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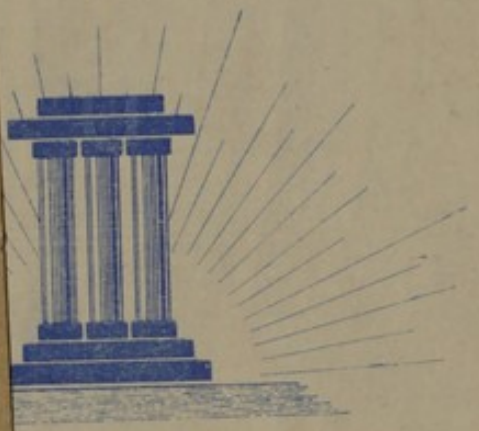

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1. *The Assassins' valley from the Alamut Rock, Central Elburz*

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PREFACE

IN 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these Handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1918 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand it has become apparent that something more is required to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge, and is printed by the Oxford and Cambridge University Presses. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in a comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, &c.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force, and other Government Departments (many of whom have given great assistance in the production of the series) will find these Handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY
Director of Naval Intelligence
1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared by the Oxford sub-centre of the Naval Intelligence Division under the direction of Lieut.-Colonel K. Mason, M.C., M.A., R.E., Professor of Geography in the University of Oxford, and is the work of a number of contributors, whose names are given on page 601.

E. G. N. RUSHBROOKE
Director of Naval Intelligence
SEPTEMBER 1945

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CHAPTER I

INTRODUCTION

MODERN Persia, officially called Iran, is the western part of the Iranian plateau which extends between Tigris and Indus. It is situated between latitudes 25° and 40° North and longitudes 44° and 63° East, flanked by the Indian Ocean on the south and the Caspian Sea and Central Asian deserts on the north, the lowlands of Iraq and highlands of Turkey on the west, and Afghanistan on the east. Broadly it comprises an irregular, quadrilateral depression, with a short southern side, hemmed in on all its flanks by mountain systems, massive and lofty on the north, west, and south-west, but much less considerable on the east and south. Formerly trade routes to farther Asia passed through Persia, which even in recent times has been regarded as a possible route for European invasions of India. But oceanic transport has destroyed its caravan value, if not its strategic significance.

Area and Frontiers

The Persian State, which has an area of 628,000 square miles, has been confined within its present limits by the pressure of external Powers, Turkey, Russia, and Great Britain, mainly since A.D. 1800. The land boundaries, which have a total length of some 2,750 miles, have been drawn with considerable attention to natural features and for about three-quarters of their length follow rivers, watersheds, marshes, and sandy wastes. They were nearly all defined and demarcated between 1800 and 1914 (pp. 286–294).

West. The Perso-Turkish boundary (290 miles) from a point on the Aras river first skirts the foothills of Ararat and then approximately follows the watershed between the Urmia basin in Persia and the Van and Great Zab basins in Turkey to the junction of the Perso-Iraqi frontier. This (550 miles) follows the watershed between the Great and Little Zab to the defile of the latter river, which with the Baneh tributary forms the boundary for 16 miles; then the Little Zab–Sirwan watershed is followed to the Sirwan defile. The nature of the boundary then changes. After crossing the lower hills, which form the south-eastern flank of the Sirwan valley, downstream to a point 17 miles south of Khanaqin, it follows the outer edge of the foothills where they meet the plain of Iraq for some 200 miles.

An arbitrary line is drawn across the Tigris and Karkheh marshes to the Shatt al Arab at Saiyid Raqir, and thence contrary to the usual international practice the boundary follows the low-water line on the north bank instead of the *thalweg* or centre of the channel, with two exceptions that leave the anchorages of Khurramshahr and Abadan to Persia[1] (figs. 13, 14).

This western frontier is strong, particularly in the Iraqi mountain sector, which is crossed by only one easy route, that of the Khanaqin–Kermanshah road, and few other routes or even tracks. The Turkish zone is less formidable and is crossed by several routes, but access is open and easy only north and south of Ararat. South of the mountain zone marshes hinder movement, though the Karun waterway provides easy access.

North. The Russian frontier (901 miles) is divided by the Caspian into a western and an eastern section. In the west the Aras river is followed downstream from the junction of the Russian, Turkish, and Persian frontiers 250 miles to Tazakend; thence the boundary traverses the Moghan steppe 35 miles to the northern Talish mountains, follows the valley of a small river to their watershed, and then the watershed itself as far as the Astara stream, which it descends to the sea; thus the mouth of the Aras and the Lenkoran district of the northern Talish are in Russian territory. This frontier has the usual defects of a river frontier. There are, however, few transverse routes, and major lines of communication follow the Aras valley. The Talish sector of the frontier splits an ethnic region into two (fig. 13).

East of the Caspian the boundary mostly follows the Atrek river to Chat and the hills of the Chandir tributary. Thence it is drawn along the outer ridges of the Kopet Dagh past Lutfabad to the Tejend (Hari Rud) river north of Sarakhs, in such a way as to leave most of the fertile foothills and the line of communications which borders them to Russian Turkistan. The river is then followed south to the Zulfikar defile, where the Perso-Afghan frontier is met (fig. 12).

East. Most of the eastern frontier either traverses lowlands or follows unimportant watersheds, and it is far more open and disputable than the northern and western frontiers.

From the Zulfikar defile the Afghan boundary (509 miles) ascends the Hari Rud valley to the great eastward bend towards Herat.

[1] At Khurramshahr the thalweg is followed from a point opposite the SE. end of the Nahr al Khayyin for 4¾ miles downstream past the mouth of the Karun to Tuwaijat. At Abadan the thalweg is followed from the NE. end of Shatait island, which is Persian territory, for 4½ miles to a point off No. 1 jetty at Abadan.

It then takes a somewhat irregular course across the plains of Bakharz and Khaf, dividing a large salt-lake between the two countries and leaving the two posts of Ghurian and Yazdan to Persia. From Yazdan it skirts the eastern flank of Kuh-i-Ahangaran directly south to the neighbourhood of the Siah Kuh peak. From Siah Kuh it turns east along the northern edge of the reed beds of the Seistan Hamun, follows the Helmand river south to the Helmand barrage, and then cuts directly south-west to the peak of Kuh-i-Malik Siah. This diversion includes in Persia almost all the irrigated area of Seistan (figs. 21, 22).

Kuh-i-Malik Siah is the junction of the Persian, Afghan, and British Baluchistan frontiers. Though between Kuh-i-Malik Siah and the Mashkel Hamun the boundary has not been demarcated, its course is defined as skirting the great waste of the Gaud-i-Zirreh (in Afghanistan) first along the crest of low hills which flank it, and then through lowlands at the foot of the Taftan range. From the Mashkel Hamun the boundary traverses lowlands to the northern watershed of the upper Mashkel valley, which is included in Persia, crosses to the southern watershed, and descends to a tributary of the Dasht watercourse of British Baluchistan; for 61 miles this forms the boundary, which then follows the watershed between the Persian Dashtiari and the British Dasht to the coastal marshes east of Gwatar (fig. 20).

Physical Features

The principal ranges are the Elburz on the north, continued westward into the Talish hills and eastward into the ranges of northern Khurasan; the Zagros on the west, alined south-east from the frontier of northern Iraq to the strait of Hormuz; the ranges of Persian Makran in the south; and a series of highlands in the east with no collective name but conveniently called the Qain–Birjand, Nasratabad, and Sarhad highlands. Behind these mountain walls the hinterland is split up in the west into a number of separate basins by secondary mountain systems which generally follow the trend of the Zagros, though some, modified by volcanic action, derange the pattern. Structurally the country has often been compared to a deep saucer, and a large percentage of the land area drains inwards, but unfortunately for man the best part of the water collected by the mountain walls drains rapidly away to the Persian Gulf and the Caspian. Since the prevailing winds are northerly, climate intensifies the effect of drainage. Except for the northern Elburz, the Caspian

coastlands, and parts of the High Zagros, Persia is very short of rain. Over three-quarters of the country has less than 20 inches a year, well over half has less than 12 inches, and rain falls only on a few days in the cooler months; hence it is only by the cunning conservation of water that inner Persia can be the home of man. Inhabited Persia, in fact, consists of the peripheral mountain zones and the north-western and western basins of the internal depression. The eastern part of this depression consists of two appalling salt-deserts known as the Great Kavir and the Southern Lut; desert conditions also prevail through most of the peripheral mountains in the south and east, from Persian Makran to the fringes of the Birjand–Qain highlands, while much of the western inland basins ranks as semi-desert.

A special characteristic of Persia is the absence of a proper soil, capable of readily sustaining plant life, from large areas of the land surface. Combined with climatic dryness this gives very special characteristics to the vegetation and to the general appearance of the Persian landscape. There are no forests or woods, except in the damp Caspian coastlands, where the natural forest is impenetrable, and in the Elburz and parts of the High Zagros; elsewhere there are very few trees except artificial plantations of fruit-trees. Grass cover is replaced by a sparse vegetation of hard and spiny type. The characteristic scene in inhabited central Persia is a wide plain hemmed in by distant mountains, and uncultivated save for some fields and gardens around a village or small town of mud-brick houses interspersed with fruit-trees and planes.

History and People

Three general factors characterize Persian history: general continuity, periodic cataclysms, and the extraordinary influence of physical environment. For 2,500 years Persia has possessed an educated ruling class and a tradition of civilization which has survived the most barbarous invasions and the most alien conquests. From about 600 B.C. to the Moslem conquest there existed a native Persian civilization which early reached its perfection; modified by Hellenic influence after the conquest of Alexander and later by Islam, this civilization blossomed again in the Abbasid period; modified a third time by Chinese influences after the Turkish and Mongolian conquests, Persian civilization produced the Safawid culture in the sixteenth and seventeenth centuries, the artistic productions of which are well known in Europe. In the twentieth century Persian

life has again become subject to violent external influence with the introduction of European thought and mechanical technique; and at present the old way of life and the new are still in flux.

The influence of physical geography is seen most clearly in the forms of government. Down to the twentieth century Persia has been governed by absolute monarchs, and the administration has been in the hands of powerful provincial governors ruling wide areas. The vast distances between the centres of provincial government have made it difficult to control the governors, and the wisest monarchs have been noted for their improvement of roads—particularly those peripheral to the central deserts—and the maintenance of a courier system or imperial post. The exaltation of the monarchic power provided a focus of loyalty for the varied and widely separated populations of which the Persian Empire was composed, and a sanction against the ever-present tendency of provincial governors to revolt. When a dynasty has weakened Persia has rapidly been restored by strong new-comers. These characteristics have survived the loss of the outer provinces of the old Persian Empire—Armenia, Mesopotamia, Herat, Kandahar, and the Oxus oases—and are inherent in the structure of its core. The country is but a federation of provinces differing in speech and custom, lacking a centre; and this lack has been compensated by the monarchic system. The shifting of the capital city is characteristic. No one city has been of sufficient focal convenience or economic importance to become permanently the capital. Before the Moslem conquest Ecbatana (Hamadan), Persepolis north-east of Shiraz, Susa near Dizful, and Rhagae near Tehran, all took their turn, and the empire was for long governed from Seleucia or Ctesiphon in lower Mesopotamia outside the Iranian plateau; likewise in the Abbasid Caliphate from Baghdad. In more recent times the Safawid kings shifted their capital from Kazvin to Isfahan, and the Qajars finally chose Tehran, which was particularly suited to deal with the growing menace of invasion from Russia. All these capitals lay just within the mountain barriers, and it is noteworthy that not even Tehran is an entirely natural focus of communications, though it lies close to the semi-desert route which connects eastern and western Persia.

