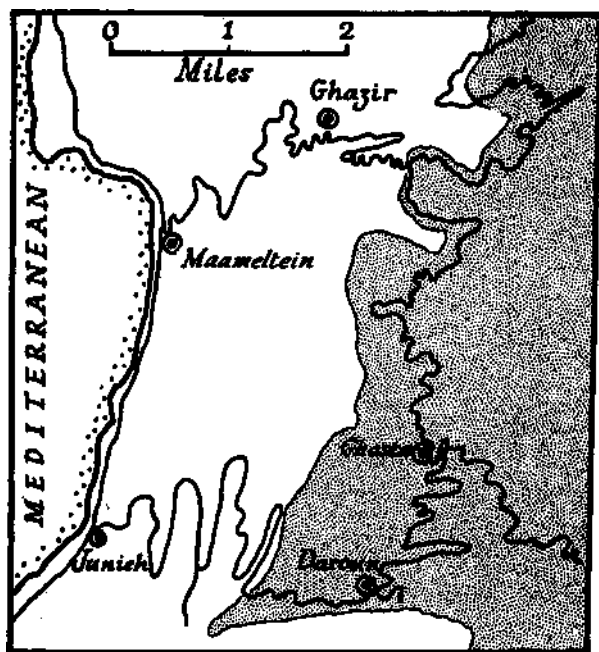


FIG. 72. Mountain Roads in the Levant (about 10 miles N. of Beirut). All roads shown are motorable. Land over 2,000 ft. stippled.

canal would be drawn from the Litani river of the Lebanon, and from small catchment dams in the wadis of the Judaeen plateau. These proposals have, however, been sharply criticised by Willatts and by M. G. Ionides on the following points:

(1) Physical difficulties have been largely ignored—e.g. (a) the building of dams in a region of porous limestone outcrops, (b) the possibility of tectonic disturbances, which might damage the canals, or allow seepage along fault lines, and (c) the difficulty of carrying canals across a deeply dissected countryside (as an example, cf. Fig. 72).

(2) Harnessing the waters of rivers that do not lie within the borders of Palestine pre-supposes extremely amicable political relations between Zionists, who would benefit most from the schemes, and neighbouring Arab states—a possibility that is at the present remote.

(3) High cost of the projects. Total expenditure would be at least .£50 million (\$200 million), in order to irrigate 625,000 acres, giving a minimum cost of £\$0 per acre. This, as Willatts pointed out, is about forty times the cost of the Aswan and Punjab schemes, and six times that of the Godavari scheme.

(4) There may not be sufficient water actually within Palestine to allow the development of extensive irrigation schemes. Besides a highly variable annual rainfall, which can fall 60 per cent, below average in a given year, there is another point to consider. Much of the present irrigation development is from wells sunk in artesian basins which have been tapped only on a large scale during the past 20 years, and previously lay unused. The fact that in some parts the water-table has sunk 10 or 15 feet during 20 years of exploitation suggests that like the woodlands of Palestine, water supplies represent an earlier, expendable accumulation which, once used up, will not be easily replaced. During past centuries, when agriculture relied on surface water only, a reserve accumulated underground, and it may be that this is now being tapped at a rate which exceeds replenishment by percolation from the surface.

Pastoralism.—This activity is as yet not very great, since it tends in many places to be restricted to the more arid and hillier parts. A conspicuous exception is the recent development of mixed farming amongst the Jewish colonies of Palestine, where recent figures indicate that the weight of fodder crops now exceeds that of the chief cereal, wheat, though, on a basis of acreage, wheat is still the predominant crop.

In the north, goats predominate—an indication of the difficult terrain of many areas. Sheep are next in importance, especially in the Lebanon, and there is much transhumance between summer and winter pastures, involving journeys of up to 30 miles. The central and northern Bekaa, and the valleys of the Anti-Lebanon are also much used as winter pastures by nomadic Badawin from the Syrian desert. The Jebel Ansarieh and south-west Syria stand out as cattle areas, the number of cattle being three or four times as great as those in the Lebanon. Pig keeping is also of some importance in the cooler Lebanon—one of two Middle Eastern states with a Christian majority

—but few pigs are found elsewhere. The chief draught animal is the donkey, with horses second in importance. Mules and camels are also reared in most regions, even the hillier and damper Lebanon.

Though dairy cattle predominate in the lowlands of Palestine, conditions in the hills much resemble those of Syria and the Lebanon, with goats and sheep as the main animals kept. Transhumance is less developed; but the lower Jordan valley, like the Bekaa, is used during winter by nomads from the east.

V. MINERALS

The mineral wealth of the Levant is extremely scanty. Small deposits of lignite exist in the Lebanon, and sporadic mining occurs at Bsharreh (east-south-east of Tripoli), and at Bikfeia (north-east of Beirut). The latter mines were first worked by Mehemet Ali a century ago, and are now practically exhausted. Present annual production is only a few tons.

Oil prospecting, as we have seen, has had disappointing results, but asphalt and bitumen occur in a few parts of the Lebanon, Anti-Lebanon and Ansarieh ranges, and as lumps that form on the bed of the Dead Sea and later rise to the surface. There is little attempt at development of any of these deposits. The Dead Sea is, however, important for its mineral salts, and ranks as the chief source of mineral products in the Levant. Analysis shows that at the surface, each litre of Dead Sea water contains 227 to 275 grams of dissolved salts. At a depth of 360 feet, the water is chemically saturated, and the corresponding figure is 327 grams.

CHEMICAL CONTENT OF DEAD SEA WATER

(In grams per litre)

	<i>Surface</i>	<i>160 ft. depth</i>
KCl	10.0 to 10.8	15.7
NaCl	71.0 to 82.4	87.4
MgCl ₂	109.5 to 142.4	169.0
CaCl ₂	31.0 to 33.0	46.7
CaSO ₄	1.3	0.6
MgBr ₂	3.9 to 4.5	7.3

In 1930 the Palestine Potash Corporation began extraction of mineral salts, using a simple process of solar evaporation, which, as

we have seen, is particularly active in the region of the lower Jordan. Pans of Dead Sea water are allowed to evaporate, and after 40 to 50 days, most of the unwanted common salt has crystallised out, and can be removed. Evaporation is continued, and a mixture of potassium and magnesium chlorides, known as carnallite, is next obtained. This can be purified by re-crystallisation (still using solar heat) to give a salt consisting of 20 per cent, potassium chloride, 70 to 80 per cent, of magnesium chloride, and a small content of sodium chloride. Further fractional crystallisation gives a much purer magnesium chloride, and finally, magnesium bromide, from which bromine itself is extracted. The potash salts are used principally as fertilisers, whilst bromine is increasingly valuable in the manufacture of armaments (explosives and lethal gases), and in the blending of aviation fuels. War conditions provided a great stimulus to development, and there are now two extraction plants on the shores of the Dead Sea, one at the north, the other at the south end. Though cost of production is extremely low, because of the availability of solar heat at the actual place of occurrence, high cost of transport over the 80 miles to Haifa is a great handicap.

For the rest, it would seem that though numerous traces of many minerals are found, none occur on a commercial scale. Iron was first worked by the Phoenicians, and is now exhausted, whilst small amounts of gold, copper, chromium, and magnesium do not justify development. A deposit of sulphur is worked near Gaza, and gypsum and limestone provide local building material, but gypsum can be more cheaply imported from Cyprus. Apart from these minor activities, the only other mineral exploitation is salt refining, which is carried on by primitive methods along the coast, and in the neighbourhood of the salt basins of Aleppo, Horns, Damascus, and Jerusalem.

VI. INDUSTRY

Under Ottoman rule, Syria was probably the most industrialised region of the Middle East, with a fairly extensive textile industry in Aleppo, Damascus, Horns, Hama, Beirut, and Tripoli that supplied most of the needs of the whole Empire. Palestine was largely agricultural, without any industries of importance. In the twentieth century, however, Syrian trade had begun to decline considerably because of competition from foreign machine made goods, and this decline was further emphasised after 1918, when the Syrian market was reduced to Syria herself. During the last 30 years, therefore, Syrian

industry has been subjected to two influences: an overall decline in the face of foreign competition and shrinking markets, and the beginnings of modern organisation and mechanisation, which has led to concentration of industry in the towns.

In Palestine, on the other hand, great expansion has occurred as the result of Jewish immigration, and it can now be said that the degree of industrialisation equals, if not actually exceeds, that in the north. In this connexion it is important to recall that nearly 80 per cent, of the Jewish population of Palestine now lives in towns and not in rural (country) areas.¹

The textile industries of Syria and the Lebanon use cotton, silk, rayon, and wool as raw materials, and part of these (silk excepted), are imported, though cotton is increasingly grown. Aleppo and Damascus specialise in luxury cloths—brocade and *crepe de chine*—which are bought mainly by tourists;² but there is also considerable production of cheaper cloths (poplin, muslin, marocain, and coarser cottons), together with some camel-hair cloth worn by richer Badawin. Horns and Hama produce a cotton and silk mixture cloth for everyday use as clothing; but it is significant that most of the home produced cloth is used in Arab style of dress, and *European* suits, worn increasingly by younger people, are imported. A modern cotton mill at Tripoli produces medium quality cloth; and the silk industry of the Lebanon, with reeling and weaving centres in and near Beirut, developed considerably during 1941-45.

In Palestine new (Jewish) textile industries have been established at Haifa and Tel Aviv, together with many small workshops or home industries on Jewish agricultural settlements. Raw materials for many of these workshops must, however, be imported. A small Arab textile industry is located at Majdal and Gaza—no *m ill' has more than 50 looms—and home production also occurs in many parts of the Judean uplands. Bethlehem and Nazareth have a small lace industry that caters for the tourist-pilgrim market.

Recent figures indicate that textiles now occupy the most people of any industry in Palestine; and though detailed figures for Syria and the Lebanon are lacking, it is probable that the same situation

¹ This fact is not always realised, since greater prominence is often given to Zionist colonisation in rural areas, which, it will be apparent, absorbs only a small proportion of the Jewish population of Palestine. According to latest figures, agriculture supports about 18 per cent, of the working population.

² Some of this production is exported to other tourist centres of the Middle East—e.g. Egypt. During the war of 1939 there were many purchases by Allied troops.

holds true there. Metal working now ranks second in importance in both countries, considerable development having occurred in Palestine since 1939. The main Palestinian centre is Haifa, where light engineering products (spare parts, electric batteries, and household implements) are made, and there is a railway repair shop. Further north, metal working is carried on almost entirely as a craft industry without the use of modern machinery, in old-fashioned workshops at Beirut, Tripoli, Damascus, and Aleppo. Damascus has long had a tradition of metal working, but is now equalled in number of workshops by Beirut.

Preparation of foodstuffs, etc., ranks close to metal working as an industrial activity—again an indication of the small extent of true industrialisation in the Levant. Because of the abundance of olives, soap boiling is carried on in many areas, Beirut, Nablus, and Jaffa being the chief centres, and the extraction of oil, cigarette making, and distilling of arak and brandy are features of most towns. A recent development has been the growth of new * industries' in Palestine—diamond cutting at Nathaniya and Tel Aviv, and the manufacture of artificial teeth at Tel Aviv—both of which follow the Swiss pattern of requiring only small amounts of imported raw material.

In view of this industrial progress, by which the number of workers in (Jewish) industry rose from 5,000 in 1925 to over 35,000 (1943), it is of interest to examine the factors underlying development. We have already noted the unfavourable features of a lack of home produced raw materials, and high cost of transport. Favourable factors are :

(1) Availability of cheap sources of power—hydro-electricity, already developed in the middle Jordan, crude oil, from the Kirkuk pipe-lines and, exceptionally, the solar heat of the lower Jordan.

(2) Rapid growth of population, both Arab and Jewish, which has provided a source of cheap labour, and also an expanding market for finished products.

(3) The marked increase of technical skill, due to Jewish immigration from Europe. Many refugees also brought machinery with them rather than money, especially those coming from Hitlerite Germany, from which the export of currency was forbidden.

(4) A large import of capital during 1920-45—on a per capita basis the highest of any nation in the world, including the United States (Kohn). This amounted in some years to a total of £10 (\$40) per head of population, and tended in the last few years to increase faster than the flow of immigrants.

Funds were hence available to start new projects even when the strict economic return seemed dubious.

(5) The demand for goods by the Allied forces during 1941-45. Willatts estimates that industry trebled in size during these years.

Development in Palestine has been so rapid that doubts have recently been expressed as to whether industrialisation can continue to develop further, or even maintain itself at the existing level. Fostered by a combination of highly unusual circumstances, with a not wholly favourable geographical background, the economic structure of Palestine may not be entirely sound. The best possibility for continued advance, now that war demands have ceased, is friendly political relations with neighbouring countries, by which markets for Palestinian goods can be extended, and dependence on the inflow of foreign capital reduced.

VII. COMMERCE AND TRADE

The countries of the Levant derive important advantages from a transit traffic with the interior of south-west Asia.

The ancient long-distance trade with India and the Far East has now been diverted to the sea; but parts of eastern Turkey, north-west Iran, and northern Iraq are most easily reached from the Levant coastlands, and not from their own seaports. Although camel caravans are increasingly giving way to motor traffic, there is still an important trans-desert trade with the east and north-east that adds to the prosperity of the Mediterranean ports, and, to a less extent, of the inland towns on the edge of the desert.

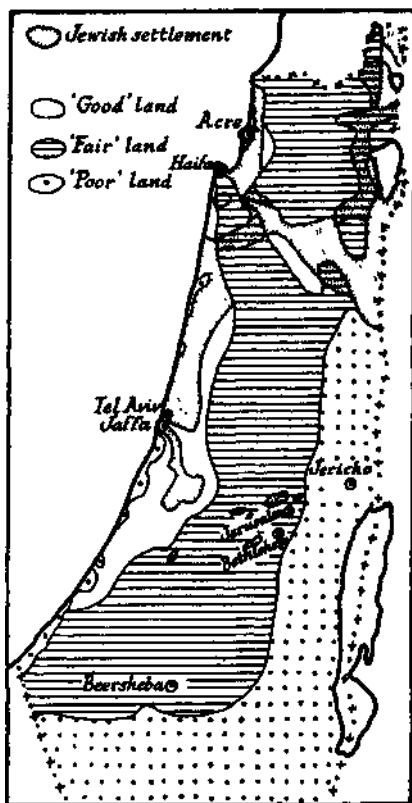


FIG. 73. Jewish Colonisation in Palestine, 1944.

The countries of the Levant are unequally placed for this trade. Transjordan derives little benefit from it, as she is isolated on the west by the difficult Jordan depression. Palestine too, with a straight shelving coastline, has only one good harbour—at Haifa, where an extension of the Carmel ridge forms a bay sheltered from the prevailing south-west winds. Jaffa and Tel Aviv are poor harbours: ships must stand off in a roadstead, and discharge their cargo into lighters, as there is no real harbour. Syria has had only one small port, Latakia, since Iskanderun (Alexandretta) was ceded to Turkey in 1939. Latakia possesses only a small harbour, and is shut off eastwards by the mass of the Jebel Ansarieh; hence there is still no rail communication, and traffic from north Syria has tended to move to Beirut and Tripoli, where (particularly at Beirut) port sites are better. Owning both these harbours, the Lebanon now handles most of the trade of Syria, though competition from Haifa is increasingly felt, especially as Haifa now has superior dock installations. The chief items of transit trade are (1) carpets, silk, and fruit (outward), and (2) cotton goods, vehicles, and machinery (inward to the Middle East). Between 1930-40, transit traffic accounted for 35% per cent, of the total trade of Syria and the Lebanon.

The economy of the Levant countries presents some very unusual features. Though predominantly agricultural or pastoral, no country is entirely self-sufficient in foodstuffs, and a large range of these must be imported. Palestine has developed a substantial citrus-fruit trade, some of which has been lost, possibly permanently, since 1941; whilst Syria and the Lebanon have no staple export commodity, but depend upon an aggregate of small items—olive oil, silk, barley, and fruit—to pay for their imports. Large quantities of manufactured goods and fuel (machinery, vehicles, textiles, coal, and oil) must be imported; and in normal times, there is a deficit of exports as compared with imports, particularly in Syria and the Lebanon.

One highly useful source of revenue is, however, the tourist-pilgrim traffic, which brings large numbers of visitors from other countries. Though the individual sums expended may be small, the total amount is great, and much of the commercial activity of Jerusalem is derived from catering for pilgrims, Christian, Jewish, and Moslem, in hotels, hospices, and monasteries. Moreover, many convents and religious houses are financially supported from abroad, but consume local produce. Pilgrims are also buyers of souvenirs and relics—in olive-wood, mother of pearl, and lace-work, the manu-

facture of which is an important activity in Jerusalem, Tel Aviv, Bethlehem, and Nazareth. Further north, there are fewer pilgrims, but the scenery and amenities of the Lebanon attract a growing number of summer and winter visitors, mostly from Egypt and Iraq. The number of such tourists reached 30,000 in 1939, of which 500 were winter-sports visitors. This traffic holds great potentialities, and the Lebanon could certainly develop further as a holiday centre.

Despite the income accruing from visitors, the net trading balance in the Levant countries remains unfavourable, with an annual deficit of exports over imports. This deficit has been made good in general by a number of extremely unusual sources of revenue from outside the region :

(1) Remittances to relatives (see Chapter XII) or donations to religious or political organisations (e.g. to Christian monasteries, Moslem seminaries, or Zionist colonisation schemes).

(2) The income accruing from the presence of numerous schools and universities, American, British, French, and Italian, the students of which come from all over the Middle East.

(3) Expenditure by former Mandatory powers—both of which, it is not always remembered, spent large sums in capital development, and provided a market for local produce.

(4) Trade rivalry between various European nations, which led to the granting of credits on very advantageous terms to local business enterprises. Some of this capital was lost by bankruptcy, but the loss did not always fall on Middle East merchants, rather, instead, on Europeans who had advanced the initial capital (Himadch). Up to 1940, Italy was particularly anxious to grant very favourable terms as a means of extending her political influence.

VIII. RAILWAYS

•

The first lines to be constructed were from Jerusalem to Jaffa (1890), of standard gauge and from Beirut to Damascus via Rayak-Zahleh (1895). Because of the difficulties of the latter route, involving an ascent of 5,000 feet above sea level, a gauge of 1*05 metres was adopted, and a quarter of the whole line used a cog-rail. In 1904-6 the 'Pilgrim Railway' from Damascus to Maan (Transjordan) was opened. This was also of narrow gauge, and a branch from Deraa reached the port of Haifa, with other less important extensions to Suweida and Bosra, the Suweida branch being of a different gauge. Shortly afterwards a standard gauge line was laid from Rayak to

Horns, Hama, and Aleppo, with a branch from Horns to the coast at Tripoli. From Aleppo there was connexion to the Anatolia-Baghdad railway, which, incomplete in 1914, was carried to Baghdad and Basra in 1934-40.

Further development in Palestine occurred during 1917, when invading British forces laid a light railway (standard gauge) across the Sinai desert into the Plain of Sharon, as far as Haifa, to meet the Deraa branch. This British line became, after improvement, the main railway of Palestine. At Lydda there is a junction with Jaffa-Tel Aviv, and Jerusalem. In 1942, during a second war, British forces continued the standard gauge line northwards along the coast to Beirut and Tripoli, thus providing (at least in theory) direct rail communication between Britain and Cairo. A swing bridge takes the line over the Suez Canal at Kantara to join the main Egyptian system.

It may be noted that all these railway lines are single track, and in a number of places, speed is restricted to 15 K.P.H. (11 m.p.h.). Any further development of a rail network is doubtful, since road transport is probably better adapted to Middle Eastern needs, and the poverty of many areas does not justify the heavy capital expenditure necessary for railway construction. Improvement of roads is likely to be the way in which future development will take place; and one of the conspicuous results of the mandatory regime has been a great improvement in road communications. Greatest achievement was probably in the Lebanon, where an exceptionally difficult terrain was the chief obstacle, and in places it was necessary to build 10 miles of road to reach a spot only 2 miles distant as the crow flies (Fig. 72).

IX. TOWNS

The largest urban centre of the Levant is neither Damascus nor Jerusalem, as might be expected, but Aleppo (population 1944, 320,000). Many geographical factors have contributed to this supremacy, which is of long standing, for after the decline of Abbasid Baghdad, Aleppo ranked as the second city of the Ottoman Empire. Chief of these factors is the location of the city on the borders of four strikingly dissimilar geographic regions. To the north lies the difficult hill country of Asia Minor, to which relatively easy access is given by the pass of the ' Cilician Gates \ and by the upper valleys of the Euphrates, Khabour, and Tigris

to the south-west lie the agricultural 'oases' of Hama, Horns, and Damascus, with at a greater distance the more intensely exploited Lebanon, backed by the Mediterranean ports of Iskanderun, Latakia, Tripoli, and Beirut, for all of which Aleppo acts as distributor and collector of produce. South-eastwards lies the pastoral Syrian desert; and eastwards the steppes of the Fertile Crescent, providing an easier, though longer, route to Iraq and Iran. Hence there is an important market for wool, livestock, and hides from the steppes;

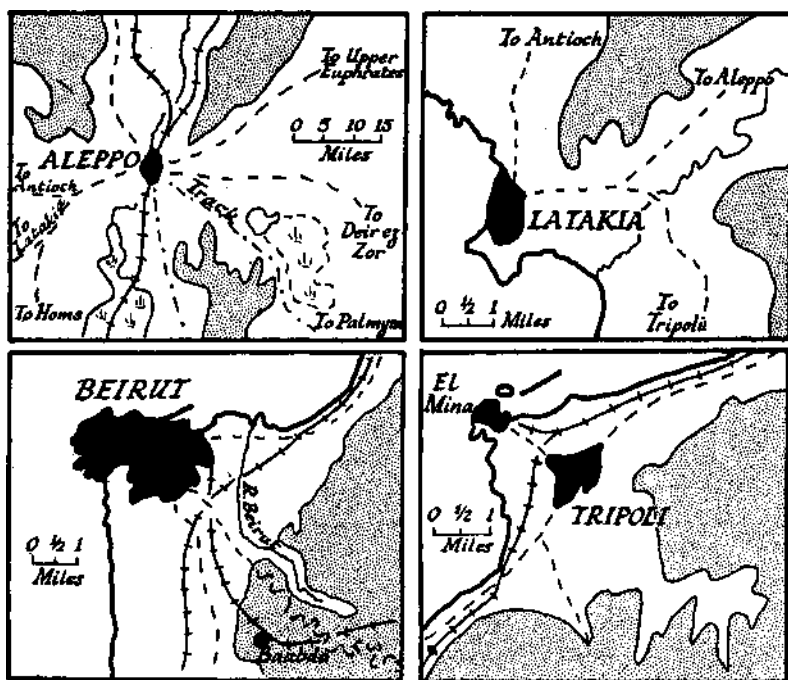


FIG. 74. The Sites of Aleppo, Latakia, Tripoli, and Beirut. Railways and main roads shown.

cereals and fruit from the oases, manufactured articles from the ports and inland towns, and wood, charcoal, and metals from Asia Minor.

Aleppo has controlled much of the inter-continental trade of the Levant, and, offering a choice of two routes across the desert, both less arduous and less dangerous than those from Damascus and Petra, the city held an advantage over its rivals. In caravan days the supremacy of Aleppo was not challenged, and the continued importance of the city as a focus of modern routes is shown by its present importance as a railjunction, with, by Middle Eastern standards, a

considerable network. Besides its commercial relations, Aleppo has, as we have seen, many local industries, the most extensive of any in Syria. Though now overshadowed politically by Damascus, it still retains much trading and industrial activity, and is less affected by westernisation than most other parts of the Levant. As a city it retains many of its ancient monuments, and hence, to westerners, appears more truly 'Oriental' than many other towns of the Levant.

Damascus, like Aleppo, owes its rise to trade and industry. Its position as a * desert port' gave it early importance—though whether Damascus or Aleppo can best claim the title of oldest city in the world is doubtful—and local advantages are the presence of abundant irrigation water, and the availability of local raw materials (silk, cotton, wool, iron, and wood). Modern Damascus owes most to its agricultural productivity, based on intensive exploitation of the Ghuta, so, even more than Aleppo, it has become a market for exchange of produce between Badawin and cultivators. Textile manufacturing continues, and more than Aleppo, Damascus is in contact with a tourist traffic that provides an outlet for the sale of trinkets, small inlaid furniture in walnut, luxury silks, rugs, and carpets (a kind of Middle Eastern * Birmingham ware'). Under the Ottomans, Damascus occupied a marginal position, lying on the edge of the Imperial domain, with Aleppo in a more central and advantageous position. To-day, the situation is reversed : Damascus is the centre of the new Syrian state, and Aleppo is in isolation in a remote corner, cut off from her natural hinterland and sea outlet by the newly-drawn frontier with Turkey (Figs. 71, 74).

The development of Beirut has been a feature of the last 50 years. This has come about because of the natural advantage of the Bay of St. George, sheltered, like Haifa, from south-west winds by a westward jutting promontory. Once the disadvantage of difficult access to the interior had been overcome in the late nineteenth century by the building of a road and railway across the Col du Beidar (5,000 feet above sea-level), Beirut soon rose to be the chief port of the northern Levant. Textile manufacturing and food processing are also important. Since Byzantine days Beirut has also had a reputation as an educational centre, and the presence of two Universities (American Protestant and French Catholic) and numerous institutions and boarding schools (native and foreign) has brought economic benefits.

Tripoli, though lacking a first class harbour, has the advantages of easy communications inland, and the availability of raw material from

the cotton growing region round Hama. As a result, it has become the natural outlet of north Syria, to the detriment of Latakia; and the oil pipe-line from Kirkuk was brought to Tripoli by way of the Bukeyia-Akkar lowlands, rather than across the Lebanon ridges to Beirut. There is a small but long-standing cotton industry, now in process of changing to modern methods; and with the growth in oil output from Iraq, Tripoli should further gain in size.

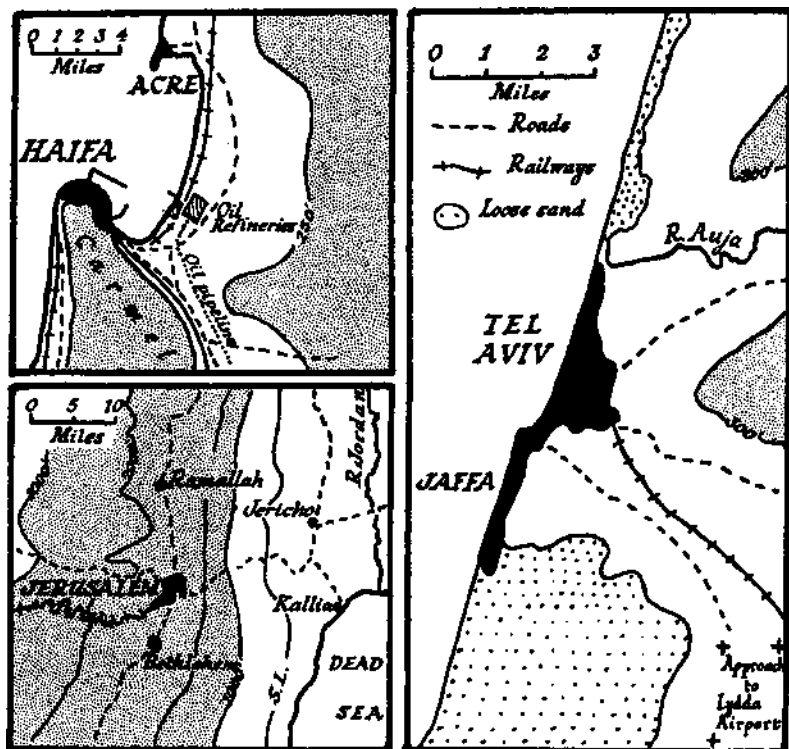


FIG. 75. The sites of Haifa, Jaffa-Tel Aviv, and Jerusalem.