A factor which has done much to mould the course of Persian history is the immense concentration of population in the north-western and Caspian provinces. Half the population of Persia lives, and must always have lived, north-west of the course of the Trans-Iranian railway. Hence it has always been easy for Persia to

concentrate a large army rapidly on her western frontiers. This goes far to explain the very formation of the Persian Empire in Achaemenid times, and later the persistent defensive success of the relatively weak Persian empires against Rome and Byzantium in classical times, and against the Turks in Safawid times, strong Powers that had, however, to supply their forces from distant bases. Conversely, the scarcity of population in eastern Persia helps to explain the feebleness of persistent Persian attempts to invade or conquer India. Even Nadir Shah, the greatest of Persian soldiers and organizers since the Moslem conquest, only reached Delhi and did not hold what he overran; the effective conquests of Hindustan from the Iranian plateau have been the work of dynasts from Afghanistan, not Persia. It is also to be noted that north-west Persia has ever been a breeding-ground of horses, and that the great Persian armies of the past have had their main strength in cavalry, a factor which has severely limited its capability for prolonged offensive action.

Despite the length of the Caspian and southern coastline the influence of the sea is little felt. At best, Persian ports are remote from the ocean highways, and the mountain walls cut off all easy access to the interior. Though there are two populous sea-lands, the Caspian coastal belt and the plains of Khuzistan, the difficulty of communications has always kept them remote from the main stream of Persian life. The Persian Empire never, in the various periods of its greatness, possessed an indigenous navy.

People. The tides of invasion which have swept across Persia are reflected in the racial-linguistic composition. Nearly two-thirds of the 10 or 12 million inhabitants speak modern Persian or an allied language, and derive from the original Aryan invaders who occupied the plateau in the second millennium B.C. One-third, mainly concentrated in the north-western provinces, speak a form of Turkish and are descendants of Turki invaders, the bulk of whom entered Persia between the eleventh and the fifteenth centuries A.D. There is also a considerable minority of Arab-speaking people, most of whom live in the plains of Khuzistan. There is religious unity, since at least 90 per cent. of the population are Shia Moslems, a form of Islam which only became prevalent in Persia during the Safawid dynasty (1500–1722). Persia is an agricultural country, and the bulk of the people are peasant farmers and shepherds with an urban population of shopkeepers and landowners, clergy, and officials. A new element has been introduced by the creation of a few modern industries in the largest cities, and by the immense growth of the oil interest,

though the effect of oil as a major source of employment is mainly confined to the refineries of Abadan.

Two factors distinguish the life of the Persian people. One is that except in the north-western provinces human settlements, large and small, are extremely isolated pockets or oases scattered through vast regions of desert, both in the plains and in the mountains. The second is that there is an immense difference between the way of life of the peasant or townsman and that of the nomadic or semi-nomadic shepherd. There are two Persias, tribal and sedentary, which are mutually hostile. Persian civilization is the product of sedentary Persia, and though it infiltrates among the highest class of tribal chiefs, the bulk of the tribal folk are, by comparison, barbarians. There is thus a tribal problem, which is aggravated by the fact that the numerous attempts to solve it have been imposed by, and based on the principles of, sedentary Persia. It is, however, a paradox of Persian life that at intervals of centuries the tribes have produced great leaders who have founded the dynasties by which Persia has been ruled. Riza Shah Pahlevi was the first townsman since the end of the Caliphate to establish a dynasty in Persia.

Riza Shah. Until Riza became Shah in 1925 Persia was the most old-fashioned Moslem country of the Middle East outside Arabia, though a small group of intellectuals had succeeded before 1914 in replacing the absolute rule of the Shahs by a 'Constitution' which few understood. Riza Shah endeavoured rapidly, by education and medical reform, and by the building of roads, railways, and industries, to modernize and emancipate Persia from the social bondage of Islam and from the economic bondage of handicraft industries. His sudden fall, and the military occupation by the Allies in 1941, have left Persia in social and political confusion, and the future form of Persian society and of the Persian State are uncertain.

Administrative Divisions

Recently a new and very artificial system of 10 *ustans*, known only by numbers, has replaced an ancient and familiar division into 19 or 20 provinces. In this handbook the older system of regional nomenclature has been retained for general reference, and is illustrated in fig. 1. It is to be remembered, however, that the boundaries of these regions have varied from period to period, and such terms as Azerbaijan and Khurasan are very elastic, while the term Kirman is not usually used to include the parts of Baluchistan and Seistan which only recently formed part of the province of Kirman. Other regional

terms in common use, such as Kurdistan, Bakhtiari Country, Arabistan (Khuzistan), Baluchistan, and Seistan, are, or were by origin, ethnographical. Local district names also are a feature of Persian topographical nomenclature, and are often used for reference

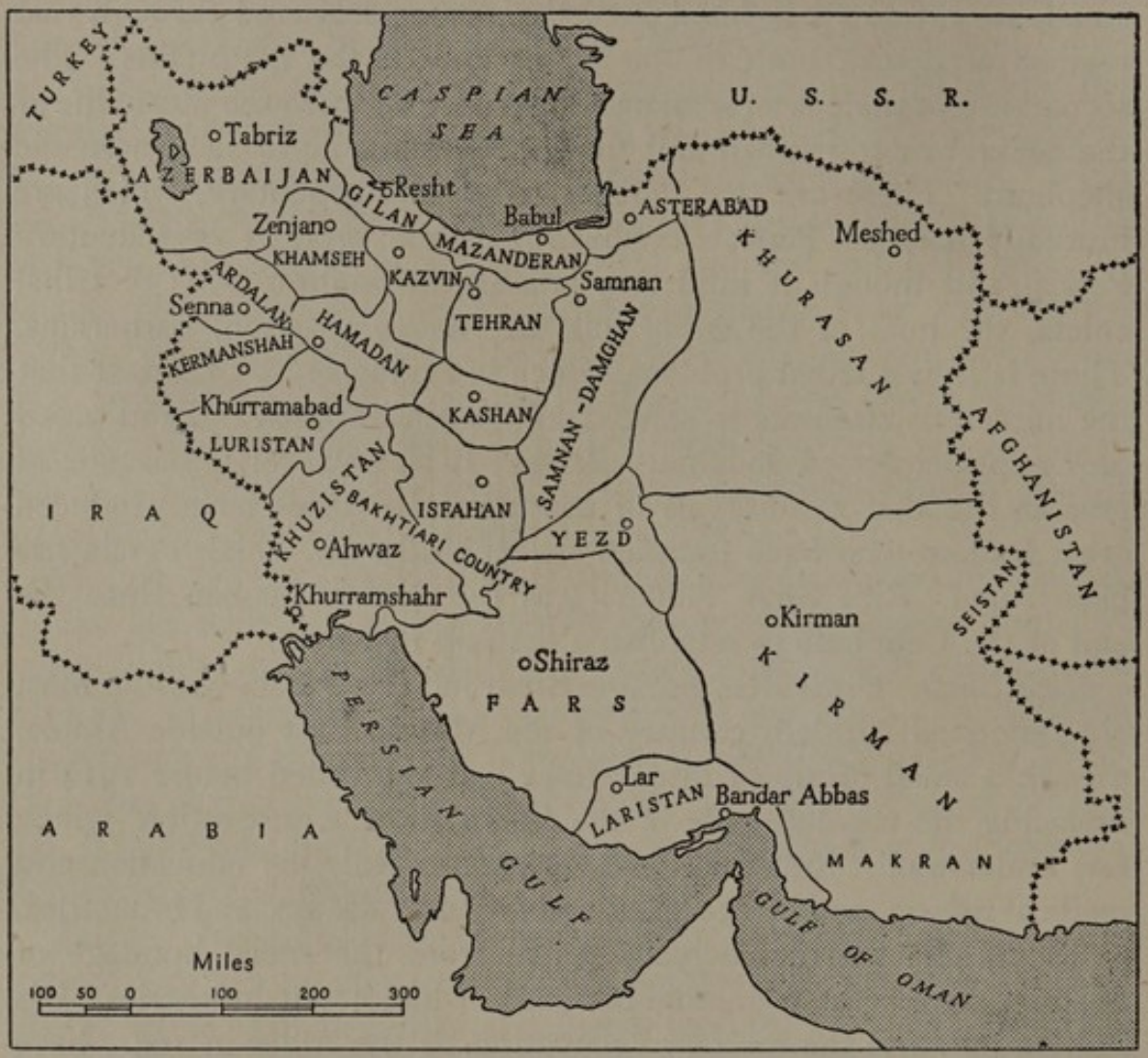


FIG. 1. *The traditional provinces and their principal towns*

in preference to town and village names because the latter tend to repetition, and thus cause confusion. There are in western Persia alone not less than 131 Aliabads, 126 Husainabads, 43 Daulatabads, and 50 Aq Bulaqs, while even the less commonplace names are recurrent.

The capital of Persia is Tehran, and there are three other cities, Tabriz, Isfahan, and Meshed, not greatly inferior in size and of greater intrinsic interest.

Communications

In ancient times Persia possessed a system of main routes and passable tracks along which the greatest dynasties built and main-

tained a fine system of bridges, caravansarais, and posting-stations, without which travel was impossible in Persia. At the beginning of the twentieth century Persia failed to bring her communications up to modern standards of efficiency with the result that, outside the large cities, there were few metalled roads, and no railways excepting two short local lines. Transport was by beasts of burden: horse, pack-pony, and mule in the mountains and wetter regions of the north, north-west, and south-west; camel in the great arid regions of the centre, south, and east. In the Caspian coastlands, jungle and excess of water were obstacles to movement, in the centre, east, and south lack of fuel and water were the chief impediments. Modern road-building was begun by the Russians during the war of 1914–1918, and their metalled road to Hamadan was continued to Khanaqin in Iraq in 1918 by the British, who also during the war made the eastern road from Zahidan (Duzdab) to Meshed fit for motor-traffic and surveyed various alternatives for a motor-road between Bandar Abbas and Kirman.

Oil

The exploitation and search for oil in Persia has brought the country into world economics and 'power politics'. The Anglo-Iranian Oil Company holds the valuable concession of 100,000 square miles in the south-west and south, and several large fields are linked by pipe to the head of the gulf, where at Abadan is one of the largest refineries in the world (p. 496). The undeveloped American concession in the north-east has been abandoned, and little is known about oil prospects elsewhere in Persia.