Three centres dispute urban leadership in Palestine. Haifa (population 145,000) has by far the best harbour; and, like Tripoli, controls an easy lowland route to the interior, which is also followed by an oil pipe-line. Hence a local industry based on oil fuel and related to transport needs (railway and motor repairs, etc.) has developed on a relatively impressive scale; and the malarial river flats of the Bay of Acre are now being covered by industrial installations, chief of which is the oil refinery of the Iraq Petroleum Co. Haifa does not,

however, occupy a central position within Palestine, and her immediate hinterland, the rocky spurs of Mount Carmel, and the indifferently fertile country of Samaria, is not particularly productive.

Tel Aviv (population 183,000) once a suburb of Jaffa, is better placed as an outlet for the richer Plain of Sharon, from which come the bulk of the citrus exports. The city is also much more centrally placed within Palestine, hence its choice as the provisional capital of the state of Israel. Jaffa, the older town (population 102,000) is now continuous with Tel Aviv. Once the chief port of Palestine, its importance has declined considerably—a process that is likely to continue further with the improvement of harbour facilities at Tel Aviv, and the flight of Arab refugees from Palestine during 1948. The population of Jaffa is almost entirely Arab, and that of Tel Aviv almost entirely Jewish.

Jerusalem (population 165,000) has few geographical advantages of any kind. Difficult of access, remote from trade routes, and lying in an arid, unproductive region, its water supplies were for long sufficient to maintain only a small settlement, and many inhabitants were dependent on open cisterns cut in the rock. To-day, water must be pumped from the lowlands to the north and west. There was however one advantage—strength as a defensive site, and this probably gave Jerusalem an original importance in early times as a tribal settlement. Since then, religious association and tradition have gradually fostered its growth as a centre of Jewish, Christian, and Moslem pilgrimage; and as in Mecca, the circulation of pilgrims can be said to provide the principal means of livelihood for its inhabitants. Catering, printing, local commerce, and the making of souvenirs are now the chief activities, and the presence of a seat of government between 1918 and 1948 further stimulated development.

THE FOREIGN TRADE OF SYRIA

(Years 1947-49)

Annual Value of Trade in £ Sterling : -£60 million *

Amount per head of population : .£15 *

<i>Imports</i> (Order of impce.)		<i>Exports</i> (Order of impce.)	
1. Manufactured goods		1. Fruit	
2. Semi-manufactured goods		2. Cattle & hides	
3. Cereals		3. Olive oil	
Total imports, .£50 million *		Total exports, .£10 million *	

Suppliers :

- (1) U.S.A.
- (2) United Kingdom
- (3) France

Buyers :

- (1) France
- (2) United Kingdom
- (3) Iraq

THE FOREIGN TRADE OF THE LEBANON

(Years 1947-49)

Annual Value of Trade in .£ Sterling : £60 million *

Amount per head of population : £15 *

*Imports**(Order of impce.)*

Manufactured goods

Raw materials

3. Foodstuffs & drinks

Total imports, £50 million *

*Exports**(Order of impce.)*

Olives & oil

Fruit

3. Refined oil

Total exports, £10 million *

Suppliers :

- (1) U.S.A.
- (2) United Kingdom
- (3) France

Buyers:

- (1) France
- (2) United Kingdom
- (3) Italy

* Figures apply to Syria and Lebanon together, since there is a joint Customs system, and separate figures are not available.

THE FOREIGN TRADE OF PALESTINE

(Year 1946-47)

Total Value of Trade in £ Sterling : £126 million

Amount per head of population : £65

*Percentage**Imports of Total*

Crude oil 14

Machinery 6

Wheat & flour 3

Total imports, ^93 million

*Percentage**Exports of Total*

Refined oil 49

Citrus Fruit 28

Potash 6

Total exports, £33 millioi

Suppliers:

- (1) Iraq
- (2) U.S.A.
- (3) United Kingdom

Buyers :

- (1) United Kingdom
- (2) U.S.A.
- (3) Syria**

THE FOREIGN TRADE OF TRANSJORDAN

(Year 1946-47)

Total Value of Trade in £ Sterling : £10 million

Amount per head of population : £25

<i>Imports</i>	<i>Percentage of Total</i>	<i>Exports *</i>	<i>Percentage of Total</i>
Foodstuffs	10	Fruit	45
Cotton Textiles	8	Vegetables	15
Livestock	7		
Total imports, £9½ million		Total exports, £\ million	

Suppliers:

- (1) U.S.A.
- (2) Iraq
- (3) United Kingdom

Buyers:

- (1) Palestine
- (2) Syria
- (3) Iraq

* 1947 was a disastrous year for crop growing. Normally, wheat forms the chief export, and in 1945-6 accounted for £1,000,000.

CHAPTER XVII

THE COASTLANDS OF THE LEVANT (CONTINUED)

I. CYPRUS

IT is dubious whether Cyprus can best be considered a part of the Levant or of Asia Minor. Structurally, there is little doubt that the island is part of a fold garland that can be traced into the Amanus ranges of Asia Minor; and, curiously, the topography of Cyprus partly repeats on a small scale the pattern of an interior basin shut off from the sea by encircling fold ranges which is characteristic of Asia Minor as a whole. In the sphere of human and economic geography,

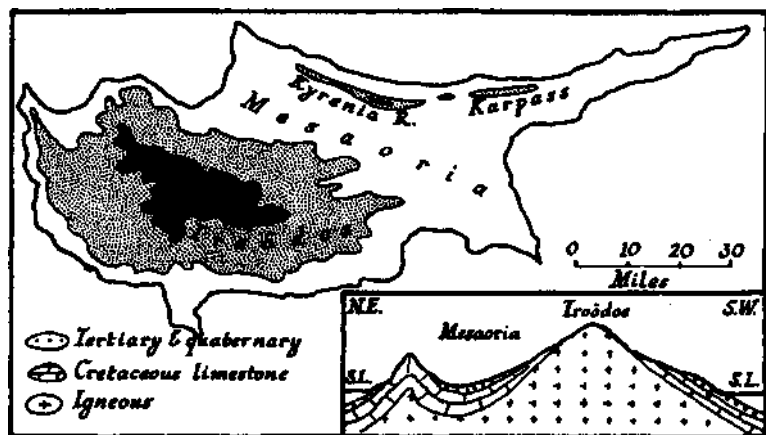


FIG. 76. Cyprus: Orography and Structure. Land over 1000 ft. stippled; over 3000 ft. in black.

however, connexion with the Levant and Egypt is much more apparent, and commercial intercourse is to-day almost entirely towards the east and south, rather than towards the north.

The remarkable shape of the island—sometimes compared to that of a lion's skin pegged out to dry—has been determined by two almost parallel and slightly curved fold ranges. The northern arc, known in its western portion as the Kyrenia Range, and as the Karpass in the extreme north-east, is a simple narrow anticline rising from the sea to a maximum height of 3,000 feet just over 4 miles inland. The

southern arc is larger, but has been shattered by great upwellings of magma in the core of the folds, so that the central part of the arc now consists of an enormous boss of plutonic material surrounded by broken fold structures. This boss forms the Troodos Range, the highest part of the island, with a maximum height of 6,400 feet. Between the two arcs lies a lowland plain some 12 to 15 miles wide, known as the Mesaoria. The plain, below 500 feet in height, and slightly undulating, is open to the sea on the east and west.

The rock series of Cyprus are all of comparatively recent formation, the oldest being of late Cretaceous age. The Kyrenia mountains are formed of a massive flexure of this Cretaceous limestone, which passes locally into dolomite and marble. The presence of limestone is again a marked feature in Cyprus, since in addition to the Cretaceous series, which is the thickest and best developed of any in the island, there are younger limestones of Miocene and Pliocene, and Pleistocene age. Chalk and chalky marl outcrops are also numerous.

II. CLIMATE

The climate of Cyprus conforms to the usual eastern Mediterranean type. Frost is practically unknown on the coast, but may occur occasionally in lowland areas inland, and frequently on the hills, though the average winter temperature is 40° on the hills, and 55° F. on the lowlands. Despite the surrounding sea, rainfall is limited to 9 months of the year, the summer being completely dry. Control of rainfall by topography is very marked, with annual rainfall varying from 18 inches on parts of the plain to over 40 inches in the higher parts of the Troodos Range.

Reference has previously been made to the frequency with which low-pressure systems develop over the island. This gives a degree of changeability in weather greater than for most other parts of the Middle East, shown particularly in the greater length of spring and autumn. Because of this, plant life in certain parts is more varied, and a wide range of crops is possible. Another special feature is the high summer temperature of the interior plain. Once again, in view of the presence of the Mediterranean, it could be expected that a modification of summer heat might occur, but in fact, temperatures of 95° to 105° F. are common on the Mesaoria. This may be due to the effect of the coastal ranges, which, besides excluding maritime

influences, may produce a concentration of heat in the basin-like interior. The prevalence of dazzling white calcareous rock series may also be another, very minor, factor. Whatever the cause, however, the effects of summer heating are seen in the dusty, baked, and barren appearance of the Mesaoria, which, surprisingly, recalls

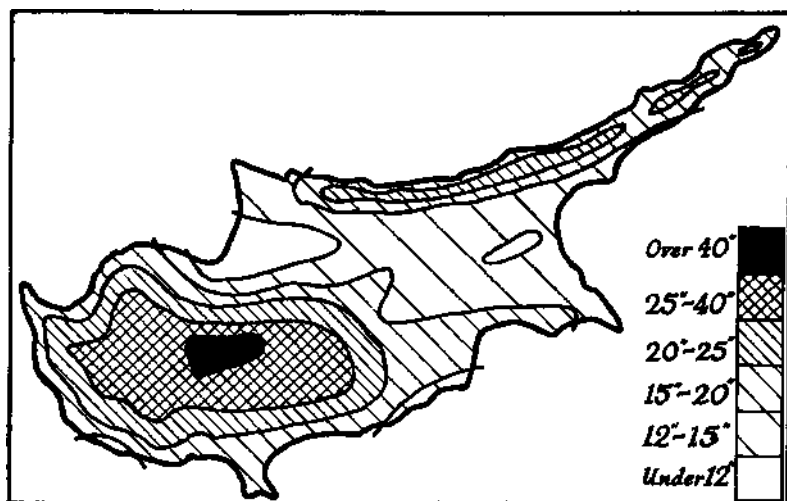


FIG. 77. Cyprus: rainfall.

parts of inner Arabia or Asia Minor rather than the verdant slopes and orchards of the Mediterranean coastlands.¹

REPRESENTATIVE CLIMATIC CONDITIONS

(° F. and inches of rainfall)

JC^w* (coast)	J	F	M	A	M	J	J	A	S	O	N	D	Total		
Temp.	53	55	58	64	71	78	83	84	79	73	63	57			
Rainfall	4.6	3.2	2.4	0.8	1.0	0.2	0	0	0.2	1.3	3.8	4.9	22.4		
Rainy days	1	1	9	8	3	3	1	0	1	3	8	1	0	5	7

Nicosia (Mesaoria)

Temp.	50	54	57	66	73	84	90	87	82	74	66	58			
Rainfall	4.3	3.1	2.0	0.7	0.9	0.1	0	0	0.1	1.1	3.0	4.7	19.0		
Rainy days	1	1	8	6	2	2	1	0	0	1	3	7	9	5	0

¹ Another indication of the fierce summer heat of the Mesaoria is the frequency of convectdonal air currents, which make the Nicosia airfield notoriously one of the most * bumpy * of the Middle East.

*Climatic Conditions—contd.**Troddos (mountain)*

	<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	<i>Total</i>
Temp.	44	48	51	57	60	66	70	69	65	59	52	46	
Rainfall	6.4	5.1	4.4	3.1	2.4	1.0	0	0	0.5	4.3	6.7	8.5	41*4
Rainy days	13	10	8	5	4	2	0	0	2	8	14	16	82

III. AGRICULTURE

The soils of Cyprus are in general very fertile. On the flanks of the Troodos Range material derived from a mixture of igneous and sedimentary rocks gives a rich soil particularly adapted to the growing of vines; and on the Mesaoria itself there is a layer of light loam, 15 to 20 feet in depth, which has been formed of material eroded from nearby hill slopes. The chief limiting factor in cultivation is, however, water-supply. Few perennial streams exist, because of percolation into porous rock measures; and the heavy, intermittent character of precipitation leads to much soil erosion. Hence though at first sight an average annual rainfall of 20 to 40 inches would seem adequate for agriculture, there is, in fact, a considerable water problem. Because of rapid run-off and evaporation, areas of good soil have become saline, and irrigation projects must overcome the difficulties of a porous bedrock and an irregular topography, which, as in Palestine, make the construction of barrages difficult. Another adverse circumstance is the system of land and water rights, which continue as under the Ottomans, with the familiar names of *mulk*, *miri*, and *waqf*. Unrestricted grazing by goats is another problem.¹ Malaria is widespread, especially in the Mesaoria, though better health measures undertaken by the government are producing a considerable improvement.

Nevertheless, Cyprus ranks as the most highly cultivated territory of the Middle East, and, with a proportion of over 50 per cent, of the total area under cultivation, is much further advanced than any other country.

Subsistence is once again the chief feature, with wheat as one main crop. Barley is grown on a scale as extensive as that of wheat, but

¹ Special laws have been enacted to reduce this menace. Damages may be claimed against the owner of goats that graze in cultivated land; and, if the owner cannot be traced, a communal fine may be inflicted on the entire animal-owning community. A village may vote to exclude all goats from its area, and special districts may be reserved for tree planting in which grazing is forbidden. Finally, shepherds and goatherds must be licensed, and the numbers of their flocks are controlled.

often in drier and less fertile areas. Besides providing fodder and an adulterant for wheaten flour, there is some export of barley for malting and distilling purposes. Production of wheat is, on the other hand, insufficient for home needs, and quantities are imported. A speciality of Cyprus is the carob—a moderately large, spreading tree that produces a long, sweet-tasting pod somewhat resembling a large broad bean in appearance. Carobs are eaten as food by poorer people, and also widely used as animal fodder. The taste of the carob makes it acceptable as a sweetmeat in many parts of the world (it was at one time sold in Great Britain under the name of 'locust bean'), and carobs are therefore used in the making of chocolate and confectionery. The pod takes 11 months to form after the flower has appeared, so that it is essential to preserve the ripening pod throughout the winter. Though an unusually 'long term' crop, even for the Middle East, carobs are of the greatest importance in the economy of Cyprus, and rank first among exports.

Potatoes thrive particularly on the sandy plains of the south-east (Famagusta region), and are exported in large numbers. Attention has recently been given to flax growing, and new plant strains have been introduced from New Zealand and Britain. Some of the flax is retained in the island as the basis of a home lace industry that provides occupation for women and girls, and the remainder is exported, chiefly to Britain. Tobacco is another crop which has increased in importance following an improvement in methods of cultivation. The Latakia variety is widely grown, chiefly for home consumption, though small quantities are sold abroad, some to Britain, as an ingredient in the blending of pipe tobaccos, the rest as cigarettes, to Egypt. A small cigarette making industry has developed in the town of Nicosia.

All the crops mentioned above are grown on the lowlands and lowest hill slopes below 1,000 feet. Most productive are the lowlands immediately adjacent to the hill ranges, since in these parts rainfall is heavier, streams are more numerous, and the soil richer and deeper. Towards the centre of the Mesaoria lack of water imposes an increasing control, and the inner parts of the plain are often left uncultivated. It is significant that Nicosia, the capital, and centre of a rich agricultural region, is located close to the southern slopes of the Kyrenia Range, and not, as might be expected from the topography, in the centre of the Mesaoria.

The coastal plain, narrow in many places, is highly cultivated, though exploitation is sharply limited by rapidly rising fold ranges.

Terracing exists, but is less a feature than in the Lebanon, where the presence of high-level mountain springs is a special inducement to develop the hill slopes. For the most part the higher parts of the Kyrenia and Troodos Ranges are given over to grazing. Because of differences in geological structure, however, there are considerable contrasts between the utilisation of the two ranges. The Kyrenia-Karpass folds, being composed of porous limestone, are karstic in many places, and vegetation often consists merely of a thin garrigue, giving scanty grazing for a few goats. The Troodos, on the other hand, is less rugged, though much higher, and has a heavier rainfall and lower temperatures. As the component rocks are impermeable, there is thus more surface water. Woodland (pine and oak) is a feature in many places, though until recently the area of forest was steadily being reduced by unrestricted grazing and cutting of timber for fuel. Now a scheme of afforestation has begun, with control of grazing, and it is hoped to preserve and extend this valuable natural resource.

On the middle slopes of both the Kyrenia and Troodos mountains, vine growing is important. The most productive area lies near the south-east of the Troodos boss, where there is a very rich, semi-volcanic soil. Cyprus has for long been the principal wine producer of the Middle East, and wines and spirits rank high in her list of exports. Cyprus wine does not compare in quality with the best products of France and Spain, but there is a moderately extensive market within the Middle East, and up to 1939, quantities were shipped to France for mixing with French wines. A special product of the island is 'Commandaria', a heavy sweet wine somewhat resembling port, the manufacture of which is said to have been introduced into the island by the Knights Templar. A 'sherry' type of wine is also produced in considerable quantities, and brandy is distilled at Nicosia and Limassol. Famagusta and Limassol, both close to the major wine region, handle the bulk of Cypriot exports of wine.

Besides their use for wine, grapes are dried and exported as raisins. The importance of raisins in the export trade of Cyprus is a reminder of the geographical relationship with Asia Minor, where raisins form a chief export. Oranges are also grown on an increasing scale, especially on the sandy soils of the coastal plains; and nut trees (almond, and to a less extent pistachio, walnut, and hazel) are also abundant.

The acreage under cotton has quadrupled since 1900. The cotton plant cannot tolerate a saline soil, but does well under a long, arid summer, so development has tended to occur on the inner regions of

the Mesaoria in parts where water can be made available. Towards the west a number of salt lakes and springs are found, and cotton cannot be grown. The best qualities of cotton are obtained when irrigation is applied, and in these irrigated areas American plants have been introduced, whilst native varieties are still grown in non-irrigated regions. Some raw cotton is used in the island for home weaving and embroidery, but an increasing market has been found in Europe, with France, Germany, and Greece as chief buyers.

IV. PASTORALISM

This is still important, though of recent years the herding of goats and sheep has been increasingly restricted. Now, with more than half the total area of the island under cultivation, herding on a large scale is a feature only of the more arid and mountainous districts. A traditional occupation in Cyprus is mule breeding, and, as mules are infertile, both horses and asses must also be kept. Mules proper (i.e. with an ass as sire) are chiefly used as harness animals—for ploughing and riding, whilst jennets (i.e. with a horse as sire) are smaller but surer-footed, and hence find employment as pack animals. In 1946 the export of mules ranked tenth amongst Cypriot exports, although during the war years the demand had been much greater, owing to the military needs of the Allies.

LIVESTOCK IN CYPRUS, 1946

<i>Sheep</i>	<i>Goats</i>	<i>Asses</i>	<i>Cattle</i>	<i>Pigs</i>	<i>Horses and Mules</i>
315,000	204,000	53,000	35,000	35,000	15,000

V. IRRIGATION

Until recently, the development of irrigation in Cyprus was very slow, and on a small scale. Sir Ronald Storrs, a former Governor of the island, suggests that one reason for this may be found in the conservative outlook of the peasants, and the deadening effect of long years of subsistence cropping by traditional methods. Other factors are geographical—deriving from structure and topography, since the problems discussed for Palestine recur in Cyprus. There is no large river that might be impounded; many of the rocks are porous, so that a large proportion of the rainfall is lost to the surface, and any barrage built must be * waterproofed' on the floor and sides before it will retain water. Another adverse factor, this time related to high summer temperatures and rapid evaporation, is the frequent

occurrence of saline deposits, which sometimes render irrigation water, when it has been collected and stored, brackish and unfit for use.

Small-scale irrigation channels have for centuries been used to lead water from the lower mountain ranges to the edges of the Mesaoria. Within the last two decades, larger schemes have been undertaken, involving the damming of small river valleys near their head, and the irrigation of patches up to several hundred acres in extent. Most of these developments have been round the Troodos massif, and in the majority of cases works are on a small scale : no comparison is possible with developments in Egypt or Iraq, though by existing standards in Cyprus, the advance has been considerable. Parallel with the development of irrigation schemes, re-afforestation has proceeded, with an attempt to find a livelihood for former goatherds and shepherds as forest watchers and fire guards. In this way the extent of cultivated land has increased, and the more wasteful aspects of pastoralism have been reduced. Moreover, with a stronger forest cover, soil erosion, which has come to be an urgent problem in some areas, is slowly being checked.

VI. INDUSTRIES

Mining.—The name Cyprus is said to be derived from *cyprium* (copper), which has been exploited in the island since Bronze Age times. Many veins of copper and other minerals still exist, though most are small, and widely scattered. As would be expected, the Troodos area is naturally the most favoured region for the occurrence of minerals, but there are a few deposits associated with the igneous intrusions of the Kyrenia Range. Iron and copper pyrites (sometimes mined together) are the most important minerals, but within the last two decades there has been considerable fluctuation in output. During the 1930's, production began in a number of centres that have since fallen off in output, or actually ceased production. In 1947, iron pyrites easily headed the list of mineral exports, and the chief centres of mining are Mandios, from which the ore is carried to Limassol and Larnaca for shipment, and Skouriotissa, from which a light railway gives access to Pendayia, on the Bay of Morphou (north-west Cyprus). Because of lack of fuel, treatment of the ore is carried out in Britain and the U.S.A. .

Copper is mined at Mavravouni (with treatment and concentration at Xeros), and there is also a smaller production from Kalavassos. One other centre, Limni, is an ancient site, re-opened in 1929 with

open-cast workings for treatment of ore formerly rejected as being too low grade; at present, however, there is no production, though work may again recommence. Active prospecting for fresh sources of minerals is in progress at Mathiaki and Apliki, which are again in the Troodos area.

Deposits of asbestos occur on the sides of Mount Troodos itself, but these were not at first regarded as valuable, since the fibres are short in length, and could not be used. Modern technique has latterly found a means of handling the short fibres—by using them in packing material, and in the manufacture of 'asbestos board'—so that the Troodos deposits are now exploited, and form the second most valuable mineral export. Amiandos is the chief centre, and an aerial ropeway carries the asbestos to Limassol, the nearest port.

The presence of small igneous dykes has led to metamorphism in surrounding sedimentary rocks, and certain of these metamorphic aureoles contain deposits of coloured earths, two of which, ochre and umber, are exploited on a commercial scale. Both earths are derived from grey Miocene marl, altered by intense heating to a yellowish or brown colour, and are mined in quantity at Mavravouni, north-west of Limassol. Italy and the United States are chief buyers of these pigments. A third coloured earth, known as *Terra Verte*, consisting of silicates of iron and potassium, is a product of the weathering of basalt. At one time, the production of *Terra Verte* was considerable, but its importance has now declined. Chromium also occurs on the slopes of the Troodos Ranges, but individual deposits are very small, and there is no real mining—instead, lumps of chromite are collected by peasants. It has been suggested that the conditions of occurrence of this chromium are closely similar to those of the Ural Mountains of Russia, and hence other minerals—platinum and nickel—may also exist. So far, however, these hopes have not been realised.

Another product of metamorphism is marble, which is found in many parts of the Kyrenian Range, and is used for building. There is no export. Gypsum of a high degree of purity is frequently found in the Tertiary series of the Mesaoria, and because of ease of working and proximity to the sea, there is an important export to the Levant states. Gypsum from Cyprus can undersell locally produced gypsum in northern Palestine, hence it has been much used in the considerable building programme that has been a recent feature of Palestine. Salt lagoons are found at Larnaca and Limassol, where it would seem that sea water penetrates inland through porous rock strata, emerging

later at the surface to form lagoons, which dry out in summer, leaving a naturally formed salt deposit. There is some exploitation for home use, and also for export.

EXPORT OF MINERALS FROM CYPRUS, 1946 (Tons)

<i>Iron Pyrites</i>	<i>Asbestos</i>	<i>Gypsum</i>	<i>Umber</i>	<i>Chrome</i>	<i>Copper (concentrate)</i>
256,000	6,400	14,000	7,000	1,000	400

It is of interest to note the wide variety of mineral production from such a small region, and also the varying methods used in exploitation. Iron, copper and asbestos are developed by large-scale companies using modern machinery, whilst part of the umber is produced by systematic methods of exploitation in open trenches. The remaining minerals are often gathered from the surface, and brought to merchants in Nicosia and Larnaca by farmers or foresters who are not directly engaged in mining.

Industries.—The industries of Cyprus are small in extent, and almost all related to agriculture. Fruit drying and packing, wine and cigarette making, olive oil pressing, and soap boiling are some of the chief activities. There is in addition a small textile industry carried on with native raw materials—cotton, flax, and wool—which is located in Nicosia and Famagusta. More important than this is, however, an extensive craft industry carried on in the home, the precise extent of which it is difficult to ascertain, since much of it is part-time work carried on by women and by agricultural workers. Large numbers of buttons are made, this item ranking fifth in the list of exports. The buttons are made from vegetable ivory (the dom nut) which is entirely imported from the Sudan. It is interesting to note that imports of the dom nut are only one-quarter as valuable as exports of the finished buttons—an example on a small scale of the value of craftsmanship applied to a small amount of raw material. Mention was made earlier of the lace-making and embroidery, which, using cotton, linen, and silk, reach a very high level of artistry. Both activities are *par excellence* a home occupation, and the villages of Lefkara and Lefkoniko are renowned as production centres, from which finished articles are sent to Nicosia for sale. Tourists provide the chief market for the lacework.

Though the Mesaoria is unattractive, the pine woods of the Troodos, and to a less extent the northern and south-western coasts provide ideal summer stations, and Cyprus may claim to rank second to the Lebanon in natural scenic beauty. Sea communications with the

mainland are not very good, but a regular air service with the Levant and Egypt brings a growing number of summer visitors from both regions. Troodos and Kyrenia are the main resorts. With settled political conditions, and an increased standard of living in the Middle East, there is some prospect of an increase in the tourist traffic of the island.

Fishing is, as we saw earlier, not well developed, and the activities of the ports are mainly in trading. There is, however, some sponge-fishing for 5 months of the year. Famagusta, on the east coast, is best placed for traffic with the Levant and Egypt, and also has easiest

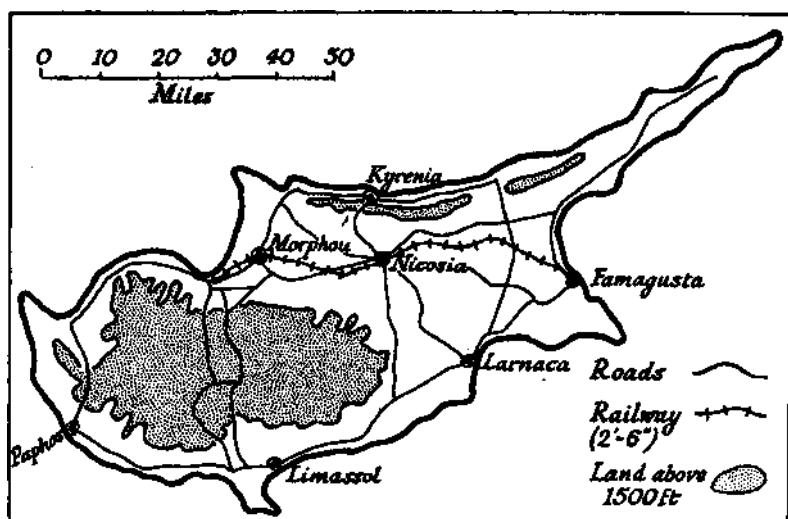


FIG. 78. Towns and Communications in Cyprus.

and most direct communications with Nicosia, the capital. The only passenger railway on the island (narrow gauge) runs between the two towns. As a result, Famagusta handles the bulk of the general trade of Cyprus, with the greatest share of imports, and most of the exports of the three commodities, carobs, fruit, and buttons. Limassol is next in importance, and its situation close to the Troodos Range gives it an advantage as an outlet for the minerals and produce of the Troodos vineyards. Asbestos and wine are the chief exports. Larnaca shares some of this trade also, and handles most of the exports of umber and common salt. Nicosia, the capital (population 34,000), is the natural centre of the island, and acts as a collecting centre for the

agricultural produce of the Mesaoria. The town is a focus of routes: one leading northwards through a gap in the hills to Kyrenia and the northern coastlands, another south-westwards to the Troodos, and a third south-eastwards to Famagusta and Larnaca. There are a number of small industries : textiles, fruit packing, cigarette and wine making, and, in addition, arising from its function as an administrative centre, some activity in printing, building construction, and light engineering. One feature indicative of the importance of Nicosia as a route centre is an elaborate system of fortifications, designed by the sixteenth-century Venetian rulers, which still dominates the lay-out and appearance of the town.

Cyprus is a British Crown Colony, having been held in full ownership since 1914, when a shadowy Ottoman suzerainty was ended. Of recent years, there has been a movement in favour of union with Greece. This is not without some valid foundation, since three-quarters of the inhabitants speak Greek and are members of the Orthodox Church. Cyprus was in fact offered to Greece in 1915, but the offer was declined, and, in view of the enhanced strategic importance of the island to Britain, now that Alexandria and Haifa have been evacuated, is not likely to be renewed. Under existing conditions, it is questionable whether union with Greece would solve Cypriot aspirations, since Greece herself may not be able to stand as an independent country, and closer association with that country might within a short time merely amount to a change of masters, with Russia or possibly even the U.S.A. replacing Britain as ruler.

THE FOREIGN TRADE OF CYPRUS

(Year 1946-47)

Total Value of Trade in £ Sterling : £19 million

Amount per head of population : £41

<i>Imports</i>		<i>Exports</i>	
	<i>Percentage of Total</i>		<i>Percentage of Total</i>
Cereals	15	Carobs	20
Cotton Textiles	7	Iron Pyrites	19
Machinery	5	Other Minerals	18
Total imports, £13 million		Total exports, £5 million	
Suppliers :		Buyers :	
(1) United Kingdom		(1) United Kingdom	
(2) U.S.A.		(2) U.S.A.	
(3) Australia		(3) Palestine	

CHAPTER XVIII

THE ARABIAN PENINSULA

FROM the environs of Palmyra as far as the Indian Ocean, and from the Red Sea to the shores of the Persian Gulf, there extends the vast platform of Arabia—a single block of ancient crystalline rocks that forms the largest unit of the Middle Eastern region. Complementing structural unity is a climatic unity: the whole of Arabia, with very small and local exceptions, has an annual rainfall of less than 10 inches, while at the same time temperatures are among the highest recorded in the world. Such physical unity has had an effect on the human geography of the region. From Arabia has arisen the special way of life spoken of as * Arab'; and though as a desert Arabia may appear unattractive and sparsely peopled, yet human activities in neighbouring lands have been closely conditioned by occurrences in the peninsula, and both from the physical and cultural aspects, Arabia emerges as the core, or heartland, of the entire Middle East.

PHYSICAL UNITS

Except in the north where it passes gradually into the Syrian steppes, and in a few parts of the north-east, where there is a continuity with the shorelands of the Persian Gulf, the Arabian platform is defined on all sides by a well-developed series of faults, which can be traced southwards from Transjordan along the whole length of the Red Sea littoral as far as Aden, then eastwards as far as Oman, northwards in parts of the Persian Gulf, and finally on a smaller scale along the western margins of the Euphrates valley as far as central Iraq. Because of this remarkable trend of faulting, the Arabian peninsula can be considered a single gigantic horst, with drowned lowland basins to south, east, and west; and a part of the ancient geosyncline of the Tethys to the north.

The block itself is covered by sheets of later sediments, which consist for the most part of calcareous series, or of sandstones. Though detailed information is lacking, it would seem that large-scale

folding and faulting is almost entirely absent; and important evidence of the simplicity of structure over most of central Arabia is furnished by the existence of copious springs of water on the shores of the Persian Gulf, particularly near and on the island of Bahrein. Flow of water from these springs greatly exceeds the total rainfall of the district, and it is thought that the source of the water must be the highlands of the Nejd, many hundreds of miles to the west—an indication that permeable rock series must extend without great disturbance for considerable distances. Further, it has been noted that the oilfields of the Persian Gulf consist of extremely flat domes, with a minimum of crustal disturbance. One exception to this general rule occurs, however. In the region of Oman, fold movements have uplifted a mountain chain to a height of 10,000 feet, but, as we have seen, this region is properly a part of the Zagros Range.

Almost all of the west and centre of Arabia lies at an altitude of at least 2,000 to 3,000 feet, with many ridges that reach considerably higher; but the plateau has been tilted so that the western edge stands much higher than the eastern side; and to the east of a straight line drawn from Abu Kemal on the Euphrates to the Kuria Muria Islands, the surface of Arabia is everywhere (Oman excepted) below 1,000 feet in altitude. Rise of magma along fracture lines in the west has further raised the level of the surface by producing extensive basaltic plateaus, with frequent volcanic cones that exceed 8,000 or 10,000 feet. The presence of igneous rocks is a prominent feature along the entire western side of Arabia, from south-west Syria as far as Aden. Further inland, basaltic eruptions become more of a minor occurrence, and are almost absent in the east.

Although no perennial rivers now exist, the whole Arabian plateau has been heavily dissected by fluvial action, as is shown by the presence of numerous deep wadis, many of which are still covered by thick layers of clay. The best developed wadis are those that follow the dip-slope of the plateau in the east and north-east, and hence open towards the Persian Gulf and Euphrates valley. It would, however, appear that certain wadis have not been entirely formed by river erosion, but are tectonic features subsequently enlarged by water action. One of the largest of these latter is the Wadi Batin, which can be traced from the region between Basra and Kuwait, where it is a steep-sided depression 4 miles wide, as far to the south-west as central Nejd. Another slightly smaller valley, but of similar origin, is the Wadi Sirhan, which runs south-east from the neighbourhood of Amman

(Transjordan) to Al Jauf. Parts of both Wadis are now filled by deposits of blown sand, and the original outline obscured.

We may subdivide the Arabian peninsula as follows:

- (I) The Western Highlands, extending from the Gulf of Akaba to the hinterland of the Straits of Bab el Mandeb.
- (II) The Southern Coastlands, from Bab el Mandeb to Oman.
- (III) The Oman region.
- (IV) The Eastern Coastlands.
- (V) The Interior Deserts.

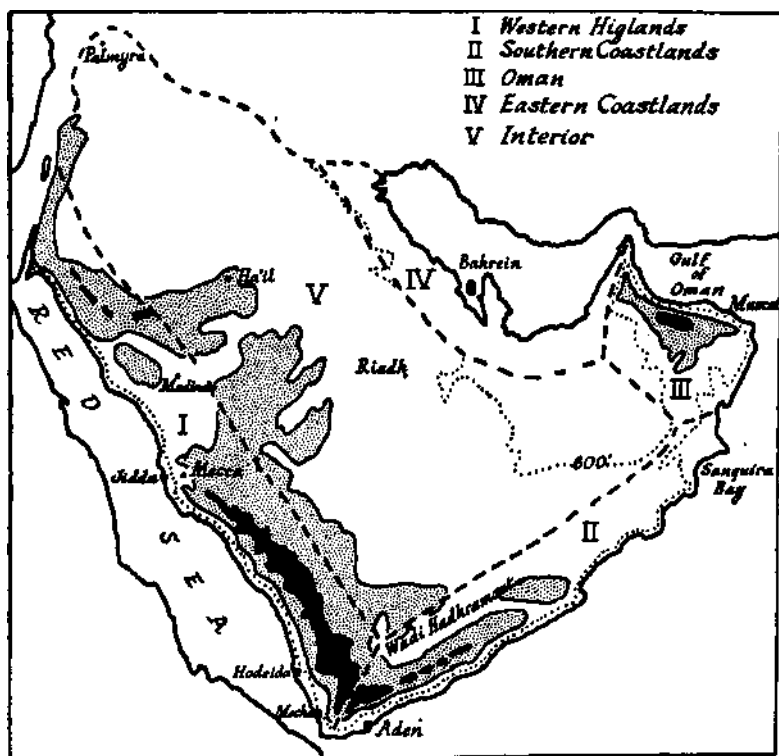


FIG. 79. Natural Regions of Arabia. Land above 3,000 ft. stippled.

I. THE WESTERN HIGHLANDS

The territory extending from the head of the Gulf of Akaba as far south as latitude 20° N., is spoken of as the Hedjaz. From the geographical point of view, however, the region of the Hedjaz is made up of two smaller and distinctive sub-regions—the Madian, which

lies north of latitude 24° N., and the Tehama, which lies between 24° and 20° N. The Madian, a highland region formed by uptilting and buckling of the plateau-edge, is composed of pre-Cambrian crystalline rocks (granite, schist, and porphyry) with numerous lava flows of Tertiary age. The highest peaks reach 9,000 feet; and on the west there is a series of step-faults which drop abruptly to a very narrow coastal plain. Many wadis have been deeply incised into the westwards facing scarps, and these are now occupied once in several years by torrents of a few days' duration, following a rare but heavy downpour of rain. Though short-lived, the torrents have considerable erosive power, and their course is often marked by ungraded deposits of silt, scree, and boulders.

On the eastern (dip) slope of the Hedjaz uplands, relief is rather less broken, and this region lends itself more to settlement and to the development of communications. Even though rainfall is sparse (being for the most part less than 5 inches per annum), and, as we have seen, extremely capricious in onset, water can be somewhat more easily retained and stored in the shallower, broader valleys of the eastern side of the mountains. A limited degree of oasis cultivation is therefore possible. The upland basins of the east also contain fairly extensive deposits of clayey alluvium, in the lower layers of which rainfall collects and is shielded from the effects of the sun, thus allowing a little irrigation from wells. On the seaward (western) side of the Madian, the effects of rainfall are soon dissipated by rapid run-off; and as a consequence towns and routeways are not found, even on the coastal plain. A further drawback to life on the coastal plain is the excessive atmospheric humidity produced by damp, on-shore breezes that bring in much moisture from the Red Sea.

Development has taken place only in the interior of the north-west Hedjaz. The extreme west, with its bare, rugged landscapes of jagged black and red rocks, is desolate; but at some distance inland, on the eastern flanks of the mountain ranges, there is a line of oases—Mudawwara, Tebuk, El Ala, and Medina—where garden cultivation is carried on to a small extent, and trade routes have been developed with the far north and south of the Arabian peninsula.

South of latitude 24° N. the mountain fringe decreases considerably in height, with a maximum elevation in many places of only 3,000 feet. The coastal plain is wider, and because of the lowness of the upland barrier, access to the interior is facilitated. This region is the

Tehama, or Plain, which has come to be the gateway to central Arabia, not merely by reason of its general lower altitude, but also, to a minor degree, because it lies in the 'waist' of Arabia, giving the shortest distance between the Persian Gulf and the Red Sea. Though rainfall is no more abundant than in the Madian, there is a greater concentration of population, due in the first instance to the development of long-distance trade, with the people of the Tehama acting as middlemen, and afterwards, as the result of historical accident, to the growth of pilgrimage to the cities of Mecca and Medina.

Over the greater part of the entire Hedjaz, vegetation is limited to a very few stunted bushes, and agriculture or even nomadic pastoralism are both virtually impossible except in a few inland wadis, where as we have noted the occurrence of clay soil retains a little water that elsewhere is soon evaporated. In such relatively favoured spots there is a little cultivation of dates, millet, wheat, barley, and Mediterranean fruits, with stock-rearing on the drier outskirts of the settlement. The towns of the Hedjaz were for long mere trading posts precariously self-sufficient in foodstuffs, and dependent for much of their existence on long-distance caravans, by which they could offer services, and hence obtain the means of importing extra food. Since the Muhammadan era the pilgrim traffic has been the chief economic activity of the district, and now that the former overland traffic in incense and coffee is carried by sea, such centres as Mecca, Medina, and Jidda would hardly exist at all, certainly not as towns of their present size.

Mecca itself, with a population of about 60,000, is situated on an alluvial-filled wadi, and the produce of its oasis can support less than one-fifth of its present inhabitants. About 100,000 pilgrims visit Mecca annually from all parts of North Africa, the Middle East, India, the East Indies, Central Africa, and even China. From these pilgrims most of the population of Mecca and Jidda is recruited, and extreme cosmopolitanism is a feature, the vast majority of merchants and *entrepreneurs* being non-Arab in origin. Medina was once rather more important than Mecca, as it has a slightly larger oasis and easier communications; but although it caters for a certain number of pilgrims,¹ it is now overshadowed by its southern neighbour. Jidda has a small trade in imports of manufactured goods (telegraphic equipment, etc.) for the state of Saudi Arabia, but the bulk of its activities too are concerned with pilgrimage, as over 90 per cent, of

¹ Medina ranks as the second holy city of Islam, with Jerusalem the third.

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Tehama, or Plain, which has come to be the gateway to central Arabia, not merely by reason of its general lower altitude, but also, to a minor degree, because it lies in the 'waist' of Arabia, giving the shortest distance between the Persian Gulf and the Red Sea. Though rainfall is no more abundant than in the Madian, there is a greater concentration of population, due in the first instance to the development of long-distance trade, with the people of the Tehama acting as middlemen, and afterwards, as the result of historical accident, to the growth of pilgrimage to the cities of Mecca and Medina.

Over the greater part of the entire Hedjaz, vegetation is limited to a very few stunted bushes, and agriculture or even nomadic pastoralism are both virtually impossible except in a few inland wadis, where as we have noted the occurrence of clay soil retains a little water that elsewhere is soon evaporated. In such relatively favoured spots there is a little cultivation of dates, millet, wheat, barley, and Mediterranean fruits, with stock-rearing on the drier outskirts of the settlement. The towns of the Hedjaz were for long mere trading posts precariously self-sufficient in foodstuffs, and dependent for much of their existence on long-distance caravans, by which they could offer services, and hence obtain the means of importing extra food. Since the Muhammadan era the pilgrim traffic has been the chief economic activity of the district, and now that the former overland traffic in incense and coffee is carried by sea, such centres as Mecca, Medina, and Jidda would hardly exist at all, certainly not as towns of their present size.

Mecca itself, with a population of about 60,000, is situated on an alluvial-filled wadi, and the produce of its oasis can support less than one-fifth of its present inhabitants. About 100,000 pilgrims visit Mecca annually from all parts of North Africa, the Middle East, India, the East Indies, Central Africa, and even China. From these pilgrims most of the population of Mecca and Jidda is recruited, and extreme cosmopolitanism is a feature, the vast majority of merchants and *entrepreneurs* being non-Arab in origin. Medina was once rather more important than Mecca, as it has a slightly larger oasis and easier communications; but although it caters for a certain number of pilgrims,¹ it is now overshadowed by its southern neighbour. Jidda has a small trade in imports of manufactured goods (telegraphic equipment, etc.) for the state of Saudi Arabia, but the bulk of its activities too are concerned with pilgrimage, as over 90 per cent, of

¹ Medina ranks as the second holy city of Islam, with Jerusalem the third.

Moslems now arrive by sea. The Pilgrim Railway from Damascus was never fully repaired after the ravages during 1914-18, and no longer functions within the limits of the Hedjaz.

To the south of the Tehama (i.e. southwards of lat. 20°), the land again rises considerably to form extensive uplands that are known as the region of Asir. The general effect is still unmistakably that of a tilted and dissected tableland, with abrupt westward-facing fault-scarps ; but most of Asir lies above 5,000 feet, with the highest points just under 10,000 feet above sea-level. By reason of their elevation, slightly greater than those of the northern Hedjaz, the uplands of Asir have a moderate precipitation, partly in the form of summer rains, and part from fog and dew. As a result, there are a number of short but fast-flowing streams for several months of the year, though none of these reach the sea, except during exceptionally heavy floods.

In their upper courses, the streams are deeply entrenched in steep valleys, which carry a dense 'jungle' vegetation of evergreen bushes, thorns, and moderately sized palms. At some distance away from the valley bottoms, this vegetation changes to thick grassland, with clumps of taller trees. The higher slopes of the valleys have been cleared and terraced for the cultivation of millet, wheat, bananas, dates, coffee, yams, and vines. In the west, at the junction of the uplands and a narrow coastal plain, the streams lose themselves in the sand, but here occur fields of millet, and groves of a special kind of palm (the Daum), which produces a hard fruit that is eaten by the Badawin of the region. As Philby has suggested, the entire region of Asir might be a part of Africa. The savanna-like aspect of the upper valleys, a climatic regime of summer rainfall, strongly African fauna, clusters of beehive shaped huts made of straw and clay, elaborate basket-work implements, and the predominant crops of sorghum, bulrush millet, bananas and coffee—all these recall East Africa or the Sudan rather than the mainland of Arabia.

One unusual feature, described by Thesiger, is the shifting cultivation practised in Asir. When rains fail, as they may, in one particular valley, the whole population migrates to another district where precipitation has been more abundant. Here they help in the routine of cultivation, and later return home with a share of the crops that they have had a hand in growing, also with the knowledge that when rains fail in other parts, they too may be called upon to receive destitute neighbours.

As the land drops towards the Red Sea, it becomes increasingly arid

and sandy. On the Singes of the piedmont zone, there are a number of communities of pastoral nomads who rear goats ; but close to the coast there is insufficient vegetation even for grazing, and most of the plain is devoid of inhabitants.

The Yemen.—South of Asir lies the state of the Yemen, independent since the withdrawal of the Turks in 1918. The country extends for about 300 miles between latitude 18° and 12° N. ; and, with a territory half the size of Great Britain, has a population estimated at 3\ to 4 million. It is a closed region, into which foreigners are not encouraged to enter; and parts are unexplored by westerners. Occasional journeys by travellers are the main source of information on geographical conditions.

As regards topography and structure, the Yemen is closely similar to Asir, except that conditions are on a slightly larger scale in the south. The structure of a tilted plateau continues, but is more imposing, with wide areas lying between 7,000 and 10,000 feet; and the highest summit in the whole of Arabia (Bani Shaib, 30 miles west of Sa'ana) is estimated to reach 14,000 feet above sea-level. The plateau surface is deeply eroded by watercourses, but there are also extensive level areas, many of which are highly cultivated. On the Red Sea side, the plateau falls steeply to a coastal plain that is a continuation of the lowland occurring in Asir, but again on a larger pattern; and there is the same feature of streams rising in the uplands but failing to cross the coastal plain to reach the sea. Lava flows are prominent on the plateau, and frequently weather to a rich fertile soil.

Because of the differences in altitude in the Yemen, there is wide variation in climatic conditions. On the plateau, winter temperatures fall below 40° F., and frost and snow are of regular occurrence on the higher ridges, though actual snowfall is less a feature than in the Hedjaz further north. Sheepskins are, however, worn by most Yemenites during the winter. In summer, because of nearness to the Equator, temperatures are high, but by no means as high as in the rest of Arabia, partly because of greater elevation, and partly owing to the fact that there is a well marked rainy season which gives a cloud cover during the months of July, August, and September. Little can be said with precision concerning the climate of the Yemen; but it is, however, definite that rainfall exceeds 20 inches per annum over most of the plateau, and may reach 40 inches on the highest parts. Most rain seems to fall in heavy, intermittent showers, often during the night; and there are two seasons of onset—a major rainy period

from July to September, which is obviously related to the monsoonal conditions that affect Abyssinia and India; and a minor rainy season in March, which may be a remnant of the Mediterranean regime that is typical of the rest of the Middle East. It is to be emphasised that these wetter conditions obtain only in the higher parts of the Yemen : the coastal plain adjoining the Red Sea has a very scanty rainfall, with a maximum discernible in winter.

Because of rapid transition from plain to interior plateau, there is a succession of climatic zones (and hence of patterns of human occupation) that recall in a very limited way conditions in the Lebanon. The flat or gently undulating coastal plain, up to 50 miles wide, is desolate, and occupied only by a very small and mixed population chiefly of African origin (Danakils, Somalis, and Abyssinians). Near the coast of the Red Sea are swamps and lagoons; further inland, dry torrent beds full of pebbles and scree alternate with loose sand that is frequently raised in dense clouds by the strong wind. Two small ports, Hodeida and Mocha (Mocca) are outlets for trade from the interior highlands, and have little contact with their immediate hinterland, the barren coastal region. Without the plateau, neither port could exist.

The lowest slopes of the plateau are deeply weathered into ravines and rocky spurs, and access to the interior is a matter of considerable difficulty—an important element in the physical and political isolation of the state of the Yemen. At first, on the borders of the plain, vegetation is scanty, consisting of cactus, tamarisk, acacias, and dates, which support a small semi-pastoral population. Above 3,000 feet, Mediterranean plants appear : carobs, figs, and walnut trees. At 4,500 feet begins the most productive zone of the Yemen. Cereals (wheat, millet, and barley) are found wherever there is sufficient soil, or wherever terraces can be cut; and one finds a considerable variety of fruit trees and vegetables : apricots, citrus fruit, vines, pomegranates, onions, tomatoes, carrots; and also lucerne. Two plants merit special mention : the coffee shrub, which grows between altitudes of 4,000 and 5,000 feet; and the qat plant. Coffee is not now cultivated on a large scale, and tends to be restricted to the damper western side of the plateau, in the district of Manakha, which lies behind the once important, and now declining port of Mocha, where one kind of coffee gained its name.

The qat is a shrub that grows to a height of about 10 feet, and its leaves, when chewed or infused, have a strongly narcotic effect like that

of alcohol—a sense of well-being is induced, though a state resembling intoxication may be brought on by considerable indulgence. Qat eating is widely practised by all sections of the population, and extensive areas in the Yemen are given over to its cultivation, with the state deriving much revenue from taxation of qat plantations. The plant

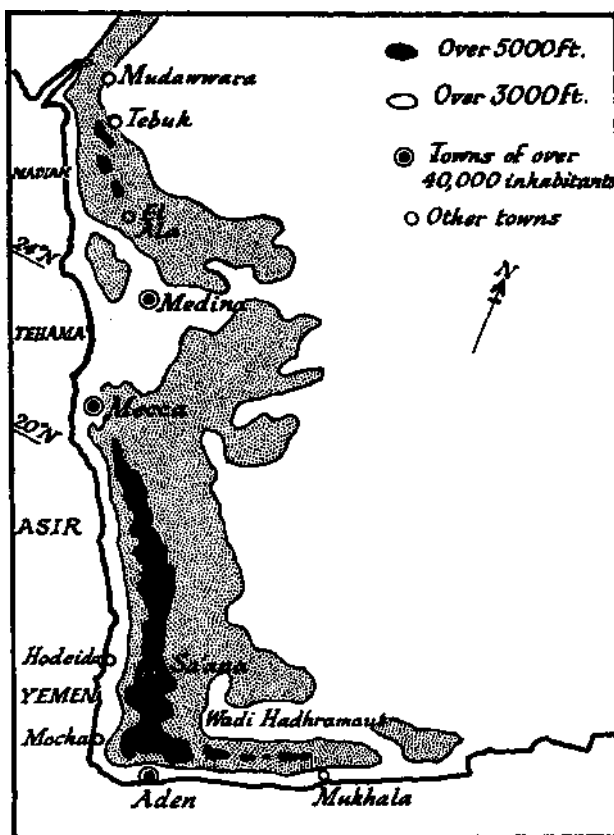


FIG. 80. The West and South of Arabia.

itself is restricted, like coffee, to high altitudes, actually 5,000 to 9,000 feet; and fairly abundant moisture is necessary in the later stages of growth. Whilst it is cultivated all over the Yemen, the main centre of production occurs in the extreme south-west, round Ta'izz; and there is some export of the plant to neighbouring regions, where, because of lower relief, the plant will not grow.

Sa'ana, the capital of the Yemen (50,000 inhabitants) lies at an altitude of about 7,500 feet, in the centre of a fertile district given over to the cultivation of cereals, fruit, and vegetables, with irrigation from wells and cisterns. Dates do not ripen at this altitude, but there is a wide range of Mediterranean fruits; and sheep, catde, and camels are kept. Besides the Zaidi (Shi'a) majority (p. 109) there are smaller groups of Sunni Moslems, and a fairly considerable community of Oriental Jews, who have been settled in south-west Arabia since the Dispersal. Many of the latter are artisans in stone, glass, and metal, and in textiles; and Jewish quarters are a feature, not merely of Sa'ana, but also of most towns in western Arabia.

Little can be said of the external economic relations of the Yemen. Small quantities of coffee are still exported, now chiefly from Hodeida rather than Mocha; and qat is carried into the interior by camel, but as it must be used within a week of picking, the volume of this traffic is distinctly limited. Otherwise the Yemenites live a self-sufficient life, and contacts with the rest of the world are deliberately kept to a minimum.

II. THE SOUTHERN COASTLANDS

The main feature is a gradual drop in elevation from west to east. In the extreme west, there is a plateau only slightly lower than that of the adjacent Yemen, but towards the east average altitude is under 3,000 feet in the region of Saihut (Long. 51° E.), and less than 600 feet at Sanqira Bay (Long. 57° E.). A special topographical element peculiar to the south-west of Arabia is the presence of a broad, well-defined valley, the Wadi Hadhramaut, which runs parallel to the coast some 120 miles inland, and extends for a distance of 200 miles before making a sharp turn south-eastwards, and cutting through the coastal ranges to reach the Indian Ocean near Saihut. One curious point about this wadi is that the upper part is much broader than the lower end; and the origin of the valley would seem to have been due to intricate river capture, with a small stream working back through the southern coastal uplands and diverting to the Indian Ocean a larger river that followed a west-east course along the dip slope of the Arabian plateau to enter the Gulf of Oman.

In structure, southern Arabia closely resembles the western region previously described. There is the same underlying pre-Cambrian basement of granitic and metamorphosed series, overlain by sedimentary limestones and sands, with massive basaltic intrusions and

occasional volcanic cones. Near the coast, fracturing and disturbance are outstanding features, so that folding and step-faulting occur; but further inland, the rocks lie almost horizontally. In the west, a narrow coastal plain 5 to 10 miles wide gives way to a tableland some 4,000 to 7,000 feet above sea-level that is heavily dissected into dry wadis. These wadis are often quite devoid of vegetation. North of the tableland lies the trough of the Wadi Hadhramaut, with, still further north, a much lower but fairly level plateau 1,000 to 2,000 feet in height, which continues into inner Arabia.