Spelling of Names

There is great divergence in the transliteration of Persian place-names, and no one system has become universal on maps of the country. On most quarter-inch maps of the country, originally compiled by the Survey of India, the Hunterian system has been followed, though departures from it appear on some recent editions. The system adopted by the Permanent Committee on Geographical Names (P.C.G.N.) does not yet appear on topographical maps and only in part on the International 'Million' series. Many place-names were changed in recent years by Riza Shah, who apparently reverted to 'old Persian' nomenclature in some cases, and incorporated his own name in others. European intervention and the employment of numerous Europeans and Americans in the oil

companies, gendarmerie, and railways have further complicated the issue. Thus the town of Sultanabad has been renamed Iraq, which is also spelled Araq and Arak. The reiteration of topographical names is also a source of confusion; there must be scores of Kuh-i-Safids and Rud Shurs.

In this volume a compromise has been effected between the quarter-inch maps and the 'Million' series, but it was felt unwise to use some of the unfamiliar and possibly temporary modern spellings in a book written for English readers. Consistency has been attempted within the volume in preference to philological exactitude.

Sources of Information

The social, political, and economic life of Persia is less exactly known to-day than in 1914 or 1918. For fifty years no study of Persia has appeared in any way comparable to the classic work of Lord Curzon published in 1892, and many modern accounts of Persia prove to be little more than a paraphrase of Curzon. Travellers' accounts are numerous, but the quality of observation and information in recent books is generally far inferior to what appeared before 1918, largely because motor and air transport take the traveller too rapidly through the country and render the foreign resident less interested in his environment than formerly. Official sources also are less well informed than formerly, because the suspicion and exclusiveness of the Riza regime prevented or reduced easy contacts between consular officials and the Persian administration. There are no Persian statistical publications to compensate for these drawbacks, and such statistics as appear in European year books are of dubious value, often being either out of date or exaggerated. Hence the account of social and economic facts in this volume must be regarded as tentative rather than authoritative. In compensation, the physical geography and geology of Persia is far better known than formerly, mainly through the publications, official and unofficial, of the Anglo-Iranian Oil Company's agents, though large tracts of Persia have not been fully explored and surveyed.





FIG. 2. *Generalized Geological Map of Persia. Kavirs and inland salt-lakes are shown by an italic K; a few towns by their initial capital.*

CHAPTER II

STRUCTURE AND DRAINAGE

STRUCTURE

PERSIA consists essentially of a curving mountain chain in the north, a south-western mountain chain nearing the northern one in the north-west and diverging from it towards the south-east, and an intermediate zone, much of it low lying, which is narrow in the north-west and wide towards the east. Both chains are composed of a thick column of rocks of various ages, dating from Palaeozoic to Pliocene, compressed into a number of large folds and broken by many faults. Folds also occur in the intermediate zone, but are less massive and often more open and less crowded together. Granite and volcanic rocks penetrate or are interbedded with the sediments, and are particularly abundant within the intermediate zone and towards its edges. Several vast basins of recent silt are present in this same zone.

European geologists have contributed to the knowledge of Persian geology from about 1850 to the present day. Abich, Blanford, Griesbach, Loftus, de Morgan, Pilgrim, and Stahl made important contributions to it before 1914, and several others have done so since. While much of the country has been mapped geologically, especially in the south-west, large blanks still appear on the map, and some areas remain all but unknown. For a brief description of the geology, the country is divided into the following regions:

1. *The Northern Mountains*, a region of massive folds and great faults, forming a link between the Caucasus to the north-west and the Hindu Kush to the east.
2. *The Intermediate Zone*, a division with vast basins filled with recent rock debris, surrounded and divided by rocky ridges showing more open folding than in the mountains. Many of the sedimentary rocks are red. Volcanic rocks are common, especially on the south-western boundary. A few large volcanic cones are piled up near the edges.
3. *The South-western Mountains*, a long chain of strongly folded rocks, most of them limestones, running from Turkish Kurdistan to near Bandar Abbas.
4. *The South-western Lowlands*, comprising the foothills of the south-western mountains, made up of a saliferous and a sandy

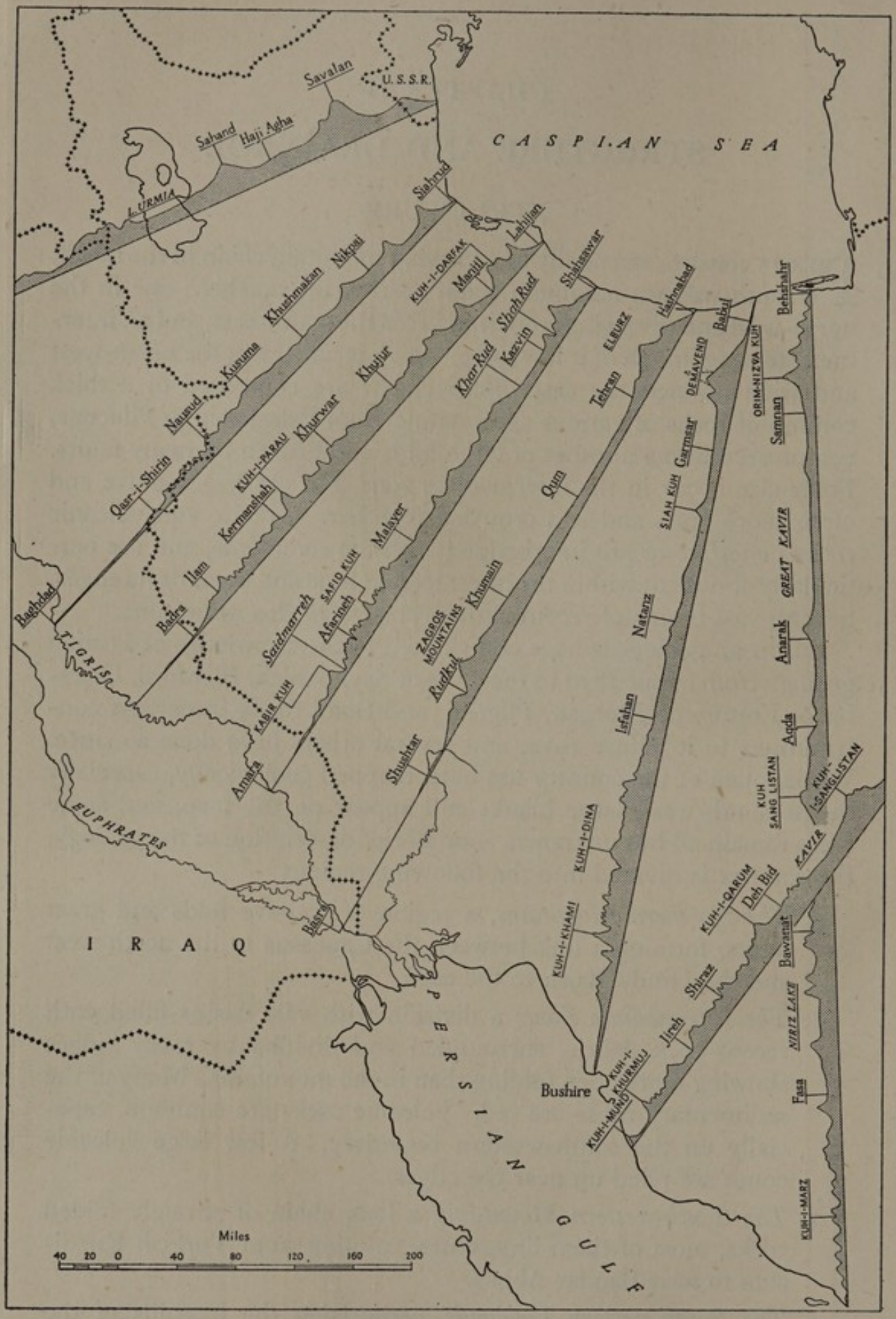


FIG. 3. *Sections across Persia*

series, and the alluvial plain extending farther south-west to Iraq and the head of the Persian Gulf.

5. *The Makran*, a drab wilderness of grey and sage-coloured sandstones and shales folded into contorted and ruptured structures, interspaced between broad basin-shaped masses of conglomerate.
6. *The Upland Rim of Eastern Persia and the frontier lowland*, where the intermediate zone rises to a broad hump which is then cut off by faults from the Afghan lowlands. Folds here often run north-north-west and south-south-east instead of in the usual north-west and south-east trend found in most of Persia.

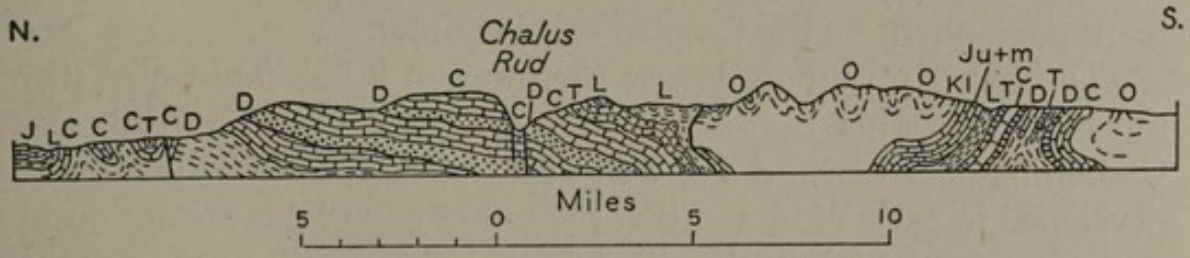


FIG. 4. *Geological Section across the Central Elburz*

O. Oligocene; Kl. Lower Cretaceous; J. Jurassic (Upper and Middle); L. Liassic; T. Triassic; C. Carboniferous; D. Devonian

1. *The Northern Mountains*

The northern mountains skirt the south-western and southern shores of the Caspian Sea and pass on eastwards to the frontier at the Hari Rud. The Talish hills north-west of the Safid Rud, the Elburz mountains east of it, with the Shah Kuh group of mountains beyond them, and the Kopet Dagh in the north-east are the main units of the chain.

The Talish hills are formed by a series of rocks still awaiting study, bent into a broad fold running south-south-east from the eastern slopes of Kuh-i-Savalan, a high recent volcanic cone, to the Safid Rud.