Rainfall is distinctly less than in the Yemen. A few of the higher parts of the Hadhramaut and Dhofar may receive as much as 25 or 30 inches annually; the rainy season occurring in summer; but over most of the south of Arabia the annual average falls below 7 inches, and the rainy season is late winter, summer being quite dry. Because of higher relief, the west is somewhat wetter than the east, and Aden has 5 inches of rain annually, whilst towards Oman, rain may fall only once in 5 or 10 years. By reason of reduced elevation as compared with the Yemen, temperatures are high; and so for the most part the southern margin of Arabia is barren, with agriculture confined to a very few and scattered districts—such as the alluvial terraces and flat beds of wadis where winter flood-water is retained in the clayey subsoil; or near hills where seasonal streams can be led into tanks and cisterns.

The cultivated plants of southern Arabia differ markedly from those of the remainder of the Middle East. Being isolated towards the north by deserts, the inhabitants tend to look more to the east and south-west, and the crops grown have therefore some resemblance to those of India and East Africa. Millet is the chief cereal, with barley and wheat as subsidiaries, and such trees as the date palm, sago palm, mango, paw-paw, banana, and guava are found, together with some cotton, castor oil, indigo, and tobacco. The oases in which cultivation takes place are naturally more numerous in the west, the largest being at Lahej (Aden Protectorate), and at Meifa and Sha'il (north-west and north-east of Mukhala). The presence of subterranean water in the Wadi Hadhramaut suggests that some considerable development of agriculture might be possible in this latter region, provided an irrigation scheme based on wells could be created. At present, cultivation in the Wadi is limited to the middle portion, where the river actually flows for a part of the year; but lower down the slopes, towards the sea, water is much scarcer and agriculture far less a feature.

Two products of southern Arabia are frankincense and myrrh, which are both obtained from the sap of trees that grow on the damper hill slopes above 3,000 feet. The sap is collected in late spring and early summer, before the onset of the rains, mainly by migrant Somalis and other Africans. At one time there was a considerable trade in these products with the north, and tradition speaks of an 'Incense Route' somewhere in south-west Arabia, along which caravans moved northwards to Medina and the Levant. Nowadays the output of frankincense and myrrh is very much smaller, most coming from the uplands of Dhofar.

Towards the east, as relief declines and rainfall diminishes, cultivation becomes more and more precarious, and fishing is the main occupation. Large quantities of shark, tunny, and sardines are caught (Chapter X), most of which are dried as food both for humans and for camels. In addition, an oil is prepared from the fish for use in woodworking. Mukhala and Shihr are the chief fishing centres, and in these towns rows of fish drying in the sun for food, and rotting in heaps to produce oil, are prominent, and according to some visitors, unforgettable, features.

With a barren hinterland, many activities in southern Arabia centre on the sea; and, in addition to fishing, trading by dhow is important. The Arabs of the south are the Greeks of the Indian Ocean, and cargoes are carried between East Africa, Arabia, the Persian Gulf, and India—even, at times, the East Indies. From their sea-trading, the natives of Aden and the Hadhramaut derive a livelihood that allows the import of foodstuffs into the country—as it is, local production of food is quite insufficient to maintain the existing population, and part must come from the outside. A cosmopolitan outlook, and wide commercial contacts, strongly contrasting with conditions in the Yemen, are strikingly indicated by the architectural styles in southern Arabia, which are very greatly influenced by East Indian models. Many storied houses, with elaborate woodwork and carving, are most characteristic. After a life of trading, perhaps with many years spent away from his country, the southern Arab often returns to Aden or the Hadhramaut with a small fortune that will keep him in comfort for the rest of his life.

Aden is the principal town of the region, and its harbour, the only good one along the entire coast, from Bab el Mandeb to Muscat, is formed by a deep bay partially enclosed by two volcanic necks. The town, of 40,000 inhabitants, owes its development to British

influence, as a coaling station and garrison; and with its settled political conditions, which are in contrast to the turbulence and unrest of the remainder of southern Arabia, Aden has come to be a collecting centre and market for the products of the entire region. Coffee is brought in native boats from both sides of the Gulf of Aden, frankincense comes from Dhofar and the Hadhramaut, cereals and other foodstuffs from India, and timber for houses and boatbuilding from the East Indies and Burma.

Politically, most of the southern coastlands of Arabia are under British influence. Aden and its immediate hinterland are British protectorates; and further east, in the Hadhramaut, there is a rather vaguer British suzerainty over Arab rulers. The lowlands of Shihir adjoining the Hadhramaut are now part of the state of Oman. In many instances, however, the frontiers between various spheres of influence are not fully delimited, and on some maps the boundaries of the Yemen, Saudi Arabia, Oman, and the British protected territories appear only as approximations.

III. OMAN

In the extreme south-east of the Arabian peninsula lies the region of Oman, distinct structurally from the rest of Arabia, and isolated on the landward side *by the desert of the Rub al Khali, or El Dahna—Philby's Empty Quarter. Because of this isolation, Oman has few contacts with the interior; and in its culture and economic life looks more towards Iran and India than towards the Arab lands of the north and west.

Oman consists of an enormous upfold of rock series of many ages, with disturbed pre-Cambrian rocks as the core and later sedimentaries (chiefly limestone), resting upon this core in irregular masses. Faulting has occurred on a considerable scale; and extensive dislocation in the north, in the region of the Musandam peninsula, has given rise to a varied topography of tectonic valleys and upland horsts. Subsequent drowning by the sea has produced a fjord type of coastline, with long, deep inlets shut in by steep walled cliffs. The largest of these drowned troughs is Elphinstone Inlet at the head of the Musandam Peninsula, which is 10 miles long, and surrounded on all sides by cliffs 3,000 to 4,000 feet in height. These deep-water estuaries make excellent harbours, but are greatly handicapped by lack of access to the shore—

as there are no rivers, most inlets come to an abrupt end in a sheer wall. This is the case at Muscat, which has a moderately good harbour, but is extremely difficult to approach from the land. Another serious drawback is the extreme heat and humidity of the inlets, which, surrounded by high cliffs, are calm, and intolerably steamy. Climatic conditions in these creeks have been described as consistently the worst in the world for sustained human activity. The few inhabitants spend only a part of the year in Oman, where there is a little winter fishing, and migrate for the summer months to Iraq, where they find employment as date harvesters.

The interior of Oman is for the most part a high tableland of about 4,000 feet in elevation, with a central ridge, the Jebel Akhdar (lying west-south-west of Muscat), that rises to 9,000 or 10,000 feet above sea level. Numerous deep and steep-sided wadis are a prominent feature, most being aligned in a south-west—north-east direction. Rainfall is thought to be less abundant than in the Yemen (statistics are lacking) but there is certainly a fall of more than 10 inches, since numerous springs occur, many of them impregnated with mineral salts. From these springs, as also from direct rainfall stored in tanks, many oases are irrigated. The higher parts of the plateau (region of the Jebel Akhdar) have a steppe vegetation, with occasional patches of small trees. Lower down, on the northern rim of the plateau, overlooking the Gulf of Oman, water is led from wadis that are deeply incised into the scarp edge to numerous terraced plots; and here millet, wheat, barley, apricots, figs, vines, and coffee trees are cultivated. On the south-western side of the plateau, overlooking the Arabian desert, water supplies are fewer, and cultivation is therefore restricted to a narrow zone along the foot of the hills, where a line of springs is found.

On the lower slopes of the northern plateau-edge, date growing becomes increasingly important. Irrigation is necessary, and this is maintained by a system of qanats (known locally *asfeledj*), which tap the waters of thermal springs. On the lowlands close to the coast of the Gulf of Oman, some oasis cultivation of dates also occurs, especially towards the east; but owing to lower relief and higher temperatures, the coastal zone is far less productive than the interior.

As in southern Arabia, many of the coastal dwellers turn to the sea for a living; and fishing, fish curing, and long-distance trading by dhow are the principal activities of this region. The deserts of the interior are generally too extensive to cross, and practically all com-

mimications, even with the west, are by sea. Trade from Oman itself is, however, on a small scale. Quantities of dates and dried fish are exported in return for cereals (chiefly rice), teak for boatbuilding, and for small manufactured goods such as rifles, ammunition, and knives.

Like that of its south-western neighbour, the population of Oman is of very mixed racial origin; and besides indigenous Arabs, there are many African negroes (some still slaves),¹ and a number of tribesmen from the northern shore of the Gulf of Oman. Structurally an outlier of Iran, Oman displays a curious cultural link with its larger neighbour: in religion the Shi'a faith is dominant; and observers have commented on the fact that ways of life seem closer to Iranian habits than to normal Arab practice.

Muscat, the chief town and port of the region, has great strategic importance through its command of the southern entrance to the Gulf of Oman. As a centre of trade, however, it is handicapped by the low productivity of its immediate hinterland, and its difficult landward communications. In one sense, it can be regarded as a mirror-image of Aden on the east side of the Arabian peninsula, since main emphasis is on sea traffic and control of a sea-gulf. Like Aden too, Muscat turns its back upon the land, and depends for its existence on relations by sea.

IV. *THE EASTERN COASTLANDS

From the peninsula of Musandum as far as the Shatt el Arab, the coastal region is everywhere below 600 feet, and consists for the greater part of an undulating plain, diversified very occasionally by low hills. In the north-west, towards the head of the Persian Gulf, the plain is either sandy or covered by stones and scree, the product of exfoliation; and on its seaward side there is a wide zone of lagoons and mangrove swamps. Because of rapid deposition of sediment from the Shatt el Arab, the coastline is being built up from the sea, hence numerous small islands, reefs, and shifting sandbanks are characteristic of the southern Gulf coast.

Reference was made earlier in the chapter to the remarkable phenomenon of springs of water occurring in many parts of Hasa, and especially on the island of Bahrein. There are even springs of water issuing from the sea bed, giving freshets of drinkable water in

¹ Oman was for long the base for Arab slave-raiding in the African continent.

the open sea. Careful investigation has established that the source of supply must lie in the western highlands of Arabia; and it would seem to be definitely not a question of supply from a local artesian basin of restricted extent, as is the case in Palestine and the London Basin. There is, however, one limiting factor—the amount of spring water is related to the amount of rain falling in the west, and so the total supply is not inexhaustible. Within the last few years, owing to excessive sinking of wells, the flow of water has been reduced.

As annual rainfall is less than 4 inches, cultivation is possible only where springs occur, or where artesian basins can be tapped. The largest of these better watered spots occurs round the periphery of the island of Bahrein, and others found near Qatif, on the mainland opposite Bahrein island. Another artesian area extends for about 10 miles in the district of Sharja. Dates are the chief crop, and millet and wheat may be grown in addition if sufficient water is available.

The fact that the coast from Ras Musandum to the base of the Qatar Peninsula was known as the Pirate Coast indicates the low productivity of the region; and now that piracy has been brought to an end as an economic activity, the western stretch of coastline from Abu Dhabi to the Qatar peninsula is uninhabited.¹ The Qatar region is a small upfold of limestone that reaches a height of 250 feet above sea level, and the entire inland zone consists of empty karstic upland. Round the coast, where artesian water occurs, there are a number of oases with date-palms, and tiny ports have grown up.

Though small, the island of Bahrein is one of the most productive regions of the Persian Gulf. The island itself, one of an archipelago, consists of a shallow limestone dome, the centre of which has been eroded to form a series of lowland basins or *poljes*. The periphery of the island, especially on the northern side, is irrigated from the springs previously mentioned, and much of the north is covered by date groves with smaller patches of citrus fruit, cereals, and fodder crops. Until the discovery of oil, the interior was uninhabited, but now considerable development has taken place in the district of the Jebel Dukhan, and drinking water is imported both into the interior, and also into the chief port, Manama, as local supplies are hardly sufficient. Manama is the capital of Bahrein, and besides handling the exports of the islands—oil, pearls, mother-of-pearl, hides, dates, and cereals—is also the centre of a fishing trade. Fish are caught and dried in large

¹ A British expedition in 1819 ended the power of the pirates, and the region is now termed the Trucial Coast.

numbers, mainly for human consumption, but to some extent as cattle fodder. The population of Manama is 30,000.

North of Qatif as far as Kuwait and the delta of the Tigris-Euphrates the coastal plain of Hasa is barren and almost uninhabited. Extensive coral reefs fringe the shore, and inland there are wide expanses of lagoon and salt marsh, which reach their greatest extent towards the north-west, in the neutral zone between Kuwait and Saudi Arabia. One very small port, Oqair, with a poor harbour, handles a tiny traffic for the interior of Arabia via Hofuf and Riadh.

In sharp contrast to the difficult coast of Hasa, where ships of any size cannot approach nearer than 20 miles to the land, there is one

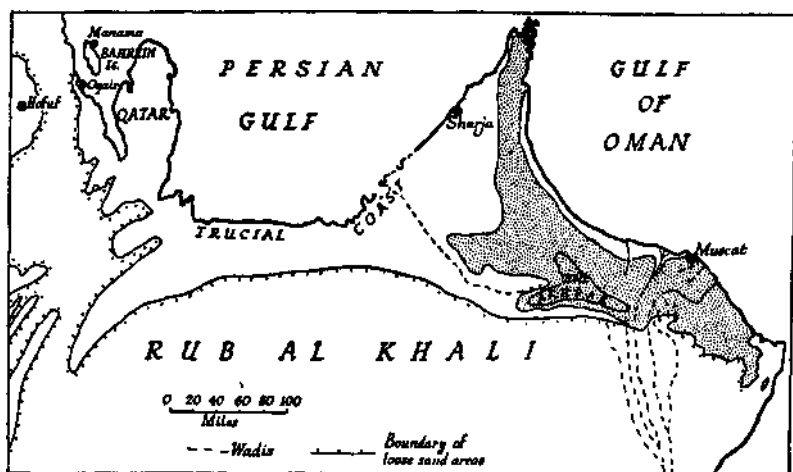


FIG. 81. Oman and Eastern Arabia. Highlands shaded. (Data from Miles and Philby.)

good harbour in the north, with a deep-water inlet. This is at Kuwait, which has a long, landlocked bay that provides the only sheltered anchorage on the southern side of the Persian Gulf. A number of springs occur, and some cultivation is carried on—chiefly of dates, vegetables, and cereals; but water supplies are now inadequate for the town of Kuwait, which has grown considerably since the development of its oil resources. Drinking water is therefore imported from the Shatt el Arab, nearly a hundred miles away. Kuwait (population 70,000) is the natural outlet for the north-east of Arabia, and in some respects is a rival to Basra. Because of the rather difficult land communications of Basra (due to the extent of marsh), Kuwait has a small trade with the interior of south-west Iraq and Arabia in livestock and

hides, since live animals can be driven on the hoof to Kuwait along the narrow zone of steppe that fringes the lowlands of Mesopotamia. An important activity in Kuwait is shipbuilding, and many of the larger dhows and pearling craft of the Persian Gulf are built there, from teak imported from Burma. Owing to its good harbour, it has also come to be a collecting centre and transshipment point for commodities moving to and from the smaller Gulf ports, which, as we have seen, are not accessible to larger vessels. Most of the trade is with India.

Pearl fishing is an important occupation from many ports of the Persian Gulf, though the last 20 years has witnessed a considerable decline, partly because of a change in fashion, and partly owing to the competition of artificial pearls. Fishing is a seasonal activity, being limited to the 4 months between May and September. The chief centre is Bahrein, and it is estimated that about 250 boats take part each year, as compared with 170 from Kuwait. Most of the pearls are sold at Bahrein; the pearl shell also being an important article of commerce.

In addition to the exploitation of oil resources, which will have considerable effect on the life and economic activities of the Persian Gulf region during the next 10 years, mention must also be made of a second recent development. This is the growth of long distance air transport between Europe, America, and Asia. Because of the flat, open nature of the east coast of Arabia, and its accessibility in certain parts by sea, a number of large air bases have recently come into existence, and the Gulf region, 50 years ago a torrid backwater isolated from commercial activity, has now regained importance owing to its situation on the main route to India and the east. Air bases exist at Sharja (100 miles south-west of the Musandum peninsula), at Khor Khaliya (near Manama on Bahrein Island), and at Kuwait.

V. THE INTERIOR DESERTS

Though generally referred to under the single term of * desert', the interior of Arabia is by no means of uniform character. North of a line drawn roughly from the Gulf of Akaba to Jauf and Kuwait, lies the Badiet esh Sham, * steppes of the north'—a level, open region, which is partly true desert, and partly steppe. Further south, between Jauf and Ha'il, is the Great Nefud, a region of loose sand and bare rock. The Nefud is continuous on the south-east with a much larger expanse of sandy desert, which sweeps south-eastwards in a great arc between

Hofuf and Riadh, and then expands southwards to occupy most of inner Arabia between Oman, the Hadhramaut, Yemen, and Asir. This is the Rub al Khali (Abode of Emptiness) or Dahna, the largest and most forbidding of all hot deserts in the world. On the west, between the Nefud and the Rub al Khali and defined summarily by a

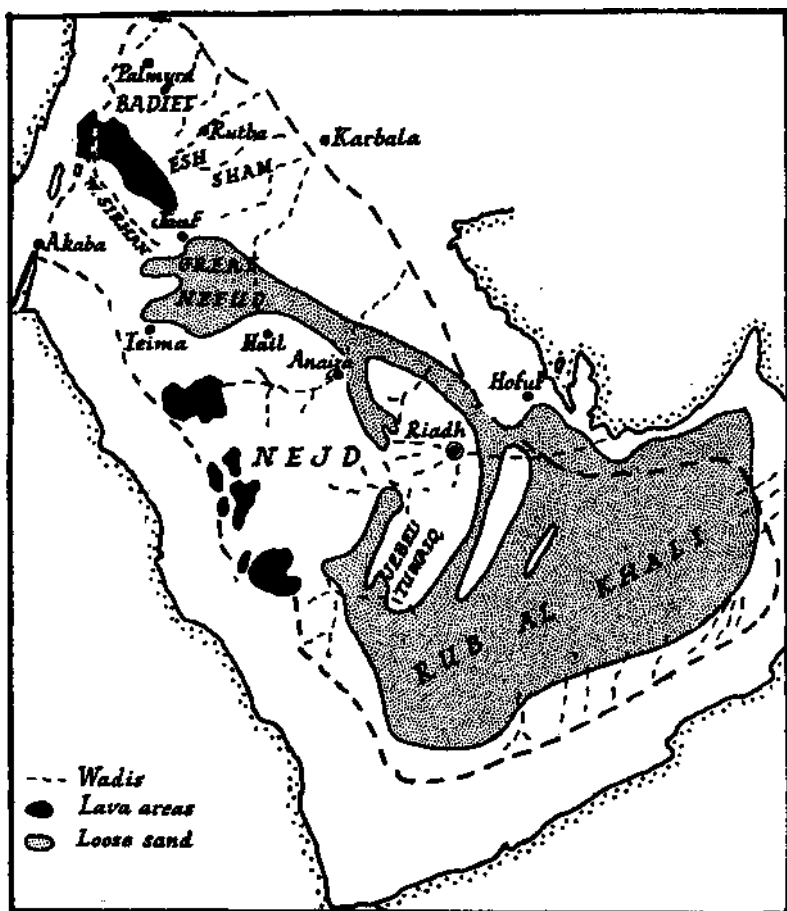


FIG. 82. The Interior of Arabia.

triangle, the points of which might be taken as Riadh, Medina, and Mecca, there lies the Nejd—a somewhat less barren region, which is the homeland of the Wahhabi confederation.

The Badiet esh Sham is in the main an upland region. From the region of Jauf, which lies at about 2,000 feet, altitude gradually

increases towards the north, reaching its maximum of 3,000 feet between Rutba and Damascus; after which it again declines gently north of Palmyra towards the lowlands of the Euphrates. The crystalline basement is completely buried under thick layers of Mesozoic and Tertiary rocks; hence the north gives an impression of a vast plain interrupted only by shallow wadis that trend generally towards the north-east, and are partially filled by alluvial and aeolian deposits. These wadis often retain small quantities of water after the scanty winter rains, and are thus the focal points of activity for the nomadic Badawin of the region. Two prominent lines of wells have led to the establishment of routeways from east to west across the desert. One line can be traced north-westwards from Jauf along the Wadi Sirhan as far as the Hauran of south-west Syria; the other runs south-west from Karbala as far as Ha'il.

As the result of a rainfall that varies between 2 and 6 inches per annum, the northern desert carries a vegetation cover for part of the year : grass in late spring and early summer, and in the autumn after the first onset of rain succulent plants like the *hashish* family, and a number of bushes that provide camel fodder. Hence in the Badiet esh Sham pastoraHsm finds its fullest development, and the uniformity of the land surface, lacking depressions like those of Siwa or Kufra (in which cultivation based on irrigation from artesian basins might develop), precludes any way of life other than strict nomadism. Largely self-sufficient, the Badawin cover enormous areas in their annual movements, and the small quantity of agricultural produce that they consume is still in certain measure obtained from reluctant cultivators on the desert margins. By reason of its openness in topography, and relatively narrow extent, the northern desert has from earliest times been a channel of routeways and transport. Palmyra, one of the few oases of the region, where a warm and strongly sulphurous spring allows date growing, was once a centre of trade; but is now merely a pumping station on the oil pipeline to Tripoli, and a garrison from which to police the north-west. Interest has shifted to Rutba, near the junction of the Haifa and Tripoli branches of the pipeline, which has now come to be a halting place on the motor route between the Levant and Baghdad.

Immediately southwards, the Great Nefud consists of rocky outcrops, principally of hard sandstones, which have been more disturbed. Tilting has produced a series of upstanding ridges that have been worn down by water action, and later still, eroded

by wind action into grotesquely shaped pinnacles and crags. Between the ridges lie lowland basins that are mostly covered in loose sand, sometimes in the form of dunes several hundred feet in height. Rainfall is extremely rare, occurring only once or twice per annum, or even once in several years; and the enclosed nature of the basins produces wide range in temperature. In summer a diurnal range of 40° F. is not unusual, with day temperatures reaching 115° or 120° F.; and in winter, frost is common. A specially unpleasant feature of the Nefud is its violent winds, which spring up and die down with equal rapidity. Owing to the local character of these winds sand dunes are aligned in many directions, in a manner quite different from the regular succession that is typical of the eastern Sahara.

In certain of the lowland depressions, water is retained by an impermeable sub-stratum, and oasis cultivation of dates and barley can be carried on. The largest of these oases are in the west, where some of the heavier rainfall in the mountains of the Hedjaz finds its way eastwards into artesian basins. One well, at Teima, is 65 feet deep, and measures 120 feet in diameter. The presence of such oases, some of which have a population of up to 15,000 people, is in marked contrast to conditions in the Badiet esh Sham.

The Rub al Khali, covering approximately 400,000 square miles, is little known: the first European to cross it was Bertram Thomas, who travelled from south-west to north-east in 1930. Much of the region would appear to be plateau-land dropping east and south-eastwards to the sea, with the greater portion covered by sand dunes. Traces of wadis are found, and this feature, together with the regularity of the rock measures (where these can be observed), has provoked the suggestion that as in Hasa and the Badiet esh Sham, small underground supplies of water may be available, in this instance, owing to seepage from the better watered highlands of the Yemen and Asir in the extreme south-west. A very few oases exist in the Rub al Khali; but so far as is known, most of the region is uninhabited. The extreme isolation of the whole area is shown by slowness with which cultural features have penetrated: for example, on the fringes towards central Arabia, groups of hunters and collectors still survive; and, until their conversion during 1923-25, several tribes on the east practised paganism—this in the country adjacent to Mecca.

The remaining area, Nejd, is somewhat complex in its structure. A certain amount of dislocation of the basement of Arabia would seem to have taken place, for we can trace a zone of weakness that

runs east-north-east from the Tehama of the southern Hedjaz (where, as was noted, the mountain barrier is distinctly lower) through Riadh and Hofuf as far as the coastal plain of Hasa. Further evidence to this effect is given by the occurrence of fault lines, along which upwelling of magma has occurred, with the formation of desolate lava-fields like those of the Jebel Druse of Syria. In a number of localities, the granitic basement is exposed at the surface, as a series of highland massifs, sometimes 4,000 and 5,000 feet in height; and a further feature of the Nejd is a series of north-south running scarps that have been formed by successive exposures of sedimentary rocks, once horizontally bedded, but now dipping towards the east.

The oldest sedimentaries—chiefly of Jurassic age—are exposed in the west, and later rocks, up to the later Tertiary measures of the Persian Gulf coast, appear in an alternation of ridges and valleys. The most prominent scarp is the Jebel Tuwaiq, formed of Jurassic limestone, and rising 1,000 feet above the surrounding plateau.

The drainage pattern originally developed on these scarplands was complicated, though now all valleys are entirely dry, and partly obliterated by sand. There were a number of consequent main-streams that flowed eastwards to the Persian Gulf, and in so doing, broke through the north-south aligned scarps, in a way somewhat similar to the Thames as it cut through the ridges of the Clay Vale and the Chilterns. The presence of lowland valleys set at right-angles to the main line of drainage also favoured the growth of numerous transverse rivers. Hence at the present time there are considerable differences in topography between the Nejd, which is a diverse region of uplands, small plateaus, scarps, broad valleys, and dry river gaps, and the surrounding dune-covered wastes of the Nefud and Rub al Khali.

Rainfall is very small on the lowlands, but heavier showers occur on the higher mountains, and a certain amount of this precipitation ultimately finds its way into the lowlands, or else is retained above the occasional impermeable layers that exist in the uplands. Owing to this, oasis cultivation is possible in certain areas of the lowlands, and, to a less degree, in the higher regions. Dates are the staple crop, with barley, wheat, millet, and lucerne as adjuncts; and a variety of fruits—walnuts, figs, apricots, and vines—are also produced. The largest of the oases are Riadh (now the capital of Saudi Arabia), Bureida, Ha'il, Jabrin, Anaiza, and, on the extreme east, Hofuf.

In addition to cultivation, nomadic pastoralism plays a great part

in Arabian* affairs, and the fact that the king of Saudi Arabia does **not** hold a fixed court, but moves with his ministers and retinue from **place** to place according to the season, shows the extent of nomadism in **the** everyday life of die country. Outside the oases, which do not cover more than 5 per cent of the total area, pastoralism or hunting **are** the sole means of life.

The existence of this triangle of better country, with its varied geological outcrops, and alternation of ridge and valley—in a very broad sense a kind of Weald, or Paris basin—has fostered the growth of Wahhabi power in Arabia. Though there is little internal trade, and few natural resources, the Nejd is an island of relative fertility in an expanse of waterless desert and barren mountain ridges. Small amounts of cloth and foreign manufactured goods are imported via Jidda or Oqair, but the volume of this trade is so far extremely limited.

As in the Persian Gulf, however, development of oil resources will bring about fundamental changes in Saudi Arabian economy; and the present situation of self-sufficiency, with internal exchange between cultivators and pastoralists will probably soon give way to a larger import of foodstuffs and manufactured goods, with exports of oil balancing the trading account. Now that the first steps in this direction have already been taken, Saudi Arabia will be inevitably subjected to far-reaching influences, and K. S. Twitchell has hinted at the basic changes now operating as former Badawin living on the extreme margin of Subsistence find regular paid work in the oilfields, and can afford to supplement their diet by imported food—with results that show both in a better physique, and in a desire for an enhanced standard of living. Here is an appetite that increases as modes of living improve, and one that sooner or later involves political considerations. The present social evolution in Saudi Arabia carries considerable dangers, and during the next few years, as the country takes its place as one of the leading oil producers of the world, a special responsibility rests upon its leaders and counsellors, both Arab and foreign.

CHAPTER XIX

THE NILE VALLEY AND ITS BORDERLANDS

I. PHYSICAL

THE region lying between the Gulf of Sirte on the west and the Gulf of Akaba on the east may in many ways be said to form one single major geographical province. Structurally, it is almost wholly a part of the Gondwanaland foreland, and crystalline basement rocks underlie the entire area, occasionally outcropping at the surface in certain districts. Five sub-regions can be distinguished :

- (I) The Sinai peninsula.
- (II) The Eastern Highlands of Egypt.
- (III) The Nile valley.
- (IV) The western desert of Egypt.
- (V) The plateau of Cyrenaica,

and of these the Nile valley is of overwhelming importance, since it contains over 95 per cent, of the total population of the region.

THE SINAI PENINSULA

This consists for the most part of an irregular tableland or plateau, which is tilted upwards towards the south. The southern half lies between altitudes of 2,500 and 5,000 feet, and occasional peaks rise some 3,000 feet higher, the largest being the Jebel Catherina (8,660 feet). On the south-western side of the peninsula, along the Gulf of Suez, the plateau drops to sea-level by a number of step -faults, the lowest of which forms the coastal plain of El Qaa, which is from 3 to 8 miles wide. In the south-east, along the Gulf of Akaba, dislocation is restricted to a much narrower zone, so that instead of a series of steps, the highlands approach closely to the sea, and there is a bold, rocky coastline which is for the most part devoid of any coastal plain. Towards the Mediterranean Sea the level of the plateau decreases, and gradually gives way to a broad coastal plain below 600 feet in altitude, which extends from the Suez region through El Arish, and passes without break into the lowlands of western Palestine. Thus

on the north, there is a low sandy coastline, diversified by lagoons and sand spits; and this region has provided a convenient corridor for movement between the Nile valley and the Levant.

Though now extremely arid, with an annual rainfall of 6 inches in the north and 2 or 3 inches only in the south, the entire Sinai region is deeply dissected by river valleys eroded at earlier geological periods. In the north, where gradients are small, the valleys are broad and open, the largest being the Wadi el Arish, which can be traced inland from

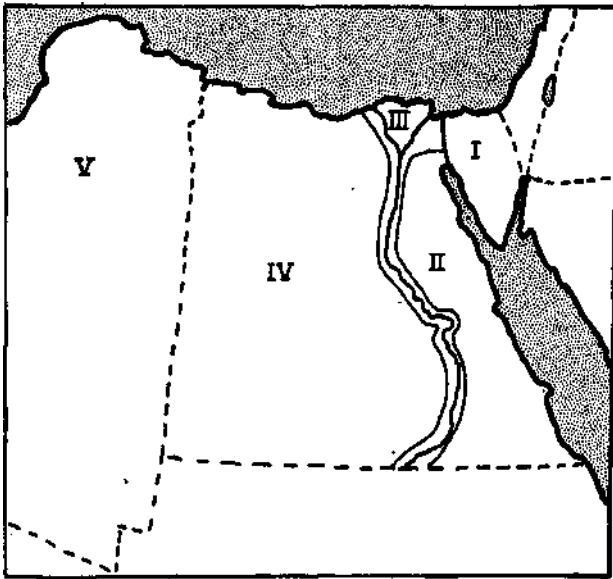


FIG. 83. Natural Regions of Egypt and Cyrenaica.

the Mediterranean to a point south of Nekhl. In the south, the wadis are much more deeply incised into the plateau, and often consist of gorges and ravines several thousand feet in depth, which break the surface of the plateau into a series of detached massifs. None of these wadis contain perennial streams, but after a rare rainy spell they can fill for a few days, and can overwhelm passing travellers, or even whole villages.¹

Many parts in the north are covered by deposits of loose, shifting sand that frequently form dunes. There is difficulty in maintaining settlements and communications, since any projecting object may

¹ Four British servicemen travelling by car, were drowned near El Arish in 1944.

provoke the formation of a dune several feet in height. Houses, and even railways and roads, can thus become partly buried, and much effort is needed to clear constantly encroaching sand. In a few regions, however, cultivation is possible, because rainfall quickly sinks through the sand, and is retained in hollows in the underlying basement rocks. Wells sunk into such hollows allow small-scale irrigation, and there is an oasis cultivation of dates and cereals, the chief of such centres being El Arish, El Auja, Nekhl, and Themed. Further south, settlement is entirely restricted to the plain of El Qaa, and nomadism is the principal way of life over most of the Sinai.

THE EASTERN HIGHLANDS

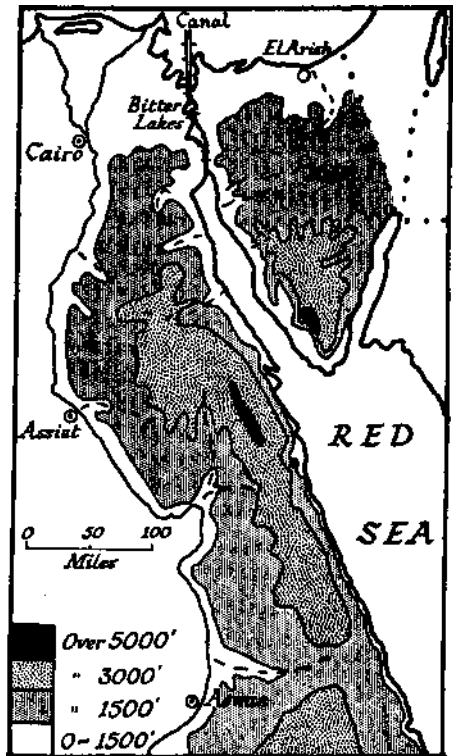
This region, a broken upland lying between the Nile valley and the Red Sea, has been formed by dislocation and uptilting of the crystalline basement rocks. In its northern part (i.e. between the latitudes of Cairo and Assiut), there is a covering of later sedimentary series—Nubian sandstone, Jurassic and Cretaceous limestones and sands—but south of latitude 26° N. pre-Cambrian series are exposed on a considerable scale. Though somewhat larger in area than the Sinai, the Eastern Highlands of Egypt are lower in altitude; the general level is between 1,000 and 2,500 feet, with the highest peak (Jebel Shayeb) reaching 7,480 feet. Like the Sinai, the highlands are heavily dissected by wadis running westwards to the Nile, and eastward to the Red Sea. Many of these wadis are narrow, but extremely deep, so that again, as in the Sinai, there is a complicated relief pattern with a series of detached upland masses.

On its western side, the Highland region is bounded by the Nile trough; and because of the numerous wadis that enter the river from the east, the adjacent edge of the trough is rather less clearly defined than the opposite (western) side, where, owing to the virtual absence of wadis, there is a strongly marked cliff. On the east, the abrupt change from desert plateau to riverine lowland is slightly less a feature.

Parts of the Eastern Highlands—more especially the deeper wadi floors, which are sheltered from the sun's rays—carry a light vegetation. Water is retained in hollows in the harder rocks, or beneath alluvial deposits in a stream bed; and there are occasional springs at the junction of certain pervious sedimentary rocks and the crystalline basement. Water resources are, however, on a very small scale, partly

because of a rainfall lower even than that of the Sinai (everywhere below 4 inches per annum), and partly because of the disturbed geological succession, which inhibits the development of large artesian basins. Cultivation is as a result almost impossible, and the few inhabitants live for the most part as nomadic shepherds. Owing to the difficulty and isolation of the region (there are no trade routes as in the Sinai, and all traffic follows the Nile valley) there is no incentive even to oasis cultivation, and no permanent settlements exist, apart from a few villages on the Red Sea coast.

There are, however, a number of mineral resources. Petroleum is worked in the sedimentary cover of the north-eastern flanks of the uplands at Hurghada and at Ras Gharib; and also near the



Red Sea coast are located deposits of phosphate, which are developed commercially in two districts (Qoseir and Safaga). Production is, however, on a small scale.

THE WESTERN DESERT

This region presents a number of contrasts to the region just described. To the west of the Nile, geographical features are on a vaster plan, and the geological disturbances caused by the formation of the Red Sea rift are absent. As a result, there is an uninterrupted expanse of basement rocks covered by extensive but fairly shallow layers of horizontally bedded sediments, giving an expanse of plain

or low plateau, with gentle gradients and wide vistas, that are relieved only occasionally by slight ridges or scarps where one rock series gives place to another. Thus about one-half of the western desert of



FIG. 85. The Oases and Depressions of the Western Desert.

Egypt lies below 600 feet in altitude, and few parts exceed 1,000 feet. The most conspicuous scarps lie in the north-west, along the Mediterranean coast near the boundary with Cyrenaica.

There are, however, a number of deep basins, with fairly steep

scarp edges, formed by erosion of softer strata either through aeolian action or by solution of soluble rock measures. The largest and deepest of these basins is the depression of Qattara, which covers an area of several thousand square miles in the region to the south-west of Alexandria. Here the floor lies some 400 feet below sea-level. Other basins are those of Dakhla, Kharga, Behariya, Siwa, and the Fayyum (Egypt); Jarabub, Gialo, and Kufra (Cyrenaica). Wide stretches of pervious rock overlying impervious basement series have given rise to numerous artesian basins, and it may in fact be stated that most of the western desert consists of one vast artesian basin. Hence on the floors of the depressions, considerable quantities of water are sometimes available. In certain instances (e.g. the Qattara depression) artesian water seeps to the surface naturally, and is evaporated, producing a salt marsh; and in the Fayyum there is, as we have noted, a lake, which at one time actually drained to the Nile. For the most part, however, wells must be dug to tap the water, and then cultivation is possible. The Qattara depression, with its malarial marshes, has few inhabitants, but the others have populations ranging from 1,000 (Farafra) to over 20,000 (Dakhla) and over 700,000 (Fayyum). The height of the water table has been worked out for the western section of the desert as follows:

Oasis of: Giof (24° N., 23° E.)	1,230 feet above sea level
Zighen (26° N., 23° E.)	1,150 " " " "
Gialo (28° N., 22° E.)	98 " " " "
Jarabub (30° N., 25° E.)	0 " " " "
Siwa (29° N., 25° E.)	100 feet below sea level

and in some districts there is a fluctuation in water level of 1 to 5 feet between autumn and spring.

Outside the basins, the desert surface consists of an alternation of bare rocky outcrops, stony wastes, or loose sand. The latter formation is increasingly prominent in the interior, producing dunes, some of which are fixed, and some mobile. In the far south-west, towards the central Sahara, sand covers the entire surface, producing the ' Sand Sea ' of Calanscio (southern Cyrenaica).

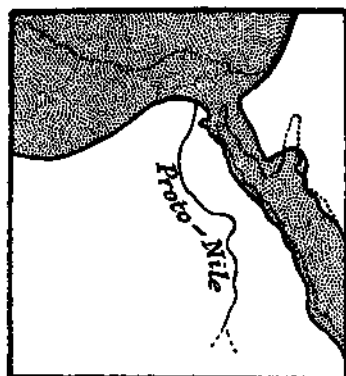
THE NILE VALLEY

Recent investigation has now made it possible to put forward a theory of the origin of the Nile valley, and the following is a summary

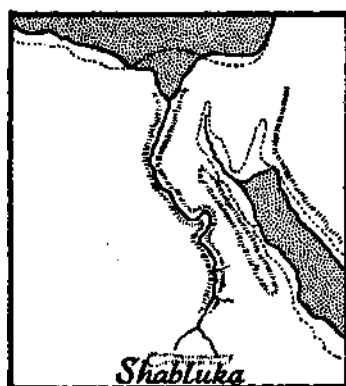
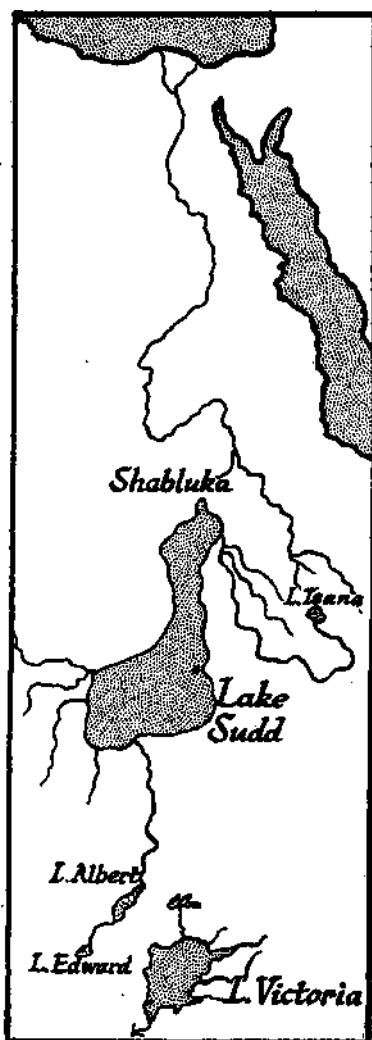
of the work of Ball, Hurst, and others on this problem. In Miocene times the Mediterranean (or Tethys) extended as far inland as Cairo and Siwa, and a number of small streams drained northwards from the African tableland to this sea. One such stream, the early, or proto-Nile, was strengthened in late Miocene times by a slight tilting of the plateau, which produced a small east-west running scarp in the region of Shabluka, and enhanced the erosive power of the proto-Nile. As a result of this, the river bed was incised several hundred feet into the plateau surface. Further to the south there were a number of entirely separate rivers: (i) the streams flowing from the region of Lake Victoria and terminating in an immense lake (termed *Lake Sudd*) in the region south of Khartoum, (ii) the Blue Nile, which entered Lake Sudd by a separate channel, and (iii) a small stream draining southwards from the Shabluka ridge into the Lake (Fig. 86).

It has been calculated that evaporation of 3 millimetres per day from the lake surface would have been sufficient to absorb all the water entering from the various rivers, and hence to maintain a closed system, without any overflow from Lake Sudd. At the present time, evaporation in the Sudan averages 5 millimetres per day, hence such a supposition is quite tenable, even if we assume a cooler climatic phase in Miocene times. Deposition of alluvium on the former bed of the lake has produced the well-known black cotton soil of the present-day Sudan.

At a later stage, however, the level of Lake Sudd began to rise; and ultimately an overflow occurred northwards. This overflow would seem to have been due to two factors: (a) rapidly increasing sedimentation in the bed of the lake, and probably also (b) an increase in inflow due to a diversion of extra water from Lake Victoria. Until recently, this lake is thought to have had an outlet south-eastwards to the Indian Ocean; but at a period estimated as about 20,000 to 25,000 years ago, a new outlet was developed towards the Sudan, giving an increased flow of water northwards. As the waters of Lake Sudd gradually rose, they were captured by the headwaters of the streams running south from the Shabluka ridge, through which the overflow soon cut a narrow defile by reason of its increased volume and load of corrasive material. The presence of the proto-Nile on the north side of the Shabluka ridge would have also contributed to the formation of a defile, since there would be a certain amount of cutting-back from the northern side. The presence of an ancient Egyptian monument at Shabluka, and known to have been at river level in the



(1) LOWER MIOCENE

(2) UPPER MIOCENE
(following uplift)

(3) PLEISTOCENE

FIG. 86. The Formation of the River Nile (after Ball).

year 1900 B.C., but now lying 25 feet above water level, suggests that the draining of Lake Sudd occurred about 21,000 years ago, since the existing valley is now 148 feet deep.¹

¹ Another small stream, part of the headwaters of the proto-Nile, would appear to have cut back southwards and captured the Atbara river.

The present Nile is thus an amalgamation of several drainage systems, this fact being made clear by brief reference to the geomorphology of the various regions through which it passes. In the extreme south, the region of the Great Lakes, the slope of the Nile bed averages 1 in 1200, but further north, from Juba as far as Malakal, it has a fall of only 1 in 139,000. This is the Sudd region proper (*Sudd* = blockage)—an alluvial plain extending some 250 miles from east to west, and covered with swamps and papyrus grass*. Here is the flattest portion of the Nile valley; and its occurrence at 2,000 miles upstream is a strong argument in favour of the Lake Sudd theory.

Below Malakal, the bed of the river is still extremely flat, falling only 25 feet in 500 miles (i.e. a slope of 1 in 101,000); but swamps no longer occur, and cultivation by irrigation is possible. We are still on the outer margins of the former Lake Sudd, since deep alluvial soil covers wide areas. At Khartoum, the entry of the Blue Nile makes good the considerable losses of water caused by intense evaporation in the Sudd region, and the great seasonal variation of the Blue Nile at the present time can produce serious flooding.

Between Khartoum and Aswan lies the Cataract zone—a hilly and almost rainless region through which the river has cut a deep trench. In several localities exposures of hard crystalline rock have proved more resistant to erosion than the surrounding Nubian sandstone; hence rapids and cascades are a feature, and river navigation is interrupted. With an average fall of 1 in 6,440, the cataract zone of the Nile is remarkable as the only stretch of the river outside of east Africa and Abyssinia in which active erosion is still proceeding. As we have just seen, the river bed is being lowered at the rate of 1 foot in 50 years, whilst elsewhere in the Nile valley, alluvium is being deposited, and the bed of the river is actually rising.

From Aswan northwards, the Nile flows in a well-developed notch cut into the plateau surface, with cliffs forming the boundary of the valley. Until it broadens into the Delta below Cairo, the river valley is about 6 miles wide, and the river itself about half a mile wide. For the most part, the Nile flows closer to the eastern valley wall: thus the greater part of the cultivated area lies west of the Nile, though there are many loops and meanders in the river. At Cairo the delta region begins, with two main distributaries, the Rosetta branch (east) and the Damietta branch (west—and 14 miles longer), together with an infinity of smaller streams. About one-half of the Delta is still occupied by lakes and swamps, with four larger sheets of water,

Lakes Brullos, Idku, Mariut, and Menzala covering between them 845 square miles of territory.

REGIME OF THE NILE IN EGYPT

At Wadi Haifa, on the Egyptian-Sudanese border, low water in the river occurs during May and June, the average flow being 212,000 cu. feet per second. The maximum flow of 2,830,000 cu. feet (over 8,000 cu. metres), occurs in September. This produces a rise in river level of 21·3 feet (6·4 metres); and a similar rise used to take place at all points downstream as far as Cairo, at the head of the Delta. Now, however, as the result of control and impounding of Nile water, the rise of the river is only 147 feet (42 metres).

AVERAGE HEIGHT OF NILE FLOODS (in feet) * (Lowest level shown as 0)

Place	Year											
	Commenced	J	F	M	A	M	J	J	A	S	O	N
El Leisi (delta)	1906	3·6	2·0	0·6	0	0	1·0	2·6	11·8	18·4	16·7	11·2
Assiut	1902	4·3	1·6	0·6	0	0·3	1·3	3·3	14·4	18·7	16·7	9·8
Aswan	1869	2·3	2·0	0·6	0	1·0	2·6	5·6	14·4	17·7	12·1	5·3
Wadi Haifa	1890	11·4	10·2	6·6	3·0	0·6	0	4·9	17·4	20·0	15·1	8·9

* These figures do not exactly agree with those given higher in the text, because they are averages over periods exceeding 40 years, during which time irrigation has been increasingly developed.

Normally, Nile water is clear, but for a period of 7 to 30 days immediately preceding the flood, green algae appear, brought down by the rise of water in the Sudd region. Later, owing to the load of sediment carried by the flood waters, the river turns dull reddish-brown, returning to its former clear condition in autumn.¹ About 110 million tons of sediment are carried annually past Wadi Haifa, and as most is derived from the erosion of volcanic rocks in Abyssinia and east Africa, this silt is extremely rich in mineral substances. Of the total burden of silt, it is estimated that 15 per cent, is spread on the land by pumps, 33 per cent, subsides to the river bottom, and so serves

¹ Persistence into the main flood period of decaying algae—red or brown in colour—may occasionally thicken Nile water, and give it an offensive odour. Hence the * turning to blood * of the Bible.

to build up the river bed, and the remainder, 52 per cent., reaches Cairo. Here, over 55 million tons of silt is carried by the flood waters of summer, and the remainder, about 1½ million tons, during the rest of the year. Besides suspended solids, considerable quantities of matter are fully dissolved in the river water, and these amount to 7½ million tons at Cairo, all but 14,000 tons being carried at the flood season. From this will be seen the enormous importance of the Nile floods—not merely for the water itself, but also for the fertilising mud laid down annually. The rate of deposition of Nile mud is as follows:

Upper Egypt (basin-irrigated lands)	. 4.1 in. per 100 years.
Lower Egypt (basin-irrigated lands)	. 1.2 in. per 100 years.
Lower Egypt (perennially-irrigated lands)	0.2 in. per 100 years.

When first laid down, Nile mud is soft and sticky, but it soon hardens to a tough, hard earth that can be used for embankments and canals, or, when sun-dried, as bricks. Because of its high chemical content, there is, however, a tendency for salinity to develop, particularly under intensive irrigation. This is most noticeable in the northern part of the Delta, where soils approaching a solonchak type are occasionally found. Because of the emphasis on cotton growing in Egypt—cotton plants being especially sensitive to soil salinity—care is necessary in developing irrigation schemes. This is one reason why parts of the Delta are still unreclaimed swamp.

II. CLIMATE

Before discussing irrigation developments in Egypt, a short summary of climatic features may be given. Because of low relief, and a land-locked position, conditions are remarkably uniform over the whole country of Egypt. Summers are hot, with day maxima reaching 100° F. in most places, though nights are distinctly cooler. Over most of the country July is the hottest month; exceptions occurring in the extreme south, where, with an approach to inter-tropical conditions, the maximum occurs in June; and in the extreme north, near the Mediterranean, where the maximum is postponed until August. The Mediterranean coast is distinctly cooler in summer because of the tempering effect of the sea; and in Alexandria, which is the summer capital of Egypt, day temperatures are some 10° to 15° F.

below those of Cairo. The prevailing onshore wind from the north-west is an important factor in reducing summer heat.

Winters are mild, allowing continuous plant growth, and though frost is unknown in the Nile valley itself,¹ occasional short-lived cold spells occur, and slight snow showers may spread as far south as Aswan. A factor more harmful to crops than frost is the prevalence of Khamsin conditions, when hot dry winds from the desert may scorch the tenuous strip of cultivated land along the river banks. The table below (for Burg el Arab, a few miles west of Alexandria) gives an indication of conditions in average, and in bad years.

FREQUENCY OF MODERATE AND SEVERE DUST STORMS
(Oliver)

		<i>J</i>	<i>F</i>	<i>M</i>	<i>A</i>	<i>M</i>	<i>J</i>	<i>J</i>	<i>A</i>	<i>S</i>	<i>O</i>	<i>N</i>	<i>D</i>	<i>Total</i>
1940	.	.	1	1	1	3	2	0	0	0	0	0	0	8
1944	.	.	3	4	4	1	3	1	2	2	0	1	0	2 1

The whole of Egypt has a rainfall of 8 inches or less. The Mediterranean coast receives 4 to 8 inches, with Alexandria the wettest part of the country; and south of Cairo, the annual average falls to less than 2 inches. This is in some respects a fictitious figure, since a fairly heavy onset of rain may take place only once in 2 or 3 years; and the fact that a half of the 2 million inhabitants of Cairo live in houses made of dried mud bricks indicates the scantiness and unreliability of rainfall. Without the Nile, Egypt would be no more than a collection of oases like those of Siwa or Dakhla.

III. IRRIGATION

There are at present two methods of irrigation in Egypt. The first, known as basin irrigation, has been in vogue since the Nile mud was first cultivated several thousand years ago, and this method consists of dividing off the fields into shallow basins by a series of earthen embankments some 4 to 8 feet in height. Flood water from the river fills the basins, depositing a layer of silt, and as the river level declines later in the season, water is retained on the fields for a few weeks, until the soil is saturated. This system of irrigation allows one crop per year, and because planting of seeds must necessarily take place

¹ Frost may, however, occur in the uplands of eastern Egypt, and in the Sinai.

in the autumn, as the river subsides, only those crops that can grow in relatively cool winter conditions (i.e. wheat, barley and fodder), can be grown on a large scale. Rice, millet, and cotton, all of them summer crops, are not very suited to basin irrigation, which has hence been superseded in many parts of Egypt by the second type, known as perennial irrigation. Basin cultivation is, however, still predominant in most of Upper Egypt,

Perennial irrigation involves the construction of large-scale barrages to control and distribute the waters of the Nile. It should, however, be noted that not all of the dams on the Nile fulfil the same function. Two especially large barrages, at Aswan and at Jebel Awliya in the Sudan, impound flood waters for several months, thus extending the season of Nile floods beyond the normal, and increasing the amount of water available in early summer. The great dam at Aswan was built in 1903 at a spot where an igneous dyke traverses the valley to form the First Cataract. Successive heightenings of the dam in 1907, 1912, and 1933, have now made it possible to store 177,000 million cubic metres of water, and the river level has been permanently raised by 121 feet, thus drowning many parts of the upper valley.

During the season of flood, when ample water is available throughout the Nile valley, all sluices are opened; but in autumn, they are partially—though not completely—closed.¹ This reduces the volume of water below Aswan during the months of November, December, and January, but the deficit is made up in the succeeding 6 months. River level at this period (February to June) is 23 inches higher than it was before construction of the barrage.

Besides the two regulator dams, there are minor barrages whose function is to raise the local level of the water, thus improving basin irrigation, and bringing new regions within reach of feeder canals. These barrages are (1) at Zifta, on the Damietta branch of the Nile, about half-way between Cairo and the Mediterranean (constructed 1901). Here the water-level of canals irrigating the eastern part of the Delta has been raised by about 10 feet, (2) immediately north of Cairo, where the Mohammed AH Barrage (built 1861) raises the water-level by nearly 13 feet, and supplies the southern Delta region, (3) at Assiut, 200 miles above Cairo, where the largest of the minor dams, built in 1902, and 900 yards long, raises local water level by 13 feet, and has permitted considerable agricultural development in districts

¹ This is to avoid silting up of the barrage, which would quickly take place if the sluices were fully closed.

previously too high for irrigation, (4) at Nag Hammadi, 160 miles south of Assiut, where a slightly smaller barrage (built 1920) fulfils a similar function for the province of Girga.

In 1947, it was announced that a further local barrage is to be constructed at Edfina, near the mouth of the Rosetta branch, in order to utilise quantities of water which at present are wasted, and also to bring into use stretches of the Delta, which are not so far cultivated.

Besides these smaller barrages, large pumping stations have been installed in the Delta, where, because of low relief, barrages are difficult to construct, and pumping is an easier method of distributing water. These stations are at Abil Menaga, Balama, Fua, and Atf.

Finally, a third type of barrage is designed to store river water from one season to the next, and so avoid the calamity of a low Nile flood. A local barrage at Esna, between Aswan and Nag Hammadi (built 1909), is now in process of extension, and when completed, will take on this new function, which, it is hoped, will make prosperity in Egypt less closely dependent upon the exact height of the annual flood.

As a result of these developments during the last century, it is now possible to bring water to many parts not only during winter, but also in the seasons of spring and early summer, when the river is at its

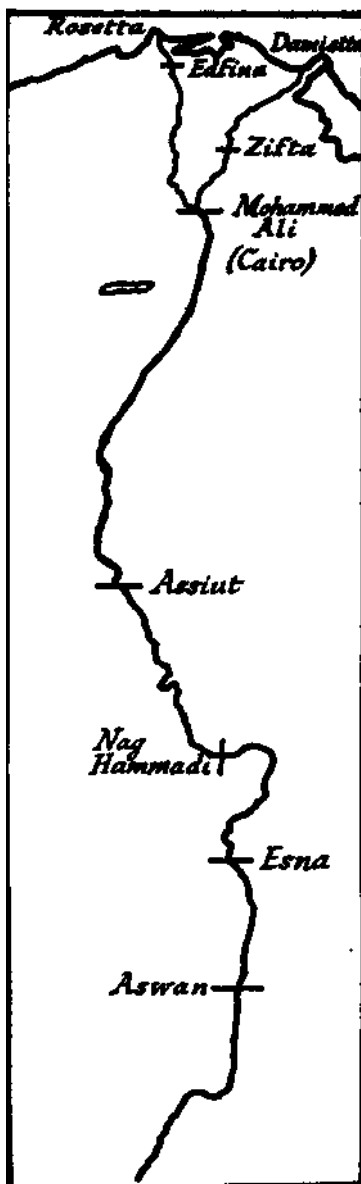


FIG. 87. Irrigation Works on the Nile.

lowest. Irrigation is now possible all the year round, and two or three—even occasionally four—crops can be raised annually, as compared with the single crop of basin-irrigated lands. The summer crops, cotton and maize, have now become Egypt's staple commodities, and together occupy over 40 per cent, of the total area under cultivation. Both crops are dependent upon perennial irrigation, and their extension in Egypt has closely kept pace with the construction of river barrages.