The Elburz mountains embody a group of massive folds which run east-south-east from the Safid Rud and then turn eastwards in the centre and east-north-eastwards towards the east. Some of the folds are large, broad, and rather gentle, but are broken by tremendous faults. The more southern flexures overlooking the intermediate zone are disturbed by overturning and thrust-faulting towards the south. Rocks as old as Ordovician are known in the northern anticlines, one of which, exposed near the Chalus–Tehran road, displays a thick sequence of alternating packets of sandstone and limestone. These include Devonian, Carboniferous, and Permian strata, amongst which is a conspicuous bed of pisolite (fig. 4). The Trias is mostly limestone

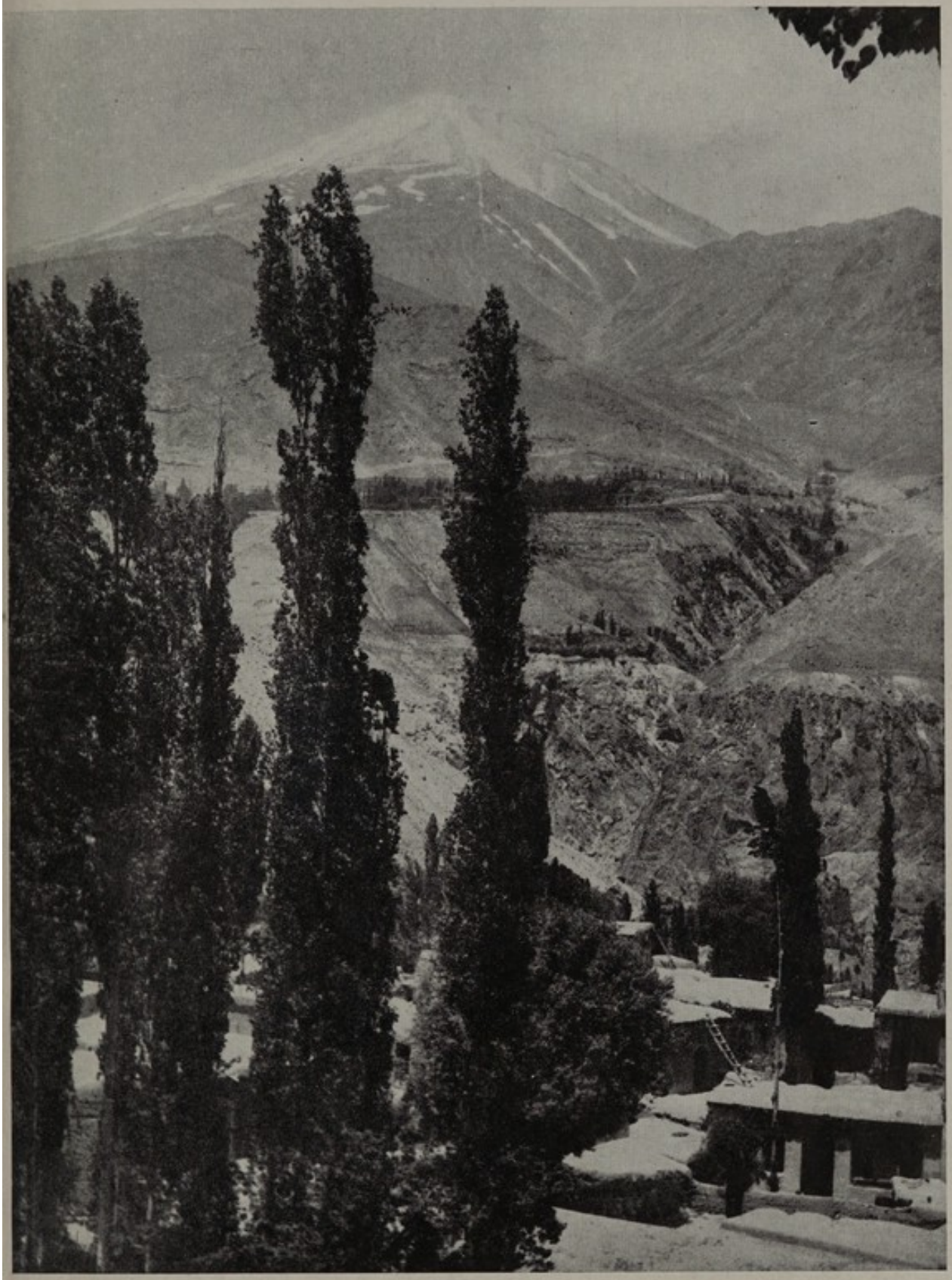
and is followed by thick sandstones and shales with beds of coal at the base of the Jurassic. They pass upwards into thick lava flows with thin interbedded limestones in the Lower Cretaceous. Thick Upper Cretaceous limestones, shales, and sandstones overlie them. On these rest unconformably the 'Green Beds' of Oligocene age. Palaeozoic and Lower Mesozoic rocks also figure largely in the roots of the folds along the southern edge of the Elburz, although they are partly obscured by great aprons of gravel swept out by the mountain streams over the southern approaches to the range. Several large faults cut the Elburz, most of them following the strike of the folds; one, along the northern edge of the mountains near Gurgan, seems to influence the topography near the Caspian considerably.

The Shah Kuh group, lower, narrower, and less forest-clad than the Elburz, has not been adequately described. It is probable that Carboniferous rocks and a series at least as high as Jurassic are well developed in parts of it, and that the rather open folds are cut off by strong faults on both flanks. The faults here are still active, for this is a region rocked by severe earthquakes.

The sheaf of folds building the Kopet Dagh forms a high wall along the southern plains of western Turkistan. It represents a direct continuation of the line of the Caucasus on the east of the Caspian Sea. Oligocene, Eocene, and Cretaceous rocks are folded up together fairly regularly in the north and west. Farther east Jurassic limestones and lower beds come into view. Once more there is strong strike faulting, well seen along the south side of the ranges not far from Meshed.

2. *The Intermediate Zone*

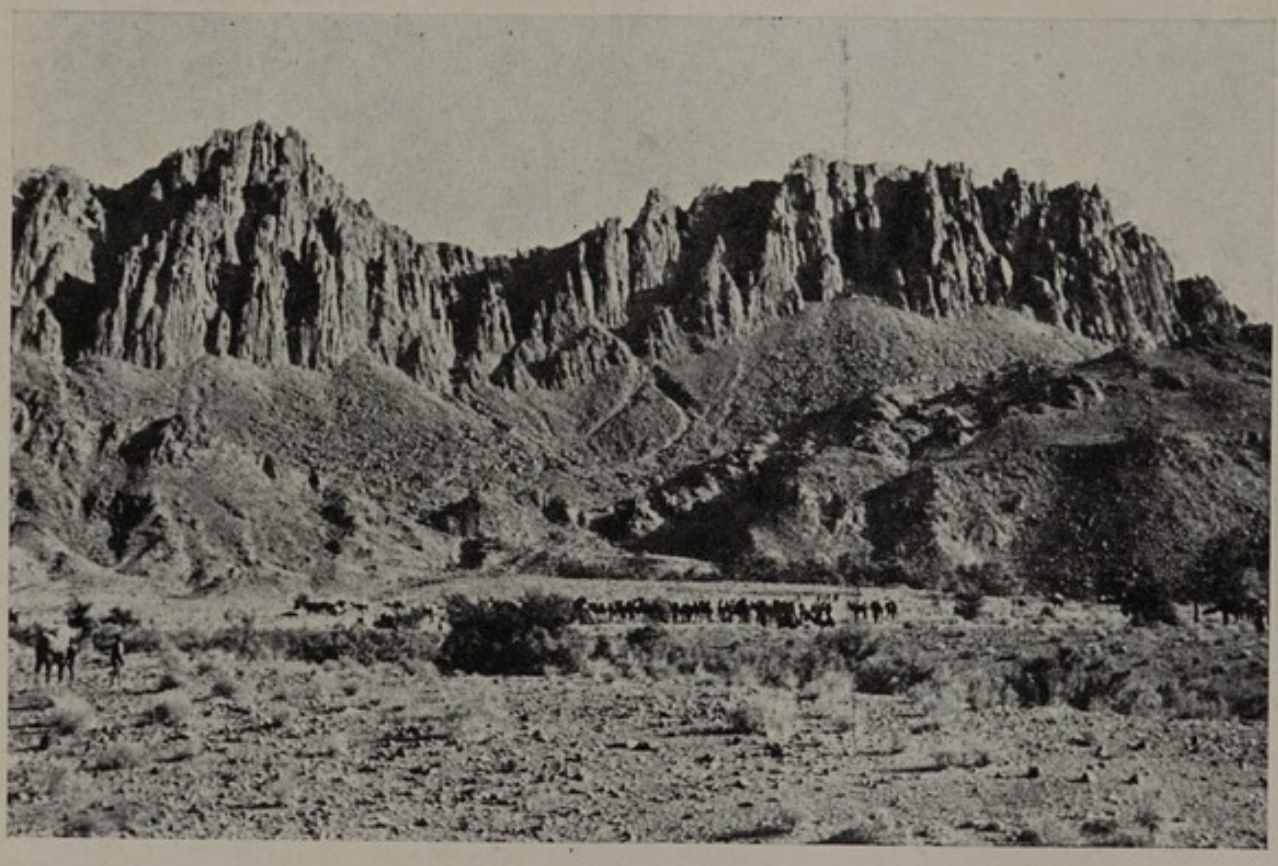
The structural geology of this large section of Persia is little known because about half of it is covered by recent deposits of saline mud and thick debris of terrestrial origin, beneath which the rocks are effectively obscured. The part best known is in north-west Persia and in neighbouring Russia across the Aras (fig. 5). Several open folds, plunging with a south-east trend into Persia, are here exposed. The south-western flanks of these folds are usually steeper than the north-eastern, but in a few cases the reverse occurs. The deep valley of the Aras exposes similar folds of Carboniferous and Triassic rocks forming part of the foundation of the edge of the Persian highlands north of Tabriz, but these soon give way to lower ground south-eastwards, where the older rocks seldom appear from below the unconformable Upper Cretaceous or Eocene rocks. These in turn are thickly overlain



2. *Demavend, Elburz range, from the east*



3. *The western flank of Bur Kuh from Sar Khusrin. Palaeozoic limestones faulted against Eocene volcanics*



4. *Andesite sill forming Panj Angusht escarpment, northern edge of the Jaz Murian basin*

by Middle Miocene red beds with some interbedded saline deposits. It is the development and wide distribution of the Miocene beds around the great inland basins that so often make the landscape predominantly red. They are usually moderately folded, but sometimes appear in long narrow domes with steep dips along the flanks. In a few places they are pierced by columns of salt and occasionally by a spine of igneous rock from a former volcano.

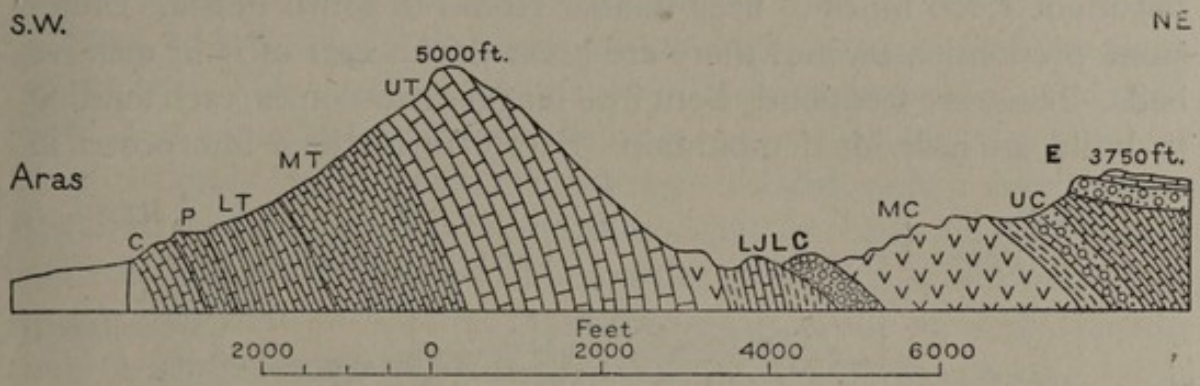


FIG. 5. *Section N.E. from Julfa, showing unconformities*

E. Eocene
(Unconformity)
UC. Upper Cretaceous
MC. Middle Cretaceous
LC. Lower Cretaceous
(Unconformity)
LJ. Lower Jurassic
UT. Upper Triassic
MT. Middle Triassic
LT. Lower Triassic
P. Permian
C. Carboniferous

In spite of the covering of young rocks, the older rocks are exposed at various points throughout the region, usually where there has been strong faulting. They build considerable mountains on the south of the central deserts near Kirman, where the same unconformity seen in Russia between the older rocks and the Cretaceous still occurs. One other large fault-block of Palaeozoic rock lies in Bur Kuh more than half-way from Kirman to the Baluchistan frontier (photo. 3).