The advantages which perennial irrigation has brought to Egypt—specialist cultivation of high quality cash crops, and doubling or trebling of the food supply, leading to an unparalleled growth in population—are considerable, but these have not been achieved without certain disadvantages. In the first place, the increase in soil water due to perennial irrigation has led to a marked increase in soil salinity, because of more extensive evaporation from the soil. In some areas, particularly those given over to cotton growing, salinity has become a menace; and Issawi states that drainage of the soil, rather than its irrigation, has now come to be regarded as the more acute problem facing Egypt. As might be expected, the Delta is the most seriously affected by this new danger; but with the turn-over from basin watering to perennial irrigation in the upper Nile, the same tendency is likely to develop in other parts of the Nile valley.

Secondly, with the greatly increased frequency of cropping on irrigated land, soil exhaustion is now beginning to be apparent in Egypt for the first time in its history. Deposition of the silt contained in the river water has hitherto been more than enough to counteract the effects of one cropping per annum; but with two or three crops, from the same field there is gradually increasing debilitation of the soil, especially as the water held in large barrages has had time to settle, and deposit some of its alluvial burden *before* it reaches the fields. It will be recalled that the rate of deposition of silt on perennially-irrigated lands is less than that on basin lands (page 460). Hence artificial fertilisers must now be applied in an increasing scale; and super-phosphates and nitrates, first used in about 1900, are now applied to the extent of over 500,000 tons annually, giving an annual consumption of 130 lb. per acre as against 84 lb. (Holland), 33 lb. (Denmark), and 18 lb. (France). The dependence of the Egyptian farmer on fertilisers was clearly demonstrated during 1940-46, when, because of war, the annual import of fertilisers was reduced to 300,000 tons. The effects on crop yields are indicated by the table below, and it is

estimated that 1938 standards cannot be regained for several more years—possibly not until 1952.

YIELDS OF CEREAL CROPS IN EGYPT

(in ardebs per feddan*)

			Wheat	Maize	Millet
1938	.	.	5.99	7.3	9.8
1946	.	.	4.89	6.45	7.65
1947	.	.	4*27	6.2	6.8

* 1 Ardeb = 5.4 bushels, i Feddan = 1.04 acres.

Thirdly, the utilisation of water resources would seem to be reaching its maximum possible limit. Already, alteration of water level at one particular point can be felt at all districts downstream; and further improvements on a large scale depend on control schemes in the higher reaches of the Nile—in east Africa, Abyssinia, and the Sudan. Hence the considerable interest of Egypt in the political future of the Sudan, where a general increase in irrigation facilities might have the effect of reducing the volume of water available in Egypt; but where also the enormous losses by evaporation in the Sudd area could be reduced by engineering projects.¹ The Jebel Awliya scheme, completed in 1937, is on a relatively small scale, the total amount of river water retained being less than half of that impounded by the Aswan barrage; and much more might still be achieved—though there will be the problem of harmonising the wishes of the local inhabitants in the matter of Nile control with those of the Egyptians downstream.

Despite these drawbacks listed above, production from irrigated lands is extremely high. With an average yield of 17 cwt. of wheat per acre, Egypt approaches the average for north-west Europe, where the heaviest crops of the world are produced per unit area; her yield of maize (1 ton per acre) is the highest in the world; and in cotton, with 600 lb. per acre, she is well ahead of the Soviet Union (368 lb.), the U.S.A. (238 lb.), and India (112 lb.). The fact that the total area stated as being under crops in Egypt is 8.3 million acres, while the total cultivated area is only 5.2 million acres, indicates that at least two crops per annum are regularly obtained from perennially-irrigated lands, and one from the basin districts of Upper Egypt.

¹ I.e. by straightening the courses of rivers in the Sudd area, and by raising the level of Lakes Albert and Tsana, which would increase the flow of water in the main Nile.

IV. AGRICULTURE

The main feature of Egyptian agriculture is the important place occupied by cotton growing—far greater than for any other part of the Middle East. Up to 1938, cotton was the principal crop of the country and accounted for 21 per cent, of the cultivated area; but since that time, as the result of war, production has fallen. In 1944 it was less than one-half of the 1938 figure, but in 1948 it reached 80 per cent, of pre-war. (Acreage : 1938, 1.8 million feddans; 1944, 0.8 million; 1948, 1.4 million.)

Normally, a two-year cycle of crops is maintained. In November of the first year, wheat, clover, or beans are sown, with the harvest in May. After 2 months of fallow, maize is planted, and reaped in November. The land again lies fallow for 2 months, then cotton is sown in February, and picked in November. This rotation is exhausting to the soil, particularly at the beginning of the period, when planting of cereals takes place immediately following the growing of cotton. As a result, a 3-year cycle with longer fallow periods is practised by some farmers for a time, so as to allow recovery of the land.

Cotton is still the mainstay of Egyptian agriculture, and, as raw cotton accounts for nearly 70 per cent, of Egyptian exports, it may also be said to be the mainstay of Egyptian commerce and business life. The reasons for the importance of the plant in Egyptian economy are :

- (1) Suitability of soil and climate. Besides the unique fertility of the soil, the long, arid summer, frost-free autumn, and 'controllability' of water supplies from canals, are specially favourable factors. The effect of all these is seen in the extraordinarily heavy yield obtained.
- (2) Under present trends of prices in world markets, cash profits from growing cotton are 50 to 100 per cent, higher than from growing cereals. Egyptian cotton is of first-class quality ; Egyptian cereals are much less valuable.
- (3) Cotton growing is admirably suited to prevailing methods of land tenure in Egypt, i.e. exploitation by absentee landlords. The peasant is under no temptation to consume the crop himself, as is the case with foodstuffs, and is the more dependent upon his landlord in marketing his share of the crop. Because of its long-keeping qualities, raw cotton is also a good form of outlet for capital investment—a point of importance in a land where such outlets are few. Mortgages can easily be raised on a cotton crop not yet grown.

Many varieties of raw cotton have been introduced, but quality has for the most part tended to fall off after a few years, generally because of hybridisation (mixing) with other species, as the result of which the specially advantageous qualities of a particular species are lost. In a few instances degeneration has also been due to attack by insect pests. This was the case with the well-known Sakellarides variety, which at one time occupied 75 per cent, of the total area under cotton. Now, the most widespread variety is Ashmouni, of medium staple (11/8 to 13/8 inches), which is almost the only kind grown in Upper Egypt, and comprises 25 to 30 per cent, of the cotton produced in Lower Egypt.

Until about 1925 the quantity and quality of cotton produced by an individual plant showed a steady decline, with a fall in yield of 5*8 cantars per feddan¹ (1900), to 3.4 cantars (1921). Energetic governmental action resulted in the formation of a Cotton Research Board, which has developed new species, controlled hybridisation and the incidence of pests, and popularised improved methods of cultivation. As a result, the yield has now improved to a figure of 5*0 cantars per feddan (1946).

Seven varieties of cotton are grown on a large scale, 5 being long staple (over 11 inches), and 2 short. The long-staple varieties are Giza 7, Sakellarides, Maarad, Malaki, and Karnak; the others Ashmouni and Zagira—and of these Giza 7 and Malaki have been evolved by the Cotton Research Board.

Though cotton is so important, it should be noted that only one-fifth of the total cultivated area is given over to its production. Issawi concludes that only one in two or three landlords actively grows cotton on his estates. Large-scale cultivation would seem to be restricted to wealthier owners and farmers; and the vast majority of poorer fellahin produce food crops—a view that accords with the general character of Middle East agriculture as being one of subsistence—and it would appear true to say that cotton growing is far more popular with landlords than with tenants.

Though the acreage devoted to cotton in Egypt is only about 15 per cent, of the cotton lands of the United States, superior quality gives Egyptian cotton a commanding position. Some 60 to 70 per cent, of the world's production of long staple, and 30 per cent, of its short staple cotton is supplied by Egypt, and there are certain manufacturing

¹ 1 Cantar = 99 lb.

processes in which Egyptian cotton is exclusively used, e.g. in the making of aeroplane types, windproof clothing, and sewing thread. The entire cotton crop is sold in September, though picking only begins in the same month, and is not completed till November. Almost all of the crop moves to Alexandria for export, only a small proportion being retained at home.

Cereals.—Maize is now the most important cereal crop, and since 1939 it has occupied the greatest extent of land under cultivation, though in value it still stands second to cotton. Being a summer crop, maize needs copious watering; and as it thrives best on a heavy clayey soil, the Delta is the chief region of production, though the plant is found all over the Nile valley. In recent years, strains of maize have been greatly improved by governmental control and research, and the yield per feddan has increased by 12 to 15 per cent. Now maize forms the principal article of diet of the people, being mixed with wheat flour to make bread.

Wheat is a winter crop, since it thrives in cooler conditions; and though it is again grown in all parts of the Nile valley, heaviest yields are obtained in Upper Egypt, where the warmer winters and a lighter soil are special advantages. Conspicuous improvements in yield have been achieved over the last 20 years (amounting to 20 to 25 per cent, increases); but some of this progress has been lost, at least temporarily, since 1940. Until the second world war, Egypt was in a position to export small quantities of wheat, and may be said to have been self-sufficient in bread supplies; but since 1941 the increase in population and lower yields of cereals have necessitated imports of wheat on an increasing scale (average 1945-47, 110,000 tons). Improvement in methods of cultivation are thus imperative, and we may note yet another country of the Middle East which, although overwhelmingly agricultural, is forced to depend on imports of wheat. Rice is now the third crop of Egypt, the area having quadrupled since 1930. This plant is tolerant of waterlogged and saline soils, so that it is a favourite crop in the northern Delta region, where salt marsh is in process of reclamation, and where also over-watering is tending to increase soil salinity. Because of its heavy demands on water, the area that can be devoted to rice growing is limited each year by government decree, in accordance with the height of Nile floods. There is now a considerable export, mainly to India and Ceylon; and during war years, the surplus of rice balanced the deficit of wheat (see p. 470).

Millet is an alternative summer crop, and flourishes best in Upper

Egypt, where temperatures are higher than in the Delta. Since 1937 production has more than doubled, but the yield per unit of area has tended to fall. Nevertheless, the importance of millet in Egypt is steadily increasing—an indication that the country is after all a part of Africa, and lies closer to inter-tropical regions than many other parts of the Middle East.

With the rise of millet and rice production, barley is slowly declining in importance. In general, the plant is now grown as an alternative to wheat; and, because of its tolerance of drier conditions, it was once frequently grown on the outer parts of the Nile valley, where irrigation is difficult. Now, with the development of perennial irrigation, emphasis can be given to summer crops, which produce a greater cash return or a heavier quantity of food per unit area, and there is less interest in barley as a substitute for wheat. The main area of barley cultivation is Upper Egypt; so that, as regards cereal production over the whole country, we may distinguish two contrasting zones: (i) Lower Egypt, where maize and rice predominate, and (ii) Upper Egypt, where wheat, millet and barley are the chief crops.

AREA OF THE CHIEF CROPS GROWN IN EGYPT

(in 000's of feddans)

1938		<i>Cotton Mrize Wheat Rice Millet Barley Clover Beans</i>									
Area			1,784	1,533	1,430	334	283	266	1,800	279	
Percentage	of	total	area	21	18	17	6	5	4	22	5
1946											
Area			1,254	1,683	1,586	633	551	245	1,776	394	
Percentage	of	total	area	15	20	19	87	3	21	5	

Other Crops.—Beerseem, or Egyptian clover, increases the nitrogen content of the soil, and is hence widely grown as a soil regenerator, in rotation with cotton and cereals. The clover is used as animal fodder, both green (in winter), and dried (in summer). Broad beans, which also have the same properties of soil regeneration, are grown to a rather small extent partly for summer fodder, and partly for human consumption. One or other of these crops is grown by most cultivators, and the area under beerseem at times exceeds that of any other crop, amounting to 20 to 23 per cent, of the total.

Sugar cane is grown to an increasing, though as yet restricted extent. Yield of sugar is low compared with that in other countries (60 per cent.

only of the average in Java, 45 per cent, of that in Hawaii), but the cane ripens in a shorter time than in either of these countries, and can successfully compete with foreign sugar in the home market. The cultivation of flax, castor oil seeds, and groundnuts is also developing, mainly because of world shortages in edible oils; and vegetables are increasingly important. The chief vegetable grown in Egypt is the onion; and, besides supplying a considerable home demand, there is some export. Foreign markets were reduced during the second war, but are now reviving, with Britain as the chief customer.

Fruit growing is not extensive, the low purchasing power of the peasant restricting development—emphasis must be laid on cereals and oil seeds, because of their greater food value. Natural geographical conditions are also less favourable in Egypt than in many other parts of the Middle East. Dates are, however, grown all along the Nile valley, and especially in the south; oranges are produced in the Delta; and in the extreme north, on the Cooler Mediterranean coast, vine growing is extending. There are small wine-making industries based on the vineyards of Gianaclis and Mariut, close to Alexandria.

WATER REQUIRED PER CROP

(in cubic metres per feddan)

<i>Crop</i>	<i>Lower Egypt</i>	<i>Upper Egypt</i>
Wheat	1,140	1,510
Barley	1,030	1,575
Maize	2,670	3,400
Millet	2,670	2,510
Rice .	10,000-16,000	
Cotton	3,740	4,640
Beerseem	2,630	3,560

Figures from M. Macdonald, *Nile Control*, Vol. I, 1920

V. PASTORALISM

Because of intense population pressure, most attention in Egypt is given to arable farming; but the increasing necessity of maintaining a crop rotation that includes such nitrogen fixing plants as beerseem and alfalfa is leading to a marked development of stock raising. Within the last 20 years there has been a sharp, almost spectacular rise in the number of animals kept; but the increase in human food

supply has* been proportionately much less, as most animals are used for draught purposes on farms, and meat yields are low. As a result Egypt imports quantities of dairy produce, and there are considerable seasonal movements of catde into the Nile valley from the desert areas of Egypt, and also from Libya and the Sinai.

Sheep, estimated at about 1 ½ million, are the most numerous, and can be seen in most villages, where they are kept either on fallow land, or on the edge of the desert. Cattle number about 1 million, but their use for ploughing reduces milk yields, and they supply only one-quarter of the total of milk consumed in Egypt. Water buffaloes are as numerous as cattle, a fact that is hardly surprising in view of geographical conditions, and these animals supply 70 per cent, of the dairy produce of Egypt. Goats have much increased within the last decade, and now number just under 1 million. Donkeys are also very numerous; but camel breeding tends to be confined to the nomadic Arabs of the deserts. Most milk produced in Egypt is made into butter, curd, or cheese. Poultry keeping has some importance, though quality, and size of both birds and eggs is not great; and in normal times there is a substantial export of eggs. Pigeons are kept in many villages, and may owe some of their popularity to the fact that they do not always restrict their eating to the food supplied by their owners.

In the opinion of some experts, there is room for further expansion and improvement of the animal husbandry in Egypt. At present, little attention is given to breeding and to improving stocks; but with the extension of crop growing during the summer, which is the main season of difficulty to animal herders, increased supplies of fodder are now available throughout the year. As regards arable farming, the position of diminishing returns may have been reached in a few areas—a fact underlined by the increasing dependence on artificial fertilisers—and there is great need for a diversification in production. Yields from wheat and barley are relatively low; there is danger in expanding maize and rice production for human food;¹ cotton production is somewhat hazardous with Egypt (because of the smallness of her production) occupying a marginal position, and dependent on price levels in America.² Hence many things point to improvement through an increase in mixed farming

¹ See Chapter K.

* E.g. the price of raw cotton fell by 25 per cent, during the month of May, 1949.

with greater emphasis on stock rearing and the development of intensive market gardening in vegetables, for which conditions in Egypt are exceptionally favourable.

VI. MINERALS

Output of oil has greatly increased since 1938 (the date of discovery of the Ras Gharib field), and all home requirements for motor spirit are met, together with about 45 per cent, of the requirements of crude oil, and 15 per cent, of the consumption of paraffin, the latter being the chief domestic fuel. Oil easily ranks first in the list of Egyptian mineral production : second place being taken by phosphate rock, which is mined at various places along the north-eastern coast of the Red Sea (mainly at Tor and Qoseir). Working is in the hands of two companies, one British, the other Italian (now temporarily controlled by the Egyptian government); but of recent years the level of output has declined, and in 1946 was only two-thirds of the 1938 total. Most of the phosphate is exported, mainly to Australia and South Africa—a rather curious state of affairs in view of the large imports of fertilisers into Egypt.

Next in importance come various sodium salts, which are produced by evaporation of salt pans in the artesian basins of the Western Desert. By far the most important centre is the Wadi Natrun (Natrun = *nitre*), a long, narrow depression' running north-west-south-eastwards between Cairo and Alexandria. Here a variety of salts have been obtained for centuries, but to-day sodium carbonate and sulphate hold chief place. Until the end of the second world war, there was a small production of manganese ore from low grade deposits at Abu Zeneima, on the Gulf of Suez, but latterly the increase of dues in the Suez Canal has made the production of ore uneconomic, and output has ceased.¹ Gold is obtained in small but significant quantities, recent rises in price having had a stimulating effect. Other minerals produced on a small scale, sometimes, as in Cyprus, by collection rather than systematic exploitation, are talc, ochre, pumice stone, and common salt. Quarrying of building stones (limestone, sandstone, granite, and basalt) is on a scale somewhat larger than in most Middle Eastern countries.

Production may, however, be resumed in 1950.

PRODUCTION OF MINERALS IN EGYPT

(metric tons)

			<i>Sodium Sulphate and</i>				
	<i>Petroleum</i>	<i>Phosphates</i>	<i>Carbonate</i>	<i>Common</i>	<i>Salt</i>	<i>Nitre</i>	<i>Talc</i>
1938	226,000	458,000	5,000	145,000	8,000		1,000
1946	1,282,000	294,000	8,000	7,000	9,000		5,000
	<i>Ochre</i>	<i>Manganese</i>	<i>Gold (oz.)</i>				
1938	700	115,000	2,000				
1946	2,000	—	3,000				

In 1937 a large deposit of high grade iron ore, estimated at 1,000 million tons (cf. total reserves in France, 4,500 million tons) was discovered 30 miles east of Aswan. The ore lies close to the surface, but so far, because of the remoteness of the area and lack of nearby fuel, no development has as yet taken place.

VII. INDUSTRY

The last 30 years have seen the rise of a number of industries in Egypt. Initial impetus was given by civilian shortages and military needs during 1914-18, when a number of local activities were started, chiefly concerned with textiles, foodstuffs, and chemicals. After 1918, certain of these industries proved uneconomic, and disappeared; but some survived, and further development took place when Egypt ended Capitulations in 1930, and was henceforward free to erect tariff barriers to protect her home markets against foreign imports. In contrast with Iran and Turkey, industrial development in Egypt has been carried out entirely by private capitalist enterprise, with no state control.

During the second war, an even larger trade 'boom' occurred, with almost all Egyptian manufacturing plant working at full capacity. Since 1945 there has been some falling off in local production, with a number of uneconomic marginal companies forced to cease production; but in general it may definitely be said that the level of industrialisation has increased since 1939. It is significant that those activities that have managed to hold their own or develop further are those which draw their raw materials from Egypt herself, e.g. cotton textiles, sugar refining, cement making, and chemical production.

Textiles are by far the most important industry in Egypt, and there are now between 35 and 45 large companies engaged in production. Cotton spinning and weaving predominate, and Egypt is now self-sufficient in the making of cotton piece goods, though substantial quantities of yarn and thread are still imported. The present volume of imports of manufactured cotton is, however, little more than 25 per cent, of the 1938 figure; and greatly expanded imports of cotton spinning machinery indicate that a greater degree of home production of textiles may shortly be expected, with a corresponding decline in foreign purchases.

Woollen goods are also manufactured on a fairly considerable scale, but the lower quality of Egyptian wool as compared with Egyptian cotton places the woollen industry under a handicap; and better quality woollens are still imported. The volume of imports of woollens has risen since 1944, indicating that Egyptian industry cannot compete with entire success against outside manufacturers, even though native output has increased. Silk, rayon, and linen are also manufactured, but to a much smaller extent; and it is doubtful whether the silk industry will ever be very extensive, as all raw material must be imported. Prospects for linen are better, as flax is grown within the country.

Cement manufacturing has approximately doubled since 1939, but a limiting factor is the availability of fuel. Despite this, Egypt is now practically self-sufficient in supplies of cement, and there is a small export to surrounding countries.

Processing of agricultural products—sugar refining, preparation of alcohol from molasses, brewing, canning and preserving, cigarette-making, and the pressing of cotton-seed for edible oil—is in the aggregate relatively extensive, as would be expected from the economy of the country. A large number of companies and of workers are engaged, though individual output is generally small, and machinery primitive. An interesting item is the greatly swollen import of tobacco and cigarettes (from a total value of £E730,000 in 1938 to £6,390,000 in 1946). Even allowing for a 130 per cent, increase in prices, there may be a curious sidelight on the effects of pressure of population on land. The vast increase of smoking amongst the people might possibly have some relation to the reduced consumption of foodstuffs (page 251), and the low state of public health.

Leather working has tended to increase with the recent development in stock raising, and current output is 25 to 50 per cent, above

1938 levels. This is especially a local craft industry scattered throughout most towns and villages. Other small industries are the production of chemicals, in which Egypt now supplies all her own needs; soap boiling, which, because of the absence of olive groves in the country, is forced to depend on imported oils; and light engineering, e.g. the manufacture of electric light bulbs, paper, and glassware.

A recent departure has been the growth of a small Arab film industry. Egypt now shares with India the world market for Arabic-speaking films, which have a circulation throughout most of the Arab lands from Morocco to China, and also in the U.S.A. and the Argentine. This activity has grown up as a complement to the film industries of America and Europe, the products of which are not always to Arab taste.¹ The climate of Egypt is a considerable advantage, and further development in-film-making may take place.

The expansion of Egyptian industry is, however, held back by a number of adverse factors, chief of which is lack of fuel. No coal of any kind is found in Egypt; local oilfields are not large (though recent discoveries in the Sinai may alter this); and the slight gradients of the Nile valley do not favour the large-scale generation of hydro-electric power. It must, however, be stated that some use could be made of the waters flowing through the Aswan Dam, and plans are now in hand (1948) to achieve this. Electricity generated from oil and imported coal, supplies about three-quarters of the motive power for industry, but even so, the amount of electricity produced in Egypt is small as compared with other countries (Egypt, 18 kw. per inhabitant, Portugal 60, Italy 360, Norway 2,760) (Dorra). Coal is imported at the rate of 1 million tons annually, and is mostly used for motive power in industry, and on the railways.² Shortage of fuel has led to a concentration of industry in the cities of Cairo and Alexandria, and to a far less extent, Port Said, where fuel supplies are most easily available. The smaller towns of the Delta are chiefly agricultural markets, and Upper Egypt has no industry whatever.³

¹ In particular' psychological * dramas, and the emancipated status of women are not usually preferred. Amatory scenes are also at times regarded as indelicate by Arab audiences.

² Until 1939 the bulk of Egypt's coal came from Britain, with Germany and Poland as minor suppliers. Now one-half comes from India and South Africa.

Egyptian railways are at present changing over to diesel haulage.

³ In an attempt to improve the coal supplies of Egypt, the project has been discussed of generating hydro-electricity by admitting the waters of the Mediterranean to the Qattara depression.

A second handicap is the low purchasing power of most Egyptians, which greatly restricts the scope and efficiency of home manufacturers. This is very apparent in the cotton trade, where locally grown cotton, which is of the highest quality, must be made into the lowest quality goods. So long as food prices remain high, and wages low, the *fellah* will be unable to buy manufactured goods; hence, lacking markets outside of Egypt, the extent of industrial activity within the country is likely to remain very circumscribed.¹ Under present conditions, Egypt can hardly rank even as a moderately industrialised country. Over half her workshops are on ^-man concerns, and the numbers employed in industry amount to only 3 \ per cent, of the total population, a figure lower than those for Syria and Palestine. Issawi gives a striking index for the cotton industry, Egypt's principal manufacturing activity : in Egypt there is 1 mechanical spindle per 64 inhabitants; in India, 1 per 36 inhabitants; in Brazil, 1 per 15 ; and in the U.S.A., 1 per 5.

Future Prospects.—Developments in the oilfields of the Sinai, and the discovery of iron near Aswan are encouraging signs for the future; but against this must be set the general lack of raw materials. Only a moderate expansion may be envisaged, and Egypt is likely to remain overwhelmingly an agricultural country. Issawi suggests that future industrialisation should be restricted to a few branches in which abundant supplies of locally produced raw materials are available : cotton textiles, leather, chemicals, and foodstuffs. Much greater emphasis could be placed on purely agricultural industries—canning, preserving, and food processing.

VIII. COMMUNICATIONS AND TOWNS

Railways.—The railway network of Egypt is remarkably complete, and on a basis of length of line per inhabited area, Egypt is as well supplied as France, with over 14 km. per 1,000 square kilometres. It should, however, be recalled that less than 10 per cent, of Egypt is inhabited. Railways were built in the nineteenth century, and added to during 1914-18, so that all parts of the Nile valley are linked by a standard gauge system. Most lines are double track—unusual in the Middle East—even as far south as Aswan. The main lines, which are state-owned, are supplemented by nearly 900 miles of light railways

¹ Egyptian products are of moderate or inferior quality, and unlikely to compete in outside markets.

(privately owned), which serve the Fayyum and parts of the Delta not touched by main lines.