Volcanic rocks are fairly freely distributed over the whole area. There are the recent volcanoes like Sahand, Savalan, Bazman, and Taftan which are close to the edge of the region. Rather older ones make a great show in the range of hills nearly 700 miles long near the south-western margin from Qum in the north-west to far beyond the longitude of Kirman in the south-east. Here the spines which filled old volcanic throats cut through the red Miocene beds or Eocene shales, as for example at the spectacular pile of Mil-i-Farhad (photo. 6). Lavas, sometimes interbedded with fossiliferous Eocene rocks, make up most of this range, and there are several masses of granites associated with the lavas and ashes which accompany them. Most of these igneous rocks are only gently folded, though several have rather high

dips depending partly on the slope of the original flows from the volcanoes (photo. 8).

3. *The South-western Mountains*

The south-western mountains, known as the Zagros arc, occur as a belt from less than 100 to more than 200 miles wide; they extend south-eastwards from the frontier south-east of Lake Van in Turkey for about 1,000 miles to near Bandar Abbas in south Persia. Limestone predominates, and there are great thicknesses of it in massive beds. These are frequently bent into long narrow domes, each tending to build an individual mountain. Sandy formations interposed in

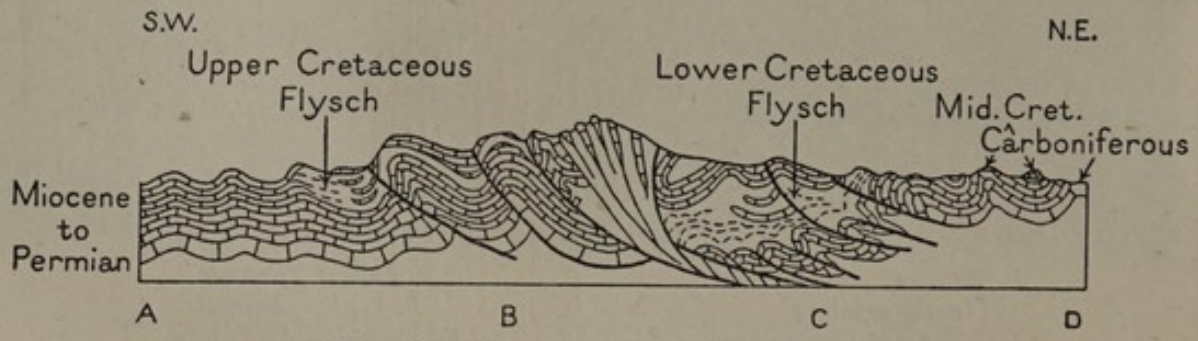


FIG. 6. *Zagros mountain structure*

Miocene compression formed the fold mountains A–B; distorted and crushed the folds B–C, which were formed by Upper Cretaceous compression; and broke up the Jurassic folds C–D, already affected by Upper Cretaceous movements

certain strips are often marked by less rugged scenery, but where conglomerates are preserved they form magnificent crags. Volcanic rocks are absent in the main south-western strip, but a string of granite masses is present along the north-eastern edge. Between these two strips a few lavas occur interbedded with crushed limestones along a narrow zone where rather detached and high irregular mountains exist. Occasional tracts of country towards the north-east are covered by contorted dull red chert, associated with bodies of green serpentine, sparkling with large gilt crystals.

The folds in the ranges of the Zagros arc are of three ages (fig. 6). Those in the north-east were wrinkled first in late Jurassic time. To the south-west, the next strip containing the lavas was folded in the Upper Cretaceous, leaving the main part farther to the south-west, and 50 to 150 miles wide, to be folded by degrees from the Eocene onwards, but chiefly in the Upper Miocene and Pliocene. The later compression which effected the final folding crushed and splintered some of the Upper Cretaceous folds. The earlier Jurassic beds which have endured the three sets of disturbance were broken up by a net-

work of faults. The young folds of the south-western zone are amply spaced without crowding in most of Kurdistan and Luristan. They are much more bunched in the Bakhtiari country, but open out again most of all in Fars and Laristan to the south-east. The ranges, often formed by the great limestone anticlines, are highest in the north-east of the zone and tend to fall off in stature to the south-west, but, exceptionally, some outstanding dome appears also in this direction and builds a high range like Kabir Kuh (north-west of Dizful), Kuh-i-Khami, and Kuh-i-Ginao, right on the edge of the foothills or close to the sea. The average fold consists of a smooth anticline and syncline, but sometimes the syncline between two domes is so pinched that two great 'whale-backs' lie side by side with only a very narrow syncline crushed between them (photo. 43). In the foothill zone they are still found, but they become smaller in stature, and south-westwards they tend to become little more than swells or warps on the hidden limestone surface underground.

The lowest rocks exposed seem to be dark micaceous slates and phyllites of unknown age found in the north-eastern edge. Near by, the mountains are made up of Carboniferous, Permian, and Triassic rocks. The oldest fossiliferous rocks, however, are limestones and shales of Middle and Upper Cambrian age exposed in the lower slopes of some of the highest south-western ranges. Red sandstone, red shale, and dark dolomite with associated salt-springs underlie them and may be Lower Cambrian. Thin sandstones with shales of either Ordovician or Silurian age lie near the foot of great mountains north of Bandar Abbas; above the sandstones are dark Silurian shales followed by reefs of Devonian limestone and then thick Lower Carboniferous limestones. Devonian rocks are known also at the other end of the Zagros in Iraqi Kurdistan, but in the intervening country a gap exists between the interbedded silts and limestone reefs of the Upper Cambrian and the hard sandstones with some fossil plants of Carboniferous (Coal Measure) age. This hump of land, enduring through much of the Upper Palaeozoic, was flooded by a great marine transgression which brought on the limestone succession in great force. The sea persisted with only a few short local interruptions until the end of the Middle Cretaceous, after which the limestones, still thick and conspicuous in places, are found amongst formations until the Lower Miocene, though they are more localized than formerly.

In the north-east the first group of Mesozoic sandstones occurred in the Lower Cretaceous with conglomerate to the north-east and

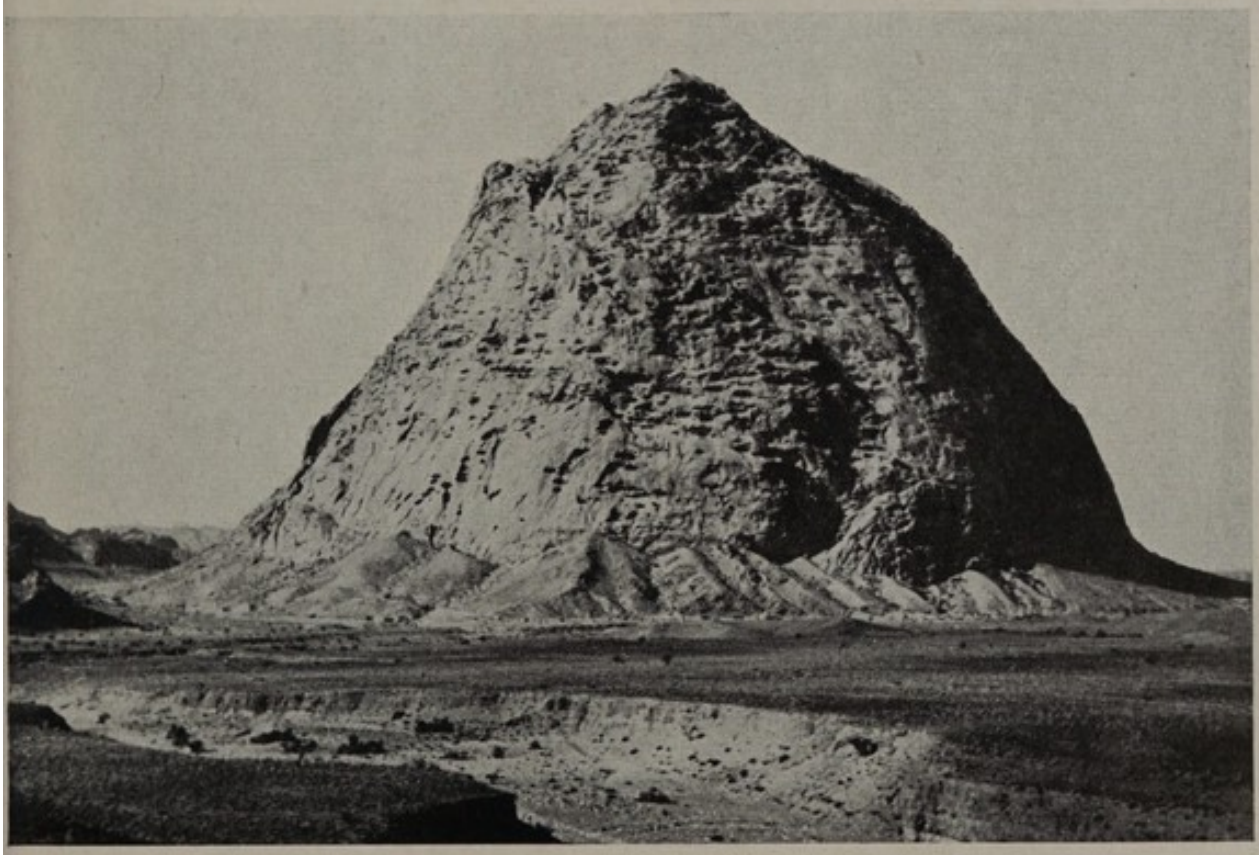
sandstone, siltstone, and shale, but thin-bedded limestones replace them wholly to the south-west. In the Upper Cretaceous a similar sequence of beds was formed except that reef-limestones, some of them many hundred feet thick, interfinger with the sandstones to the south-west and then give place to marlstones. In the Eocene and Oligocene the same course of events recurred. Red chert conglomerate and grits to the north-east pass through thick massive nummulitic limestones several miles across to grey-green siltstones and shales towards the south-west, but this whole series is found farther south-west than that of earlier date. Lastly, after some folding and erosion, all these strips were flooded in the late Oligocene and early Miocene and the shore-line moved back to the north-east, so that the limestones of this age now rest upon the other series and pass farther north-east than the Upper Cretaceous conglomerates which mark the position of that early shore.

In the rest of the Miocene, chemical deposits at first and then detrital ones accumulated over the south-western edge of the mountain belt and in the foothills, where they predominate. They are present over a wide belt of country south-east of Bushire and are preserved in the synclines between the lofty limestone whale-backs that stand up at intervals right to the shores of the Persian Gulf. The Lower Fars deposits, of many alternations of salt, anhydrite, thin limestones, and red marls or shales, form one group. The Middle Fars deposits, more sandy and containing several bands of limestones and hardly any of the saliferous layers, come next in a few places, though generally the Upper Fars deposits, an alternation of red ripple-marked sandstones and red shales and marls, rest on top of the Lower Fars. A much more local deposit, often found best developed rather close to the south-west front of the limestone mountains, is the conglomerate, several large piles of which have weathered into magnificent crags.

In the south-eastern part of the Zagros arc are five unusual features: (*a*) The breadth of the range over all increases to nearly 200 miles. The mountains are often great limestone domes with spacious valleys between them. (*b*) The size of the domes seems to decrease only a little towards the shores of the Persian Gulf. (*c*) The direction of the individual ranges gradually changes from north-west and south-east at Bushire to east and west and sometimes east-north-east and west-south-west close to Bandar Abbas. (*d*) The ordinary folds of the stratified rocks are ruptured at more than 100 places by roughly cylindrical vertical columns of salt tilting up the strata around them



5. *Core of the Hamant block in the Nashahman valley, southern edge of the Jaz Murian basin opposite Bampur, built mostly of limestones and lavas*



6. *Mil-i-Farhad, a granitic plug, 2,500 feet high and 4,000 feet in diameter, near the divide between the Southern Lut and the Jaz Murian basin, seen from the north*



7. *Kuh-i-Dina cliffs from the south, Central Zagros*



8. *Young lava hills (Kuh-i-Kalinti) near Bam, south-western edge of the Southern Lut*

and bringing up with them rock fragments of many colours and types that are not known amongst the local rocks. Some of the blocks carried up have Middle Cambrian trilobites in them. (*e*) The nearly east-and-west structures behind Bandar Abbas are much more strongly faulted than is usual elsewhere, and they end abruptly against a chain running north and south made up of rocks of the same age as some of those seen to the west, but consisting of very different types. The rocks, scenery, and structure change here as the Zagros arc ends.

4. *The South-western Lowlands*

The south-western lowlands include both the foothills of the Zagros arc and the plains adjoining them as far as the Iraqi frontier and the shores of the Persian Gulf. It is difficult to draw a hard-and-fast line of separation between the mountains and their foothills, and so a boundary has been chosen running south and then south-east from the Sirwan (Diyala) river north of Qasr-i-Shirin, skirting the south-western front of the continuous limestone mountains. It makes a big embayment north of Dizful towards the north-east where the three big rivers of Luristan and Bakhtiari country (Saidmarreh, Diz, and Karun) break out from the mountains. It then holds on south-eastwards until it meets the Bushire and Shiraz road near the ruins of the ancient town of Shahpur. From there it follows the road roughly south to the coast near Bushire. South-east of Bushire the south-western lowlands cannot be recognized because the lofty anticlines that form the mountains come down close to the sea. They contain wide, low synclinal valleys between them, but these are intermontane and not coastal.

The south-western lowlands fall into two parts: a north-eastern part with a pattern of gypsum areas where the beds appear in very disturbed attitudes bursting out at the surface within a framework of more orderly masses of red sandstones and shales, and a south-western part in which expanses of pale yellow silt predominate, though they are crossed in a few places by low sandstone ridges and obscured occasionally by local sheets or terraces of gravel. The region as a whole is very important to Persia, not only because great oilfields lie amongst the foothills, but also because the fertile silts only require adequate irrigation to make the district a tremendous granary once more. The evidence supplied by drilling has proved that the limestone folds seen in the mountains have counterparts buried below the red rocks, and the occurrence of such hills as those near Ahwaz make it probable that these extend out under the alluvial plains as well. At

a few places in the north-eastern strip a long whale-back mountain of limestone comes to the surface, but such emerging giants are rare and always isolated.

The limestone foundation is a series of folds arranged on a fairly simple plan. The soluble and easily folded saliferous series of Lower Fars deposits is often much disturbed by puckers, thrusts, and squeezes as well as by solution, leaving the saline series in a rather turbulent condition. The Middle Fars is only present locally. The Upper Fars series is usually much more regularly arranged, forming

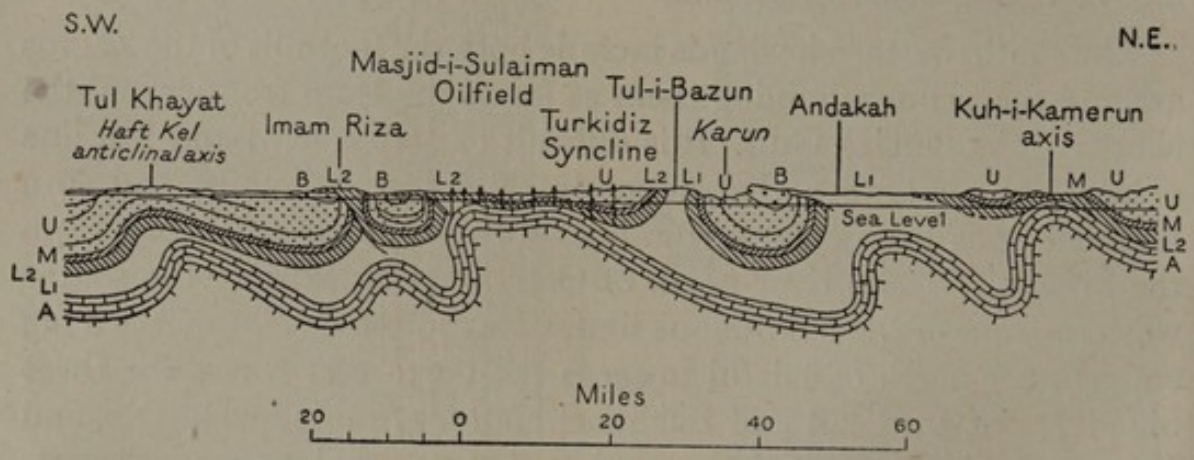


FIG. 7. *The South-west Persian Oilfield Belt*

B. Bakhtiari conglomerates; U. Upper Fars and Lower Bakhtiari; M. Middle Fars; L2 Lower Fars, stages III and II; L1 Lower Fars, stage I; A. Asmari and older rocks

rough monotonous low country. The conglomerate on top is only patchy, but often forms a mountain sculptured out of a basin-shaped mass of rock. The trend in the red rocks is usually north-west and south-east. It is a noteworthy fact that even the orderly domes in the red sandstone of the Upper Fars deposits do not exactly overlie and match the underground limestone structure and in a few cases have been far off the mark. The domes of limestone furnishing the reservoir for oil at Naft Khaneh on the Iraqi frontier, and at Haft Kel and Agajari farther south-east, lie somewhat displaced below the surface fold as displayed by the Upper Fars rocks. The first field to be found, Masjid-i-Sulaiman, occupies a great underground dome which is hardly reflected at all by the surface rocks (fig. 7). The most south-easterly field yet discovered, known as Gach Saran, is similar. Its fine long smooth dome is overlain by a complicated group of folds and puckers in the red and white rocks which gave little promise of the prize below.

The Ahwaz hills run north-west and south-east, and although they maintain their trend for a great distance they never rise to more than

a few hundred feet above the plain. Whether they immediately reflect a limestone anticline below has not been proved, but they are important as they separate the country easily drained from that which may remain waterlogged. Farther south other low prongs of red rocks partition the plain, and the curiously isolated hill of Kuh-i-Bang, a neat little dome close to the head of the Persian Gulf, rises from it. It is a kind of forerunner of the larger domes that line the lower reaches of the Gulf.

5. *The Makran*

Persian Makran is the nearly rectangular area lying between the strait of Hormuz and the frontier of British Baluchistan. With its Indian neighbour it fills the gap between the end of the Zagros on the west and the ranges on the east which lie on the west side of the Indus and form the mountains of the Indian North-west Frontier. The shape of the narrow structures in the Makran is unlike the lusty ones in the Zagros, and the rocks are mainly shales and sandstones with no more than a rare thin rib of limestone amongst them. The grain in most of the terrain is from west to east, but it turns abruptly to north-north-west along the western edge. This results in a western coastal range appearing with a knife-edge crest like that in the Zindan range farther north, in response to prevailing moderate dips and some harder calcareous sandstone ribs. On the long south coast, however, the dips in the sandstones are usually low, the result being fluted and finely sculptured sandstone cliffs rising from the coastal plain with flat-topped hills behind them. These hills are not broad, and they end steeply inland at a zone of low plains underlain by silts and sandstones. Then comes another long range of curious design, made up of a number of broad basin-shaped sandstone masses standing end to end, but often with room for a stream to pass between them on its way from a lowland silty plain on the north to another on the south. The northern plains rise to foothills farther north and then to a dominating range of crushed and broken thin-bedded sandstone. At its western end this sends out a broad spur of mountain to the south, which is not a structural unit but an eroded relic of the congested shark-fin folds in the silts and sandstones such as underlie the plain to the east. The spur runs south, but the folds are all transverse to it. Along the northern slopes of this dominating range a basement of schist and a varied assortment of deep-seated eruptive rocks emerges. It is pre-Jurassic and may be much older. Still farther north the country falls away into the Jaz Murian, one of the inland basins of southern Persia

where great areas are covered by sand and silt but without the usual taint of salt. Masses of Eocene and Oligocene reef limestones and lavas project like islands, here and there, from the waste of debris.

There is a progression from nearly flat unfolded rocks close to the coast to the very broken and contorted structures in the dominating range. Locally intense disturbance occurs round the edges of the sandstone basins, and a little farther north there are strips of country in which many large and small blocks of underlying rocks, torn from their proper place below, are found in crushed and folded silts where their shape and colour are discordant from the surrounding rocks.

The rocks of the Makran consist of serpentine, diorite, and granite associated with schists on its northern edge. Lavas, porphyry, chert, and limestone are represented amongst the exotic blocks and range from Jurassic to Eocene in age. The lower silts, sandstones, and grits which house these detached masses carry occasional limestone ribs holding fossils of Eocene and Oligocene types. A few limestone reefs in the east bridge the gap which usually exists between the Oligocene and the Pliocene, to which system belong most of the rocks in the south, including the sandstones near the coast. Later rocks are sub-recent, represented by the well-preserved raised beach deposits which stand at three levels. They are matched inland by gravels coating the smooth and extensive plains notched in the rocks along several of the valleys.

An apron of recent silt, broad here and narrow there, lies between the rock outcrops and the sea. Along the coast itself narrow strips of shelly and gritty limestone have developed, usually within reach of the waves or recently raised from them. Mud volcanoes are dotted about on the coastal plain from the strait of Hormuz up to and beyond the Baluchistan border. They seem to be unconnected with definable structures and to be sporadic. They erupt thick mud in some places and watery slime in others, the first building up warty pustules, the second wide-angled conical piles.