River Transport.—From the geography of the country, there would seem to be much scope for this; but water transport is less developed than might be expected, because (a) main importance is given to irrigation, and river level is often low, with many small weirs and irrigation works that impede traffic, and (b) low bridges are numerous, because of the slight relief of the region. Nevertheless, an increasing amount of traffic is passing from the railways to river barges, and nearly 80 per cent, of the raw cotton of Upper Egypt, and 10 per cent, of the cotton of Lower Egypt moves by water to Alexandria. The ratio

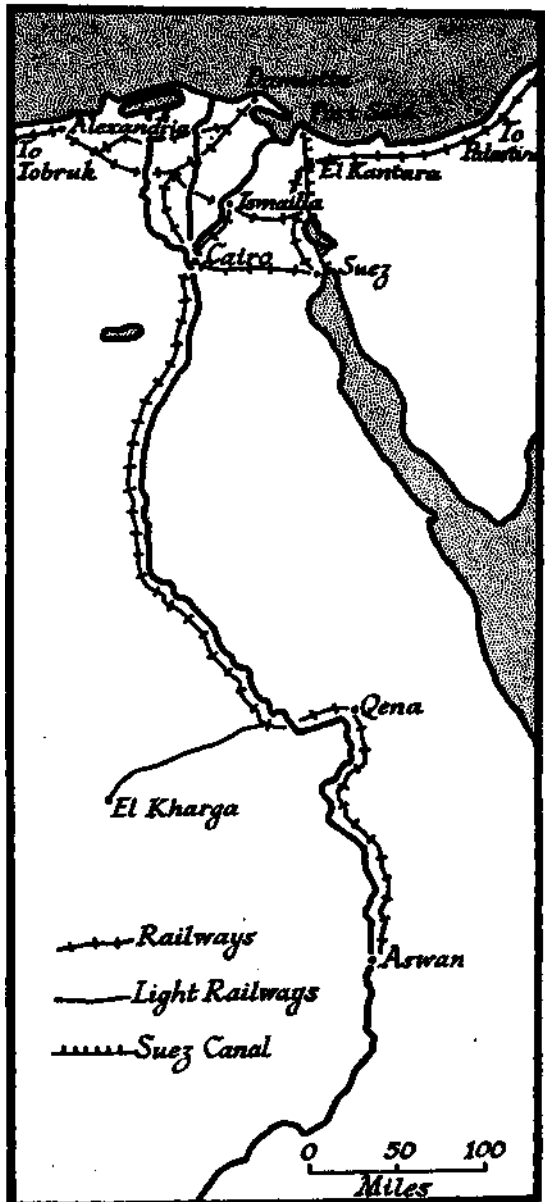


FIG. 88. Egypt: Railways.

of water-borne to rail traffic has altered from 1:4 in 1925-30 to 1:3 in 1940-45. Most of the crops of Lower Egypt—particularly vegetables such as onions—are carried by rail, but as the years pass a larger proportion is now diverted to the river. Roads are comparatively neglected, and the only ones with a good surface are found near Cairo and Alexandria. One reason for the indifferent state of upkeep is that because of the narrowness of the Nile valley, road, river, and railway must run parallel, and most of the traffic can be handled by the last two. Moreover, annual flooding makes construction and upkeep of roads very costly. Motor transport is better developed in Lower Egypt, but still, railways handle over 4 times the tonnage carried by road.

Most commercial and industrial activity is located in Cairo and Alexandria. A census in 1937 gave Cairo 20 per cent, of all commercial enterprises, and Alexandria 12 per cent., but as one-man establishments were included in this total, the importance of the two cities is actually greater than these figures would appear to suggest. Cairo is situated at the head of the Delta, where the Nile waters divide, at a spot where a large island provides a convenient crossing place; and this central site, on the borders of Upper and Lower Egypt, and fairly close to the productive oasis of the Fayyum, makes Cairo a distribution and market centre for the whole of Egypt. As compared with Alexandria, which does not lie in a particularly productive region, and is to some extent isolated by large brackish lakes, Cairo is far better placed for internal exchange; and most of the foodstuffs of the Delta are marketed there. Rail communication with Alexandria, Port Said, and Port Tewfik (with a branch at Kantara across the Suez Canal to Palestine) has allowed the import of fuel and raw materials, so that although there is no outstanding richness in natural resources, Cairo has developed a diversity of industries, chiefly concerned with processing of agricultural materials: textiles,¹ cement making, food packing, brewing (with imported hops), oil pressing, printing, and the making of light consumption goods. Cutting of the Suez Canal, and the growth of air transport have been a considerable stimulus to expansion; and, with a population of over 2 million, Cairo far exceeds any other city in the Middle East.

The centre of Cairo is well built and laid out, and, with its opulent department stores, would challenge comparison with Rome, Paris, or

¹ The largest textile centre in Egypt is, however, a small town of the Delta, Mehalla el Kubra.

San Francisco; but away from the centre, mud brick soon replaces stone and ferro-concrete, and electricity is no longer the main illuminant. Like many other Arab cities, Cairo has a large community of wealthy landowners.

Alexandria is the chief port of Egypt, and handles almost all of the cotton and rice crops. There are numerous cotton ginneries, which

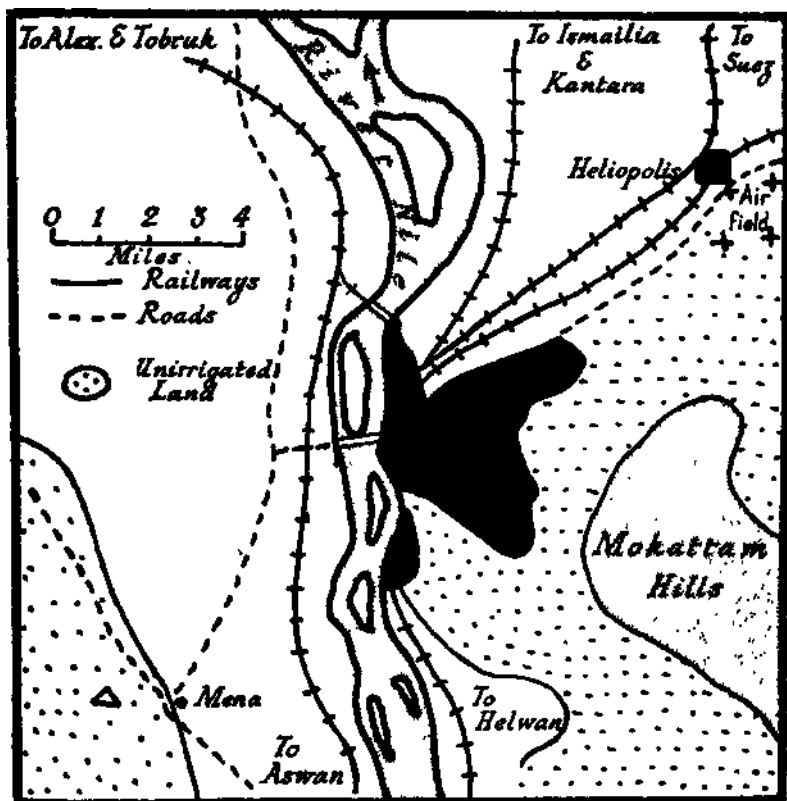


FIG. 89. The site of Cairo. Note how roads avoid the irrigated land.

for the half of the year following the harvest provide occupation for 40,000 people; and rice-husking is another activity, though this is also spread amongst the smaller towns of the northern Delta—Damietta, Mansura, and Rosetta. The city lies close to a small promontory of land that runs north to join a small island: in this way there is a kind of natural quay, and a double sea frontage, with an eastern and a western harbour. One disadvantage is that landward communications

are rather difficult—road and rail must pass on a causeway between two large sheets of water, Lakes Mariut and Idku.

The situation of Alexandria, on the extreme north-west of the Delta—so as to be removed from the danger of silting by Nile waters—has tended to produce a certain isolation from the main currents of Egyptian communications, which, especially since the construction of the Suez Canal, are stronger in the east of the country. As a result, the city ceased to be the main capital in 1863. Because, however, of communications by sea, Alexandria has one advantage over Cairo in the matter of imported fuels, coal and oil; hence a number of large

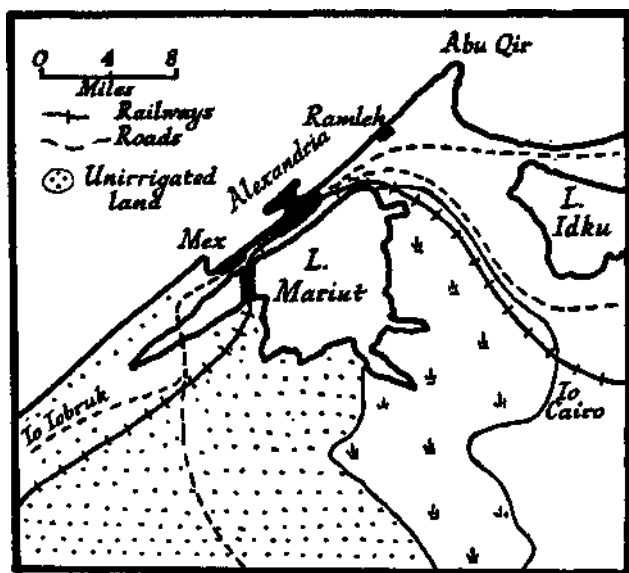


FIG. 90. The site of Alexandria.

cotton spinning and weaving mills have been started, and cigarette-making is important. The cool summer has made Alexandria a favourite summer resort, and for 3 months each year it still functions as the summer capital. Population (1947) was just under 1 million, i.e. about the same as that of Marseilles.

Port Said, with 174,000 inhabitants, is important mainly as a port of call for passenger steamers, and for its oil refineries. There is a small trade in bunker coal and tourists disembarking in Egypt provide an extra activity; but the share of Port Said in the total export trade of Egypt amounts to only 8 per cent.

IX. CYRENAICA

Physical Features.—Westwards of Egypt the Archaean platform is somewhat more thickly covered by later sedimentary series, principally limestones; and marked dislocation has given rise to a faulted, irregular coastline, with the main mass of Cyrenaica standing like a promontory into the Mediterranean, isolated on the west by the Gulf of Sirte, and to a much smaller degree on the east by the Gulf of Bomba and Gulf of Solium. Cyrenaica is essentially a tableland formed by uptilting of the fractured plateau-edge of north Africa, with the northern side dropping by a series of fault-scarps to the Mediterranean. It may be emphasised that although by their trend and disposition the uplands of Cyrenaica might suggest a connexion with Asia Minor or Sicily, folding is in fact largely absent, and existing land-forms are due to differential movement along fault-planes. A number of small sub-regions may be discerned within Cyrenaica—four occurring on the northern flanks of the massif, and three on the southern edge.

(a) *The North.*—Here the edge of the uplands has been broken into several steps, giving a series of scarps that face north and west. The lowest step, spoken of as El Sahel, is a narrow and often discontinuous coastal plain which runs from the Gulf of Sirte to the Gulf of Bomba. In places only a few hundred yards wide, it reaches its maximum extent (12 miles) near Benghazi. Because of its broken nature, routes cannot follow the coast, but must keep inland, particularly towards the north-east and east. In the neighbourhood of Benghazi and Tobra numerous salt-pans occur, fed (as in Cyprus) by seepage from the Mediterranean. Brackish lakes or marshes during winter, the pans dry out in summer, hence the plain is much less exploited than one might expect, and cultivation is limited to a very few patches.

The second step (El Arqab) appears as a series of ridges in the east, and as a flatter and more open terrace (the plain of Barce) on the south-west. In the east, consequent drainage from the interior uplands has heavily dissected the ridges, producing a tangled country of deep wadis and isolated hills. Though scattered patches of alluvium may be found on some wadi floors, most wadis are in general too bare of soil for extensive human occupation, and are covered by maquis or scrub.

The third step comprises a moderately high plateau, broad and

rolling in the west (inland from Benghazi) but narrower in the east, where it rises to just under 2,000 feet above sea-level, and forms in its extreme eastern portion the small dissected ridge of El Hamrin, which is the highest part of Cyrenaica. By reason of its green vegetation cover, the entire plateau is often termed the Jebel Akhdar, and here occur the best possibilities of settled occupation.

(b) *The South*.—To the south of the Jebel Akhdar, the surface slopes gradually down to the main Saharan plateau. Immediately below the crest of the Jebel lie a number of deep, southward-running wadis that were developed at an earlier period, and are now either occupied by streams for a few days only in each year, or else completely dry. This deeply eroded topography is a remarkable indication of the variation of climate which has supervened in the Middle East, since no present day stream could possibly cut such deep clefts. Further south still, relief is gentler, and playas—shallow, alluvium-filled basins—separated by low irregular ridges, with, now and again, a larger hill, are the main features. The largest playa is the Baltet el Zulaq, which has several wadis and streams draining into it.

Finally, the playa region gives way to true desert—at first formed of masses of stones with a thin layer of sand. In the extreme south, however, sand predominates, until, in the heart of the eastern Sahara, we reach the Sand Sea of Calanscio. This consists of several thousand square miles of mobile sand, with dunes that reach hundreds of feet in height. Very occasionally, there occurs a lowland basin (e.g. Kufra) where artesian water is available, and where a very limited degree of human settlement is therefore possible.

East of the Gulf of Bomba, in the region known as Marmarica, the variety in topography which is characteristic of central and western Cyrenaica does not occur. Instead, there is a simpler succession of north-facing scarps rising in a series of shallow steps, or low ridges. As far as Mersa Matruh, the coast is low-lying; but westwards of this point, the first step occurs at the coast, which is hence high and bold, with an occasional cove, e.g. as at Solium and Tobruk. Inland, relief is distinctly lower than in western Cyrenaica, since none of the ridges attain a height greater than 1,500 feet. Owing to this, Marmarica is much more arid; but artesian basins exist in certain districts even though their water may be rather saline. Settlement is as a result confined to the coast, or to a very few inland passes such as Gialo and Siwa, where good artesian water is available.

Climate.—Owing to high relief, and the extent of surrounding sea,

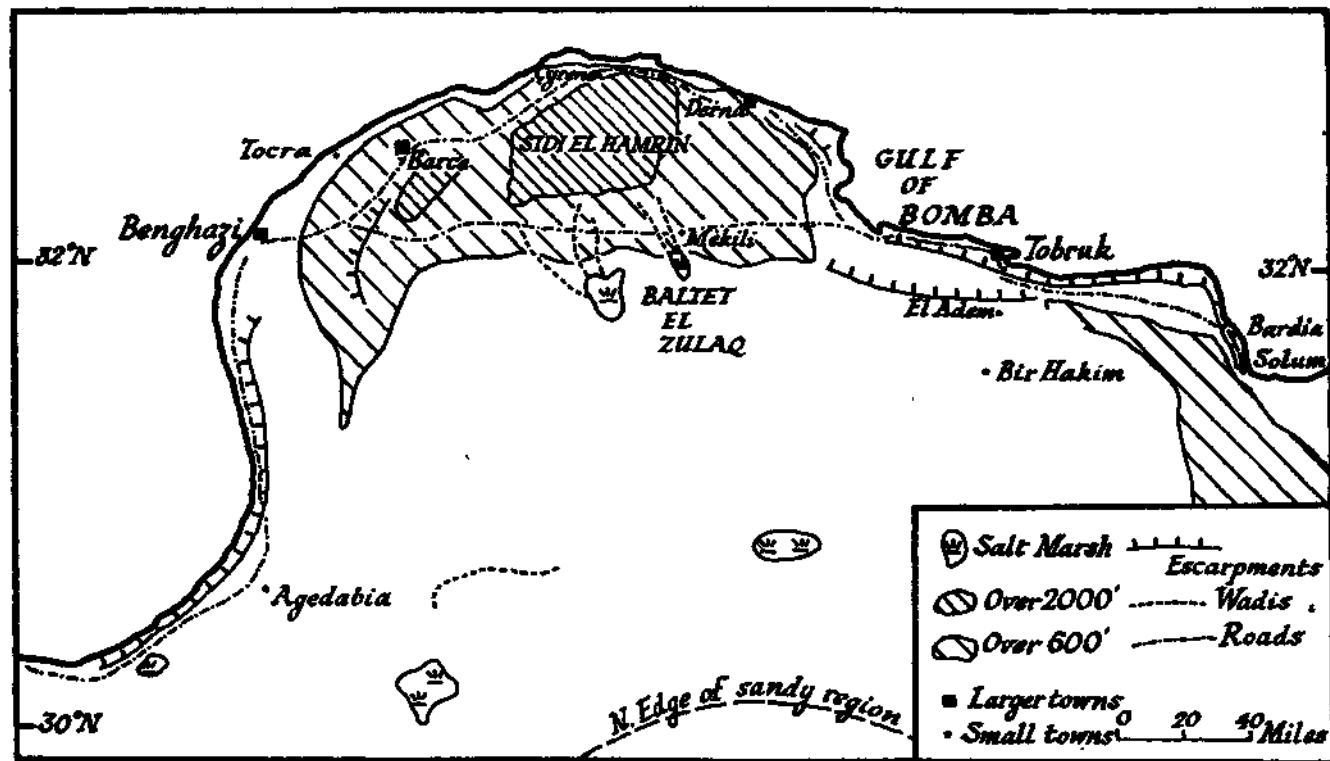


FIG. 91. Cyrenaica : Physical.

parts of Cyrenaica receive as much as 15 to 20 inches of rainfall annually (Ahlmann); but the amount is sharply controlled by relief, and diminishes rapidly to the east and south. One serious disadvantage is that onset of rainfall is distinctly irregular, and the quantity received fluctuates widely from year to year. Once every 4 or 5 years, there is a bad season, with the rains markedly deficient or unevenly distributed; so that cultivation is a hazardous matter, even where average rainfall exceeds 15 inches. There is as a result a strong bias towards, pastoralism (Evans-Pritchard).

The bolder relief of Cyrenaica also has an effect on temperatures. In winter, sleet is common, and for occasional periods of a few hours during each winter, the higher hills may carry a thin snow covering. Frost can occur inland in a good many parts of the plateau, but is rare at sea-level. In summer too, there is a distinctly lower temperature in the interior; though the average for Benghazi at sea-level shows Utde difference from that of Alexandria. Relatively cool summers give early morning fog along the coast—a factor which is of some importance to agriculture, since there is enough moisture to influence the growing of plants. With allowance made for these two slight differences of heavier rainfall in the plateau, and a somewhat reduced average temperature, it can, however, be said that the climate of Cyrenaica conforms to the normal pattern of the Middle East, and much resembles that of Egypt and southern Palestine.

CLIMATIC DATA—REPRESENTATIVE STATION

	J	F	M	A	M	J	J	A	S	O	N	D	Total
Benghazi													
Temp. ° F.	57	59	63	66	71	76	78	80	79	74	67	61	
Rainfall (ins.)	2.6	1.5	0.7	0.2	0.1	0	0	0	0.1	0.6	1.9	2.4	10.1
Rainy days	n	8	6	2	1	0	0	0	2	4	7	13	54

Soils and Vegetation.—As a result of its heavier rainfall, north-west Cyrenaica has a soil of true Terra Rossa type; but south of the Jebel Akhdar, Terra Rossa quickly gives way to steppe soils, in which extensive deposits of desert pan or crust occur. This hard pan is particularly noticeable in Marmarica, from the region of Solium as far west as Tobruk, Derna, and Bir Hakim. Then, as the Sahara proper is approached, white solonchak soils are increasingly prominent, until, at die playa zone, full desert conditions are reached.

Each soil type carries a characteristic vegetation cover. Garrigue is most widespread on the coastal plain, with scattered clumps of cultivated fruit trees (including the date-palm) in better watered areas. The presence of salt marsh reduces the growth of typical Mediterranean flora, hence tamarisk often takes the place of evergreens. On the second of the plateau-steps (El Arqab) extensive woodland is a feature. This is a low, but fairly dense growth of juniper and lentisk trees, with occasional olives, Mediterranean pines, and evergreens; and this vegetation has a surprising extension over northern Cyrenaica. The importance of this 'forest' (or better, shrubbery, since few

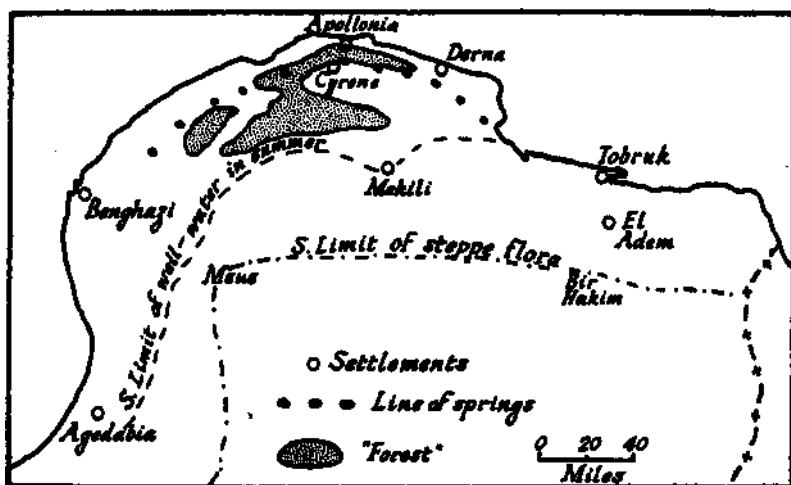


FIG. 92. Vegetation Zones in Cyrenaica (after Evans-Pritchard)*

trees exceed 8 feet in height), is very great, since it provides grazing for animals in poor seasons; and remarkably enough, it seems able to resist even damage by goats. Evans-Pritchard writes, 'There is no evidence that the forest has anywhere been destroyed by goats, or even severely damaged by them'; and it would appear that the goat actually thrives best in wooded areas. Even cattle can be kept there permanently, provided that there are occasional open clearings where grass grows.

The woodland ceases below the crest of the Jebel Akhdar, giving way to more open expanses of garrigue, and scattered grass-covered stretches. South of the crest, steppe vegetation is increasingly a feature, with the lotus in the deeper and damper valleys, and juniper

on the **uplands**. Ultimately vegetation becomes extremely sparse, and of a true desert type.

Agriculture.—By contrast with Egypt, there is in Cyrenaica a gradation between herding and cultivation. Though pastoralism is the principal activity, it can be said that most of the Badawin plough, even if merely to a very limited extent. In effect, the life of most Arabs could be described as a kind of mixed farming, with animal husbandry the major element, and cultivation a very minor feature. Barley is the chief crop, being sown in the lowlands as soon as the first autumnal rains have fallen; but on the plateau lower temperatures often retard planting until January, and the harvest (which takes place on the coast during May) is correspondingly later (often in August). By sowing two separate plots, one in the lowlands, and the other at higher altitudes, it is possible to spread the work of cultivation over a long period, and to some extent mitigate the effects of a capricious rainfall. Barley grows wild in Cyrenaica, and is extremely hardy; hence it can thrive on a minimum of attention—the farmer may move off with his animals, and leave his fields unattended until the harvest.

Wheat is much less grown, and barley predominates in all regions. Sometimes millet is grown in the north as a summer crop; and a special bulrush millet (*dukhn*) is grown under irrigation in the southern oases. Maize has recently been introduced into the Benghazi region, but because of its need of water, development of irrigation schemes will be essential before it can be produced on a large scale.

Besides cereals, fruit and vegetables are grown in small gardens along the coastal plain, and in interior oases; but in all cases such cultivation is at least partially dependent on irrigation, and the distribution of gardens is controlled by the occurrence of springs. The date is widespread, but thrives most in the south, where it provides the bulk of Arab food during at least 3 months of the year. On the north coast, conditions are really too cool and damp for luxuriant growth. Grapes do well on the extreme north of the plateau, and also at Derna, which lies on a narrow shelf by the sea, and is sheltered to landward by a high cliff or escarpment. Other Mediterranean fruits (peaches, apricots, almonds, etc.) are cultivated on a small scale, but in all instances supplies are barely adequate for local needs.

Irrigation.—Owing to the predominance of limestone, even the moderate rainfall of the plateau is entirely absorbed by the soil, and there are no perennial rivers of any kind in the country. Water is, however, to be found underground—near Benghazi there is an under-

ground lake known as the waters of Lethe—and in other places small artesian basins exist. Extensive fracturing of the northern plateau region has also given rise to numerous springs: hence one can divide Cyrenaica into two zones—the north, where springs provide most of the water; and the south, where wells must be sunk into artesian structures.

Limited attempts have been made by the Italians to develop irrigation schemes, notably in the Arqab region round Barce and Cyrene; but in view of the broken porous nature of the surface, dams have not been constructed, instead, smaller covered tanks are the chief methods of storing water.

Pastoralism.—Many of the Badawin move south with their animals into the steppe region during December, after the completion of barley sowing; and they return to the plateau in late spring, when pasture in the south is exhausted, but still growing on the cooler, damper slopes of the northern hills. Farthest south reached by most pastoralists is the line Bir Hakim-Agedabia; and by the month of August, most herders have returned to the plateau, though a few may stay in the region of deep wadis and playas, where scanty pasture often lasts all the year.

Most Arabs prefer to remain in fairly close proximity to the plateau, and the majority of those living in the north move only a few miles between the coastal terraces and the higher ridges of the Jebel Akhdar. One factor in this restricted degree of movement is the occurrence over much of the north of a plant, drias (*Thapsia gargantica*), which, when dried for fodder, is poisonous to cattle that have not previously grazed on it earlier in the same year. This means that animals must stay in the one region during spring and summer, and cannot be moved in from winter pastures in the south.

The extreme north of Cyrenaica tends to be given over to goats and cattle, which, as we have noted, can thrive in the woodland and scrub of the mountain terraces. In the south, sheep and camels are most numerous, and these animals can exist without drinking for 1 to 4 days.¹ Animal products—skins, wool, cheese, butter—and the stock itself, are the chief wealth of Cyrenaica; and a surplus of these commodities, together with a little barley, which can be used for whisky distilling, are sold abroad to pay for imports of tea, sugar, cloth, and weapons. The economy of Cyrenaica is entirely based on herding

¹ Sheep can be accustomed to go entirely without watering in winter and spring, when vegetation is rich, and to drink only every fourth day during the dry season.

and cultivation; there are no industries, except a very few bazaar crafts (chiefly repair of implements) found in the towns of Benghazi, Apollonia, Derna, and Tobruk. In western Cyrenaica, there is a gradation from almost fully settled agriculture to nomadism; in Marmarica, pastoralism with patches of oasis cultivation is more characteristic. We may in fact distinguish two contrasting zones

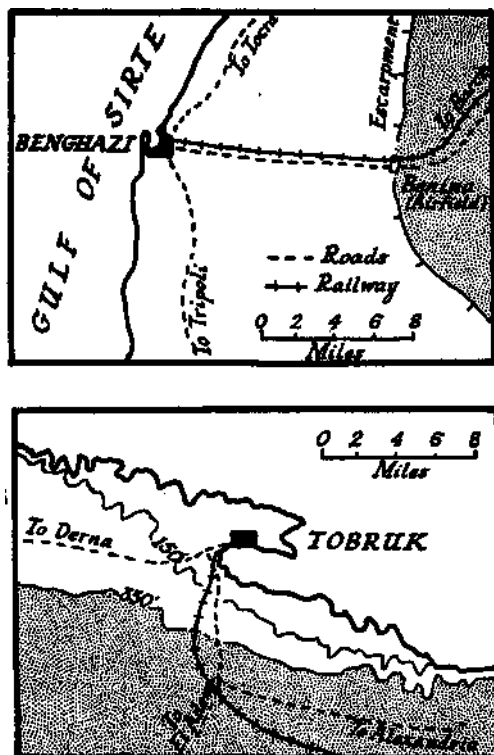


FIG. 93. The sites of Benghazi and Tobruk (high ground stippled).

within the country—the north, with its varied topography, red soils, woodland and scrub cover, watering from springs, and an emphasis on arable land, cattle and goats; and the south, a region of open country, white alkali soils, steppe or desert vegetation, watering from wells, and a pastoral economy that is based on sheep and camels.

People.—Estimates for 1940 gave a population of 170,000 Arabs and 50,000 Italians and Jews; but over 40,000 Italians were evacuated during the war years. Of the Moslem Arabs, over one-quarter live

in towns, as Italian warfare against the Sanussi tribes of the interior greatly reduced livestock in the steppes.¹ Elaborate and extensive Italian colonisation schemes aimed at bringing in Italians as settled farmers, mainly in the Barce, Cyrene, and Benghazi areas; and model houses, with attached vines, fruit gardens, and pasture still remain to be seen on the plateau. These are now held by Arab Badawin, who use them more as tents than as real houses, and much of the cleared land is slowly returning to scrub.