6. *Upland Rim of Eastern Persia and the Frontier Lowland*

The last division of Persia is made up of the broad hump of country extending south-south-east from near Meshed to Hamant, a wild peak near the south-eastern edge of Jaz Murian (photo. 5). This hump forms a kind of wall across the end of the intermediate zone and comprises certain rocks of similar type to those found there. But the differences make it easier to consider them apart. The structures are more congested here, they show stronger changes of trend locally,

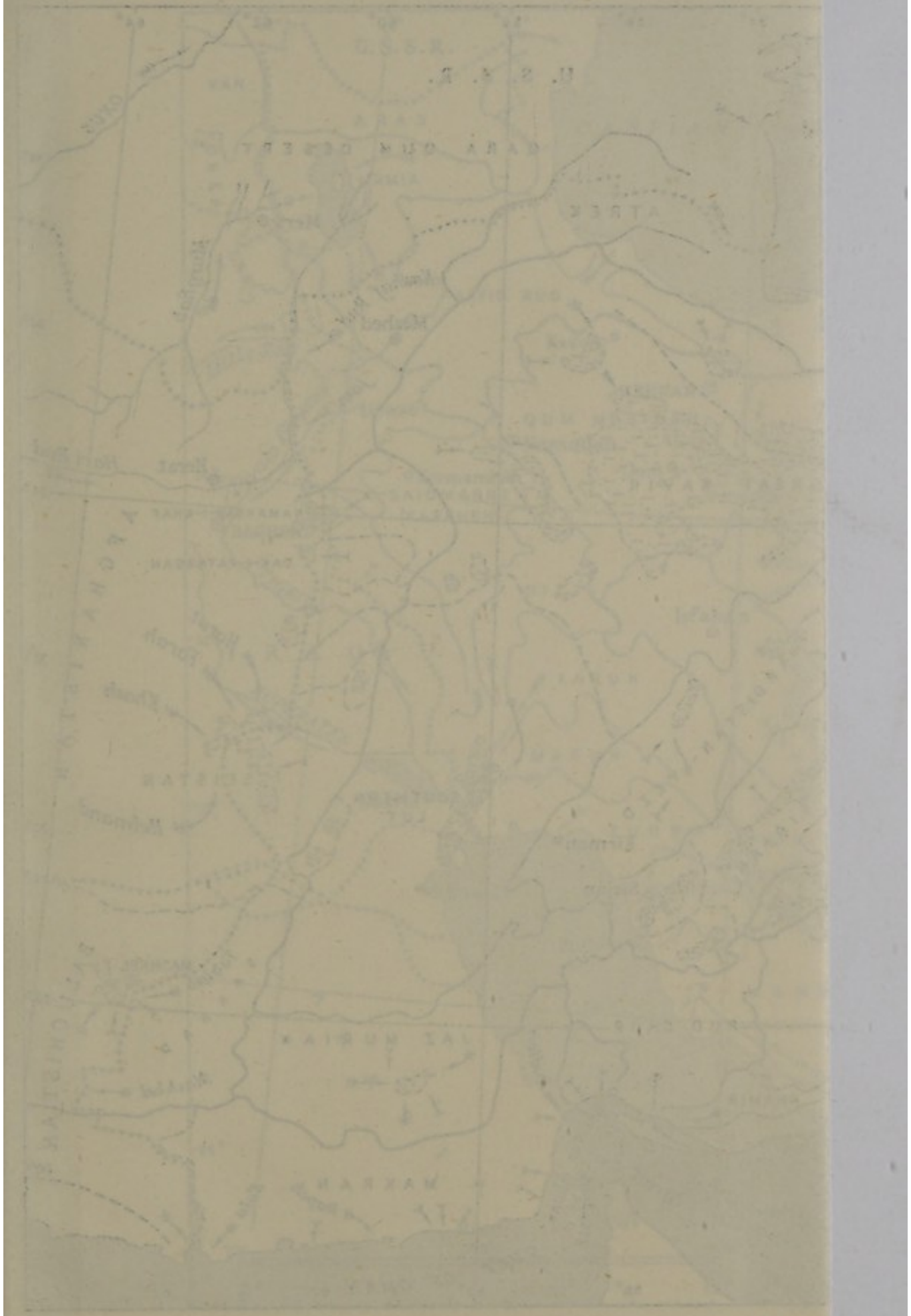




FIG. 8. *Drainage basins of Persia. Primary watersheds are shown by thick lines; less important watersheds by thin or broken lines. The relative importance of river discharge is shown by the number of 'feathers' on each arrow.*

even west of the several faults which have caused the Seistan region to drop down to the east. Across this fault-zone structures seem to show an entirely different trend, though it is encountered again in Afghanistan south of Herat.

The rocks concerned are imperfectly known. Some schists are exposed around the edge of the Lut and several patches of Upper Carboniferous limestones have been observed. Jurassic rocks are less abundant than in the Meshed area, but are exposed with Cretaceous in many of the anticlines so far examined. The dark grey sands and shales of Eocene and later date contain much volcanic ash and substantial thicknesses of lavas. Pliocene sandstones, gravels, and often shales complete the column.

The usual trend of the folds in Persia is from north-west to south-east, and this is present here in the north; farther south the trend becomes from north-north-west to south-south-east, and this is maintained in the latitude of Seistan and continues until near Kwash. Then it again becomes south-east before swinging to east a little north-east of Hamant. The folds in the north are fairly open and akin to the usual type found in the intermediate zone, but they change gradually in the south to a congested mass of 'shark-fin' type of folds recalling the structures of the northern Makran. Large faults truncate their western end and drop down the country to the east more than 4,000 feet. Granite masses occur in the Upland Rim at some three points, in the north, middle, and south. The lofty cone of Chihiltan rises on the south-east of the hump and is still quietly active (photo. 114).

The Persian part of Seistan is covered largely with silt brought down to this inland depression by the Helmand river from the Hindu Kush, but some volcanic rock is also exposed. The surprising feature of the region is that folds farther north on the edge of the lowland strike north-north-east. What can have changed the orientation of the rocks so sharply across this fracture line is quite unknown but is an intriguing problem.

Conclusion

The building of Persia has been attributed to the spasmodic movement towards one another of two large robust and only slightly folded masses of the earth's crust, the more pliable part between them being thrown up into folds. The northern block is in Russia, the southern or African block includes Arabia. The nipped zone suffered most folding at its edges, but its central part was also wrinkled. The general effect has been as if the Russian block was the active one and tended to drive

the mobile belt before it and strand it on the north-eastern edge of the African one. The Elburz folds rise steeply from the Caspian and the plains extending to the southern margin of the Russian block, whilst the Zagros folds gradually increase in size and altitude as they are followed north-eastwards away from Iraq and the buried Arabian edge of the African mass. The compression occurred in three main cycles which reached a climax in the late Jurassic, Upper Cretaceous, and Pliocene periods respectively. Apart from being folded, the zone that includes all Persia has experienced large vertical movements accompanied by faulting which has gone on vigorously. Scars of some faults are still clear on the landscape, for instance, along the flanks of the Elburz and of the Kopet Dagh, and near the eastern boundary just west of Seistan.

A few of the palaeogeographic features of Persia may be mentioned. The limits of the Cambrian sea are not known, but a land emerged from it at the end of this period in the south-west. Sea lay north-west, north-east, and south-east of it at times up to the Upper Carboniferous, after which probably the whole country was awash. A swampy plain embracing much of southern Russia developed later and extended at the beginning of the Jurassic far into Persia, at least as far south as Kirman in the east and to Tehran in the centre, and perhaps to near Tabriz in the west. Seas still covered southern Persia. During later Jurassic times the sea was again much more extensive over the country, but towards the end of the period a range was formed and stretched from north-west to south-east through the Isfahan district. Sea lay to the south-west and locally on the north-east. Sea covered much of central Persia during the Middle Cretaceous period, but withdrew south-westwards in Upper Cretaceous times after the mountains along the Khurramabad line had been formed. These seem to have separated the south-west section of Persia from the north-east from the date of their growth, since the Eocene and Oligocene on the south-west indicate an open sea in that direction, whilst to the north-east the waters were narrow and loaded with sediment. Thus the Green Beds of the Elburz may be compared with the clean nummulitic limestones of Khamir near Bandar Abbas. In the Miocene there was a kind of syncopation, for limestone was followed by Red Beds in the south-west very early in the period, whilst north-east of the line of the Upper Cretaceous hills the same sequence occurs but only towards the middle of the period, when the Middle Fars beds, and perhaps the Upper, were being deposited in the south-west. It is therefore evident that different parts of Persia

have had rather different histories, but that the main features after the disappearance of the Lower Jurassic land in the north have been closely dependent upon the coming and going of the forerunners of the present Zagros mountains.

DRAINAGE AND WATER-SUPPLY

THE 'Persian garden' in poetry and prose has given rise to the popular notion that Persia is a well-watered and fertile country. But a 'garden' is a relative term, and in Persia it is more often an oasis at the end of a barren dusty journey, where water and shade give relief from glare and heat. Over large areas water is the main problem of life, particularly during the summer months, and the owner of water is often richer than the proprietor of land. Only along the northern borderlands, in the Zagros valleys, and in parts of the north-western provinces is there a plentiful supply of fresh running water. Elsewhere many of the streams are short, intermittent, or salt, their waters often absorbed into the alluvium or rubbish that covers so much of the valley bottoms, and life is dependent on springs, wells, or other artificial devices for storing a precarious rainfall.

The pattern of the drainage basins is remarkable and is directly related to the structure and rainfall (fig. 8). In the north, where considerable precipitation is caused by moist northerly winds (p. 179), mountain torrents plunge down the northern slopes of the Elburz ranges to the Caspian. On the west and south-west, where the Zagros receives much rain and snow, a succession of river basins succeed one another from north to south, each having an outlet carved through the barrier ranges by which the collected waters reach the Mesopotamian trough or the Persian Gulf. Rainfall decreases southwards and eastwards, so that beyond the Elburz and Zagros barriers almost the whole country lies in a vast 'rain-shadow', it becomes increasingly arid from west to east and from north to south, and with the exception of a strip of country along the coast of the gulf of Oman all the drainage is collected in inland sumps. These aline themselves as a rule parallel to the predominant structural trend from north-west to south-east. In these interior basins the volume of water in streams is very variable. The only perennial streams are those which are fed by springs or melting snow. Though fresh and drinkable in their upper reaches they often become salt lower down, and with very few exceptions they empty into salt-lakes or salt-encrusted mires (*kavirs*, p. 88).

Persian river systems fall into six groups:

(*a*) Caspian drainage.
(*b*) Persian Gulf drainage.
(*c*) Drainage to the strait of Hormuz and gulf of Oman.
(*d*) Interior Persian sumps.
(*e*) Perso-Afghan sumps.
(*f*) Qara Qum desert drainage.

Caspian Drainage

Apart from the short streams draining the Caspian slopes of the Elburz ranges, there are three rivers which drain larger areas of Persia into the Caspian Sea: the Aras, the Safid Rud, and the Atrek. The Aras rises just east of Erzurum and in the Bingöl Dağ in eastern Turkey, and the greater part of its basin, about 9,230 square miles, is in that country among the volcanic highlands between Sarikamiş and the Şaitan Dağ.[1] West of Erivan the Aras collects the Arpa tributary, and then forms the boundary between Persian and Russian territory from the eastern skirts of Ararat to the Moghan steppe. In this section the right-bank tributaries drain Persian Azerbaijan, but the delta mouths are in Russia.