A little may be said about the towns of Cyrenaica. Benghazi (population 35,000) is by far the largest of these, and lies on the widest part of the coastal plain. Most, though not all of this district is cultivated. A gradually rising hinterland provides fairly easy access to the inner plateau country, and the town has a moderately good harbour, which, however, is open to north-west winds. These, unfortunately, are common in winter. A light railway connects Benghazi to the fertile Barce district, and the port is the main outlet for the more prosperous north and west of Cyrenaica.

Many other once famous centres—Tocra, Tolmeita, Apollonia; and Cyrene—are now tiny hamlets; and the only other settlements of importance are (i) Derna, which has a poor harbour, but a very productive, yet small, oasis, and rather difficult landward communications; and (ii) Tobruk. The latter lies on a small creek (now choked with the wrecks of 97 vessels) and is the outlet for the scanty pastoral products of Marmarica. A railway now runs from Tobruk to Alexandria, but most of the traffic comprises supplies for a British airport at El Adem (19 miles south of Tobruk), which has some importance as a stage in the African and Far Eastern air routes. Even for these needs a twice-weekly train is ample.

Future Possibilities.—In the opinion of certain authorities, the future of Cyrenaica lies in a development of pastoral industries, with cultivation as a secondary adjunct. Improvement of stock and marketing, and the establishment of water supplies in the south (by well-boring) would be far more advantageous than attempting to develop agriculture under only moderately favourable geographical conditions. The Italian settlement plan was never financially successful; and it remains a fact, despite political aims to demonstrate the contrary, that in many semi-arid areas herding of animals is the only possible economic activity.

¹ Italian reports give the reduction in livestock between 1926 and 1933 as follows : sheep, 800,000 to 98,000 ; camels, 75,000 to 2,600 ; goats, 70,000 to 25,000.

THE FOREIGN TRADE OF EGYPT

(Year 1947-48)

Total Value of Trade in £ Sterling : £190 million

Amount per head of population : £10

<i>Imports</i> (Order of impce.)	<i>Exports</i> (Order of expce.)
1. Manufactured goods	1. Raw Cotton
2. Fuel	2. Vegetables
3. Fertilisers	3. Cereals
Total Imports, £104 million	Total Exports, £86 million
Suppliers :	Buyers :
(1) U.S.A.	(1) United Kingdom
(2) United Kingdom	(2) France
(3) India	(3) India

APPENDIX 1

OUTLINE OF THE GEOLOGICAL HISTORY OF THE MIDDLE EAST

IN pre-Cambrian times, the greater part of the Middle East area consisted of a complex of igneous and metamorphic rocks, forming a widespread land area. This ancient Archaean continent extended over the greater part of Africa, and continued unbroken through Arabia, Iraq, Iran, Armenia, and much of Turkey. In the extreme north-east of the Middle East region a mountain range may have come into existence in late Archaean or early Cambrian times, as the result of fold movements. Further to the east, much of northern India was covered by sea, with a coastline approximately in the area of the present north-west Provinces ; and a less extensive sea or gulf would also appear to have existed over north-west Arabia, in the region of the Wadi Araba. Later, in the Cambrian age, certain outlying portions of the Archaean platform underwent subsidence ; and well developed Cambrian series of Umestone, shale, rock-salt, and anhydrite can be traced in a number of regions of the Middle East, particularly in the north and east, along the zone of the present Zagros mountains, with continuations into Armenia, central Iran, and Palestine.

Quiet conditions seem to have prevailed throughout much of the remaining lower Palaeozoic epoch, so that deposits are generally scanty, uneven in thickness, and local in extent. The Devonian age saw considerable flooding by sea of many parts of the northern region, with a corresponding deposition of sediments in much of western Turkey, in a narrow zone along the Black Sea coast, in Armenia, and also in parts of Iran.

During the succeeding Carboniferous age the emergence of a land-mass took place in central and eastern Europe, accompanied by warping movements in the region of Asia Minor. The northern part was uplifted, and a large area round the Black Sea emerged as low-lying land bordering a shallow sea. In this basin, which was one of a series extending westwards through central Europe as far as the British Isles, extensive but discontinuous coal deposits were laid down. The greater portion of the Carboniferous structures of the Black Sea area, one of the major coal basins of the world, are preserved in the Donbas region of Russia; but a much smaller coal basin also occurs in the Eregli-Zonguldak area of north-western Turkey. Further south, a down-warping led to the transgression of the sea over north-west Syria and the north of central Arabia, with probably temporary marine transgressions as far as western Iran. Deposits in Oman province indicate that the sea may have formed a gulf extending as far as south-east Arabia.

During the Permian age, further flooding occurred, so that most of the northern and eastern parts of south-west Asia became submerged beneath a great sea, to which the name Tethys has been given. This sea probably extended from southern Asia, leaving a narrow strip of unsubmerged land in the extreme north of Turkey. Punjabian limestone of Middle Permian age, found in the region of the Iranian Zagros, and the Araxes valley of Turkestan indicates the great extension of the Tethys.

In late Permian times, fold movements due to compression occurred in Anatolia. These were probably influenced in the north by the structure lines of the Carboniferous basin, and hence the folds themselves run east-west for some distance to the south of Zonguldak. Folds of similar age, but with a generally north-south trend, occur in the Maras district of southern Anatolia; and contemporaneous folding on a small scale may also have taken place in central Iran. Elsewhere, the main features were (*a*) the extensive sea area covering Syria, Iraq, and western Iran, with (*b*) the stable block of north Africa and Arabia forming a shoreline at some distance to the south and west.

In Turkey, regional uplift followed by considerable denudation gave rise to a number of small, but relatively stable and resistant, land masses, surrounded by more yielding and pliable sediments. The nucleus of a few of these resistant blocks can be considered as fragments broken off the Archaean platform underlying the south-west of the Middle East region; but this is by no means the whole story, since several of the blocks appear to have no Archaean foundation, and instead, show signs of intensive folding of Palaeozoic age—the indication being that they themselves have been sufficiently rigid to offer resistance to later fold movements. Trends are, however, so confused with one direction frequently giving place to another over a short distance, that no definite plan of folding can be distinguished. The westernmost of these blocks occurs in the Rhodope massif of the Balkans; and others have been delimited by Salomon-Calvi and Tromp in the Cyclades region of the southern Aegean; in the area transversed by the Biiyiik Menderes of south-west Turkey; and in the Konya region of the central plateau.

The early Mesozoic period was one of wide submergence. Considerable masses of Jurassic limestone were laid down in western Syria, Armenia, and Iran; and other marine sediments of this epoch show that the Tethys extended from Spain to Northern India. From the opening of the Mesozoic period until middle Cretaceous times, the permanence of the geosyncline of the Tethys was the main feature in the northern, central, and western parts of the Middle East region. The deepest part of the geosyncline lay most probably along an axis running from north-west to south-east, on the extreme eastern limits of the present day Zagros, since in this region Triassic and Cretaceous radiolarian chert series, formed from deep-water organisms, are a widespread feature.

In Middle Cretaceous times a series of fold movements affected Turkey

and the north-eastern margin of the geosyncline. The resistant blocks of the former region were brought closer together, with a consequent compression of the later sediments surrounding them. A series of asymmetrical folds thus developed in southern Turkey, with a trend closely influenced by the disposition of the harder blocks ; but rapid erosion after elevation soon reduced the folds to mere stumps. In Iran, intensive folding occurred in the region of the north-western Zagros, between Niriz and Kirman, with the result that the site of the deeper part of the Tethys was displaced towards the south-west.

Further south, somewhat similar earth movements (chiefly during upper Cretaceous times) have been shown to have had great influence on the structure of the lower Persian Gulf. For a distance of some 600 miles from Ras Musandam, at the head of the peninsula separating the Persian Gulf and the Gulf of Oman, to Ras Madraka on the Arabian coast of the Indian Ocean, a strongly developed series of folds, with a complex of overthrusts and nappes, together with widespread vulcanicity, form the main structural feature. The trend of folding is generally north and south, and in the north there are signs that the mountain range continues into southern Iran at least as far as Niriz. The southward extension is much more difficult to trace, and several alternatives present themselves.¹

The Tertiary period opened quietly in most areas, with extensive sedimentation in the geosynclinal trough, due to erosion from the recently elevated land masses further to the north and east.² The progressive filling up of marine basins is shown by a considerable development of shallow water limestones that can be traced in Asia Minor, and from Cyrenaica across northern Libya and Egypt into parts of Arabia and southern Iran. Deposition continued further in Oligocene times. The geosyncline became even shallower, with the emergence of dry land on the margins. In many areas, particularly southern Turkey and the regions round the Persian Gulf, salt and anhydrite beds of Oligocene age indicate increasing desiccation in land areas and their adjacent shallow seas.

It is suggested that the geosyncline may have been divided laterally by the development of a shallow water platform in the region of the middle Persian Gulf, since at this period the rock series formed in the north-west differ from those formed to the south-east. The division of the geosyncline into two relatively shallow basins would thus advance the precipitation of chemical deposits, which are a conspicuous feature of the early and middle Tertiary periods. The formation of these deposits was also aided by slight oscillation, which produced two periods of uplift each followed by marine transgression.

In the Miocene period, considerable folding took place. The effects were greatest in the north, where younger and less resistant sedimentary measures

¹ For a discussion of these alternatives see G. M. Lees, *Oman, Geol. Mag.*, Vol. XXX, 1940.

² There was, however, some disturbance in central Iran, which led to marked volcanic activity during Eocene times.

of Asia Minor were compressed against the still resistant plateau blocks, with a widespread development of fold structures controlled once more by the extent and disposition of the older masses.

The Taurus Mountains became a prominent feature along the southern edges of the Aydin and Anatolian plateau blocks, although of a somewhat lower elevation than now; and more irregularly disposed arcs came into existence to the east and west, i.e. between the Aydin and Cyclades masses; north of the Gulf of Alexandretta; and south of the basins of Van and Urmia. In the last area the arcs are wider in extent.

Further to the south-east, the geosyncline underwent subsidence, with the development of folds on the north-eastern margins. Regression of the sea then followed, with a considerable shrinkage of the geosynclinal area as a whole; yet a further displacement of the site of the deeper portion took place, bringing the axis more towards the south-west, along the borders of Iraq and Iran.

The continuation of orogenic movements during the Middle Tertiary led to a second phase of mountain building in the north and north-east of the Middle East region. The composite mass of rock series of varying age proved resistant to further fold movements, but continued compression led to extensive fracturing of the rigid, although relatively brittle, strata. Widespread faulting accompanied by differential movement gave rise to a series of horsts and downthrow basins. In Turkey, this development is particularly well marked: recently formed fold structures and older blocks hitherto resistant to all earth movements were alike extensively fractured. The opening of cracks and fissures in the crust of the earth allowed the rise of magma from the interior, and intrusion by igneous rocks, with a considerable development of volcanic cones and lava flows, is hence characteristic of this period.

The earlier Tertiary folding movements were of greater importance in the north: a final period of activity in Pliocene times had its maximum effect in the east and south-east. The remnant of the Tethys continued to shrink, and to retreat towards the south-east, although subject to minor oscillations, whilst great fold structures began to develop on the north-eastern limb. The Zagros Mountains took their present form: an immense series of folds and nappes, with a remarkable unity of trend from north-west to south-east, continuing unbroken for a thousand miles between Armenia and Bandar Abbas. Further to the south and east, in the Makran, the trend gradually takes on a more easterly direction; and finally, in the extreme east, towards Afghanistan and India, the direction turns south-west to north-east, under the influence of the pre-existing structures of the Suleiman Mountains of north-west India.

Pliocene disturbances also had important results in Turkey. Minor folds were formed along the southern edge of the region. More important, however, was the renewed fracturing of the whole of Asia Minor, followed by uplift on a considerable scale. The interior basins of the west were elevated

to an average height of 3,000 feet, and those of the east to 7,500 feet, with fold ranges rising above this height on the margins. This last movement—one of wholesale uplift, not merely in Asia Minor, but also affecting central Iran—would appear to have been episodic, since at least four separate river terraces can be traced in all the major rivers.

Extensive movement along tectonic lines broke down the northern and western edges on the newly-raised land mass of Asia Minor. In the north, downward warping along generally east-west aligned faults gave rise to the present Black Sea coastline—straight, sheer, and harbourless ; in the west, more involved cross-faulting produced an extremely broken shoreline bordering a drowned central basin, out of which stand irregular fragments in the form of islands. The Bosphorus was formed by the drowning of a channel opened by north-north-east—south-south-west running minor faults in a land mass defined by east-west tectonics.

Inland, differential movement along fault-lines accentuated the topography of the interior basins, and hence controlled the development of the great lakes—Tuz, Van, Gokce, and Urmia. Finally, a renewed outburst of volcanic activity raised the massive cones of Ararat, Suphan, and Nemrut that now form the highest points in the country. Movement along the numerous tectonic lines in Asia Minor has by no means ceased, even at the present time, so that earthquakes are frequent. A number of districts in Turkey that lie on great fault zones, are badly affected.

APPENDIX II

TEMPERATURE DISTRIBUTION IN THE ATMOSPHERE

IF for any reason a quantity of air is compelled to change its position vertically in the atmosphere, heating or cooling takes place according to whether the air sinks or rises. On sinking, the parcel of air moves into a part of the atmosphere where pressure is greater, so that compression occurs, and the parcel shrinks in volume. The heat energy within the air remains unaffected by the change in volume, and thus if no transfer of heat from, or to, external sources takes place, the energy contained in the parcel of air itself now has a reduced air mass upon which to exert its heating action. The temperature of the air rises, because an unaltered quantum of heat is existent in a reduced volume of air.

Conversely, if a parcel of air ascends in the atmosphere, reduced pressure leads to expansion in volume, with a resulting fall in temperature, since the heat energy has now a larger mass upon which to exert its influence.¹ Such changes of temperature in response to changes of pressure are termed *adiabatic*, because they develop within the air mass itself and are quite independent of external temperature conditions. For dry air, the rate of heating or cooling following adiabatic contraction or expansion is 5.4° F. per 1,000 feet; and for saturated air (i.e. 100 per cent, humid) 2.7° F. The difference arises owing to absorption or liberation of latent heat.²

The phenomenon of adiabatic heating or-cooling is of great importance in meteorology, since it influences weather conditions in several ways. As regards the Middle East region, adiabatic effects are most marked (a) in producing changes in temperature and relative humidity in an air-mass as the result of ascent or descent over mountain ranges (i.e. Fohn effects) ; and (b) in leading to the development of stable and unstable conditions.

Influences of Changes in Altitude,—Let us suppose that a mass of air, damp but not saturated, is forced to rise. If the initial temperature of the air is 50° F., and its dew point 45° , an ascent of slightly less than 1,000 feet will bring it to its dew-point, i.e. the air will become saturated, and cloud will form.² From this point, if ascent is continued, cooling will be at the rate of 27° F. per 1,000 feet; but at the same time, the air will remain saturated,

¹ Compare the effect of moving an electric radiator from a smaller to a larger room.

² An everyday example of adiabatic heating may be noted in a bicycle pump. As air is compressed during the inflation of a tyre, heat is generated and the pump becomes warm. Intense adiabatic cooling takes place when highly compressed gases are allowed to expand quickly. This principle is utilised in certain types of refrigeration plant.

³ As the air-mass is not at first 100 per cent, humid, it will cool at the rate of 5.4° per 1,000 feet of ascent until it reaches its dew-point.

and further cooling will be accompanied by the precipitation of water in the form of clouds or rain. Let us assume that the air ascends 3,000 feet above its starting level. Temperature will fall to approximately $39^{\circ}6'$ F., and, although the air will still be saturated, the total quantity of water-vapour held in it will be diminished, since air at $39^{\circ}6'$ cannot hold as much water as air at 45° . The excess water will have formed cloud or rain ; and the dew-point will of course also have fallen to $39^{\circ}6'$ F.

If the air now descends, adiabatic heating at the saturated rate will begin ; and, for a time, so long as water-drops persist in the air, and can be evaporated to keep the air 100 per cent, humid, this will continue. But the quantity of water-drops will be limited, because their presence on the downward slope is due merely to mechanical transfer from the upward slope, and none will be formed from the air itself. Hence when all the water drops have been evaporated, the air mass will cease to be saturated, and further heating will then take place at the dry adiabatic rate. The dew-point, $39^{\circ}6'$ F. at the summit, will rise at the rate of 2.7° so long as the air remains saturated ; and, as has been said, allowing for certain persistence of water vapour and water drops past the summit, could be expected to reach 40° or 41° . Over much of the 3,000 feet of descent, the greater part will, however, be at the rate of 5.4° per 1,000 feet, giving an approximate figure of 13° F. rise in temperature. Thus on completing its descent, the air mass will have reached a temperature of 53° to 54° F. as compared with its original 50° , and it will in addition be considerably drier, having lost a quantity of its vapour during the journey (new dew-point 40° or 41° as compared with the original 45°).

These theoretical considerations must be slightly modified in practice, because a certain amount of heat is lost by conduction to the land surface, and the gain in heat is therefore actually less than would be expected. Nevertheless, an important topographical barrier can produce marked changes in the air passing over it, and such changes become even more striking when air descends without having undergone previous ascent, e.g. from an interior plateau to a coastal plain. Heating is almost entirely at the dry adiabatic rate, so that abnormally high temperatures result, giving rise to the well-known phenomenon of Fohn winds. These are frequent in many parts of the Middle East, where high interior plateaus are a common feature ; and Asia Minor is probably the most outstanding region in this respect.

Atmospheric Stability.—The above considerations relating to adiabatic heating and cooling apply only to *air actively in vertical motion*. Obviously this does not hold for the greater part of the atmosphere, which remains either still, or in fluctuating horizontal motion, with only a very slight vertical component.

The atmosphere as a whole takes on a temperature distribution controlled by the presence of various local heating agencies—insolation, the character of the surface, or the presence of solid matter in the air : and adiabatic laws

play no direct part in influencing the temperature of the general atmosphere *so long as vertical motion is not involved*. It therefore follows that the atmosphere can vary considerably in temperature from place to place and from day to day, not merely in a horizontal direction, but also vertically. Being controlled by local weather changes, temperature distribution is subject to no fixed laws. Excessive heating of the ground will affect only the lower layers of the atmosphere ; and differential heating of the opposite kind occurs when a warmer air mass over-runs a colder.

The figure of 3^0 F. drop in temperature per 1,000 feet of ascent, normally quoted in geographical text-books, is merely an approximation based on average conditions, and bears only the most general relationship to existing temperatures. It is usually exceeded in tropical regions, but may not be attained during spells of settled weather in higher latitudes. Variation takes place almost from hour to hour. Determination of the vertical distribution of temperature in the atmosphere (or lapse rate), is employed by meteorologists as the indispensable preliminary of weather forecasting, and to observe the lapse-rate, elaborate methods involving radar, and balloon and aeroplane flights are necessary.

It has, however, been shown that air actually rising in the free atmosphere is immediately influenced by adiabatic cooling; and its temperature will therefore change at a definite rate. Let us now consider the behaviour of a small mass of air which, we will assume, is forced to rise

(a) within an atmosphere where the lower layers are very warm, and the upper layers unduly cold. Assuming an average decrease in temperature, or lapse rate, of 7^0 F. per 1,000 feet for this atmosphere, it will be apparent that the longer the small mass continues to rise, the warmer it will become *relative to its surrounding environment*, since the small air mass will cool only at the rate of 5.4^0 F. so long as it remains dry, and at 2.7^0 after saturation, in accordance with adiabatic laws. Being relatively warmer than the atmosphere around it, the small mass will have a lighter density, and its vertical motion will thus tend to increase, in the same way as a lighter hydrogen balloon will ascend in denser air, or a bubble of oil rise through water to the surface. The longer ascent continues, the greater the disparity in temperature between the air mass and its surrounding atmosphere, and therefore, the greater the acceleration upward. (See table below.)

(fc) If the lapse rate of the atmosphere changes only slowly, i.e. temperature differences between higher and lower layers are small, a rising air mass -will cool more rapidly than the atmosphere round it, and will become relatively denser, hence heavier, than its environment. Vertical motion will be retarded, and ultimately damped out completely. (See table below.)

	Air Mass	Atmosphere	Atmosphere
	$\angle^*$ °F.	°F. W	°F. (*)
5,000 feet	33-0	25	50
4,000 „	38-4	32	52
3,000 „	43*8	39	54
2,000 „	49-2	46	56
1,000 „	54-6	53	58
Surface	60-0	60	60

Column (x) represents actual temperature changes undergone by a mass of air, initial temperature 60° F. during 5,000 feet of ascent under dry adiabatic conditions.

Column (a) gives conditions in an atmosphere with an assumed lapse rate of 7° F. per 1,000 feet. Dry air (col. x) rising in this atmosphere will be 8° warmer than its environment after an ascent of 5,000 feet.

Column (b) gives conditions in an atmosphere with an assumed lapse rate of 2° F. per 1,000 feet. Dry air (col. x) rising in this atmosphere will be 17° colder than its environment after an ascent of 5,000 feet.

Summing up, we may say that under conditions of rapid variation of temperature in the atmosphere (i.e. steep lapse-rates) air masses are aided in an upward motion they may acquire, and such motion increases the higher they rise. When the atmosphere cools only slowly with height, air masses within it cannot develop any marked vertical motion.

In order to understand this conception, it is essential to distinguish clearly between the *general atmosphere*, which is not involved in a vertical motion, and is hence free to develop a temperature gradient (lapse rate) of its own, and a *rising air mass*, which cools at a fixed rate determined by the laws of adiabatic change. An atmosphere is said to be *unstable* if it has a great vertical range of temperature, that is, if air masses within it can easily develop vertical motion. A *stable* atmosphere is one with a relatively slow lapse rate, and a restricted range of temperature, in which vertical motion tends to be damped out.

The practical importance of this feature of the atmosphere is very great. Under conditions of instability, small scale eddies formed near the ground as the wind blows against obstacles such as hills, buildings, or even trees, can develop into large updrafts of air. This in turn gives rise, if moisture is present, to the elaboration of cumuliiform cloud, leading to showers, heavy rain, or possibly hail and thunder. Squally winds, blowing violently for short periods, then rapidly changing in direction of onset, are also characteristic of atmospheric instability.

Excessive surface heating leads most easily to the development of unstable atmospheric conditions, and this, as we have seen, is widespread in the Middle East. Weather phenomena associated with instability are therefore highly characteristic of the climatic regimes of the area.

APPENDIX m

GLOSSARY OF GEOGRAPHICAL TERMS

Unless otherwise shown as Greek, Persian, or Turkish
all words used are of Arabic origin.

Abu	father of (tribal)	Jebel	hill
Ain	spring	Kara (T)	black
Ala (T)	very high	Kasr, Qasr	castle, barracks
Akhbar	greater	Kebir	great
Akhdar	green	Kefr	village
Asir	isolated	Khan	night stopping place for caravans
Aya (Ayos) (G)	saint		
Bab	gate, strait	Khor	open water, salt steppe
Bahr	sea, lake		
Balkan (T)	wooded hill	Maaden (T)	mine
Beit	house	Maidan (P)	open expanse, small plain
Bekaa	fertile plain		
Bir	well	Mar	saint
Birkeh, Birket	pool, tank	Merj, Marj	plain
Biiyiik (T)	great	Meskin	poor
Col (T)	desert	Nahr	river
Dagh (T)	mountains	Nakle	palm tree
Dar	dwelling	Ova (T)	plain, basin
Deir	monastery	Qanat (P)	canal
El (al, em, en er, esh, et)	the	Ramlc(h)	sand
Gezira, Jezireh	island	Ras	cape, headland
Ghab	forest	Rud (P)	river
Ghor	hollow	Sabkha	salt marsh
Gol (T)	lake	Sahel	plain
Hamad	barren	Sidi	ridge
Hedjaz	boundary	Sii(T)	river
Hosn, Husn	fortress	Sur (P)	fortress
lbn	son of	Tel, Tell (plural Tulul)	small hill
Irmak (T)	river	Tuz (T)	salt

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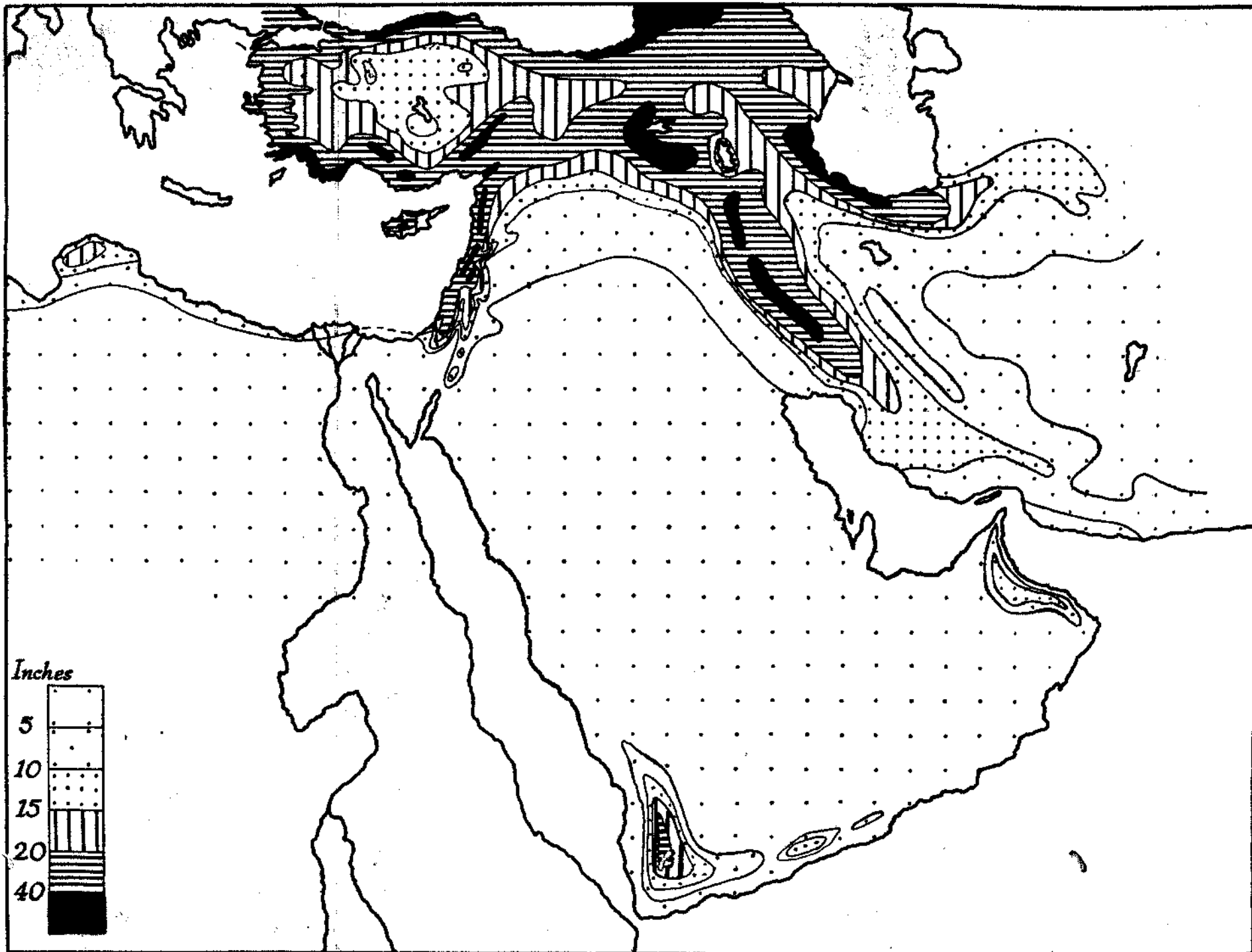
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II. MIDDLE EAST: ANNUAL RAINFALL