The Atrek rises in Persia and drains the trough between the Kopet Dagh and Kuh-i-Aleh. Almost its whole course is in Persian territory, though it receives some right-bank tributaries from the Kopet Dagh foothills beyond the border. The Safid Rud, alone of these three rivers, has its basin entirely in Persia, and it has cut back through the western Elburz to capture a large area of upland to the south, where its chief contributor is the Qizil Uzun (p. 54). No figures are available for the discharge of any of these rivers, but it is probably at its maximum in the month of May when snow is melting fast in the mountains. At this time of year many mountain streams are only fordable in the early morning.

Persian Gulf Drainage

Drainage to the Persian Gulf is collected by two large tributaries of the Tigris (the Little Zab and the Ab-i-Sirwan or Diyala); by four principal feeders of the Shatt al Arab or of the marshlands near the head of the gulf (Saidmarreh or Karkheh, Diz, Karun, and Marun or Jarrahi); and by five main rivers which reach the gulf independently (Zuhra, Shahpur, Mand, Khamir, and Rud Shur). There are also some minor hill streams which drain the outer foothills of the Zagros,

[1] The Turkish letter ş is equivalent to *sh* in English.

most of which lose themselves in marshland or desert between the first two groups; a fraction of their water reaches the Tigris by subsoil percolation. In the south a number of small watercourses carry the drainage of coastal ranges only after rare falls of rain.

The Tigris Tributaries. The Little Zab and Sirwan are rivers of Kurdistan. Both have several perennial headstreams on the Persian side of the border and are already large rivers when they enter Iraq, but observations for discharge have only been made low down their courses in Iraq after much water has been added by Iraqi tributaries; the greater part of the Little Zab basin is outside Persia, and its discharge figures and regime are only of interest to Persian geography for comparison with Persian rivers farther south (*below*).

The Karkheh and Karun. The four rivers which reach the marshlands and Shatt al Arab at the head of the gulf are of particular interest, because of the part they have played in building up the Mesopotamian plain by throwing a barrier of alluvial silt across the gulf from the Persian hills to the Arabian coast. This is largely the consequence of the remarkable pattern of the basins of the three largest rivers, the Karkheh (Saidmarreh), the Diz, and the Karun, which extend for over 400 miles from north-west to south-east and in this stretch collect all the drainage of the Zagros as far as the plateau, while their three exits to the plains of Khuzistan are bunched in a strip of country 20 miles wide. It is no longer possible to unravel the numerous changes of course that these rivers have undergone throughout the ages, but there is little doubt that they combined in early historical times and formed a triple delta. Later, the Karkheh was deflected westwards and the combined Diz and Karun eastwards by the delta deposits. In Abbasid times the Karun is known to have entered the gulf independently of the Shatt al Arab, and an artificial channel, the Haffar, now the lowest course of the Karun immediately above Khurramshahr, was cut in order to provide a navigable waterway between Basra and Ahwaz. At a still later period one channel of the Karun appears to have entered the gulf by the Khor Musa, where it was joined by the Marun, the two rivers combining to reclaim land on the northern shore of the gulf. To-day the Karun and Diz unite about 20 miles north of Ahwaz and take a course partly natural, partly artificial to the Shatt al Arab (p. 84); the Karkheh pours its silt-laden waters into the Hawiza marshes to the west and helps the Tigris to build up the land between the Tigris and the boundary of Persian Khuzistan; the Marun, a river with a much smaller catchment, drains into the swamps north of the Khor Musa.

The Karun is the only navigable river of Persia and the only river whose regime and discharge have been studied from observations covering any length of time. River steamers can ascend it from Khurramshahr to Bandar Nasiri, 1¼ miles below Ahwaz, beyond which point navigation is obstructed by a rocky ledge. It is for this reason that river-gauge readings have been taken at this point almost continuously since 1894, while discharge observations have also been made in certain years. As similar observations have been made over a number of years on the Euphrates and Tigris, and low down the courses of the two Zabs and the Diyala, much can be learnt from a study of the data.

The following table compares the discharges, in cubic feet per second, of the Karun at Ahwaz, of the Little Zab at Erbil, of the Great Zab at Girdmamukh, and of the Tigris at Mosul and Baghdad.

	Mean annual discharge	*Mean maximum monthly discharge*	*Mean minimum monthly discharge*
Karun	27,050	62,150 April	7,060 Oct.
Little Zab	6,920	16,140 March	1,340 Sept.
Great Zab	10,910	28,530 May	2,860 Oct.
Tigris (Mosul)	19,180	48,730 April	4,980 Sept.
Tigris (Baghdad)	43,790	106,650 April	11,900 Oct.

These figures are calculated by various methods and from readings over different periods; though they must therefore only be considered as approximate, they certainly show that the discharge of the Karun is considerably greater than that of the two Zabs combined and that it is rather less than that of the Tigris after being joined by the Great Zab. The Diz–Karun catchment (19,700 sq. miles) is considerably larger than that of the Great and Little Zabs combined (13,600 sq. miles) and smaller than that of the Great Zab and of the Tigris above Mosul combined (25,100 sq. miles).

The calculated discharge rates give the following total volumes of water brought down by these rivers each year:

Karun	854,560 millions of cubic feet.
Little Zab	215,420 ,, ,, ,,
Great Zab	342,550 ,, ,, ,,
Tigris (Mosul)	612,880 ,, ,, ,,

These figures are equivalent to water-depths spread evenly over each catchment area as follows:

Karun–Diz catchment	18·6 inches
Little Zab ,,	16·5 ,,
Great Zab ,,	18·9 ,,
Tigris (Mosul) ,,	17·3 ,,

The 10-inch isohyet approximately follows the edge of the foothills in Iraq, but the rainfall gradient rises steeply within the hills to as much as 50 or 60 inches in some parts. The high proportion of precipitation that is collected and discharged by the rivers is mainly accounted for by the fact that the greater part falls in the winter and spring, when evaporation is least; much of it is also stored as snow in the high mountains before being melted.

The figures have a practical value because they enable a rough estimate to be made of the discharge of the Karkheh catchment area, which is approximately 17,000 square miles, rather less than the combined catchments of the Diz and Karun (19,700). A conservative estimate would put the mean annual discharge of the Karkheh at four-fifths of that of the Karun at Ahwaz, or approximately 21,650 cubic feet a second; so that the combined discharge of the Karkheh, Diz, and Karun would average approximately 48,700 cubic feet per second throughout the year, which may be compared with 43,790 cubic feet discharged by the Tigris at Baghdad.

Estimates of the amount of silt brought down by the rivers of Iraq and western Persia are still only very rough and must vary considerably from year to year. Sir Arnold Wilson quotes estimates of 1·22 million cubic yards per annum at Falluja on the Euphrates, 2·2 million cubic yards at Baghdad on the Tigris, and 1·5 million cubic yards for the combined Karkheh, Diz, and Karun. In view of the mean discharge rates given above, this figure for the Persian rivers is almost certainly much too low compared with the figure for the Tigris. The figure must be at least 2 million cubic yards and may be more, of which probably 1·1 million cubic yards are carried by the Diz and Karun, and 0·9 by the Karkheh. It is this vast amount of silt brought down by the three rivers which accounts for the blocking of the head of the gulf in the past; now the Karkheh load is added to the silt of the Tigris and the Euphrates and helps to build up the Mesopotamian plain—no longer to reclaim land at the head of the gulf.[1]

From the foregoing it must be assumed that the regime of the Karkheh is much the same as that of the Diz–Karun. The monthly mean gauge-readings in feet at Ahwaz over the period 1894–1930 are given in the following table, together with the absolute maxima and minima, and are shown on fig. 9. All are corrected to a single arbitrary datum.

[1] See *Iraq and the Persian Gulf* (Admiralty B.R. 524), p. 54 and fig. 14, which gives an estimate of the conditions at the head of the Gulf at different periods in history, based partly on these figures, and partly on other factors.

	Normal	*Absolute max.*	*Absolute min.*
Jan.	141·7	157·5	136·5
Feb.	142·8	158·4	136·8
Mar.	145·7	156·5	137·7
Apr.	147·1	154·9	141·4
May	145·4	155·5	140·1
June	142·1	148·2	138·4
July	140·1	145·0	137·1
Aug.	138·6	141·4	136·0
Sept.	137·5	139·6	135·5
Oct.	136·9	140·6	135·4
Nov.	137·6	150·1	135·4
Dec.	139·6	155·8	136·4

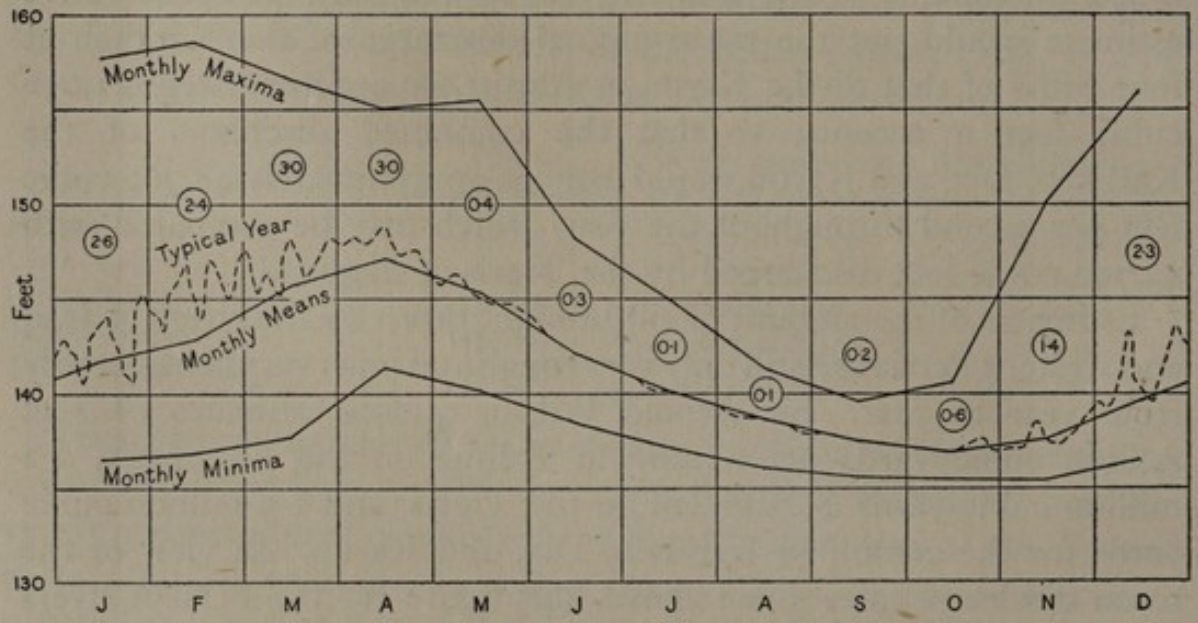


FIG. 9. *Regime of the Karun River at Ahwaz*

Monthly maxima, minima, and means, 1905–30, on arbitrary datum. Figures in circles are the average number of changes from rise to fall in each month, 1920–9

In most years October is the month of low water, but rain is not uncommon in November and December, when sudden rises may occur. The river continues to rise with considerable fluctuation until April, or early May, from the combined effect of rain and melting snow; and then gradually falls to its October minimum. The maximum rise in 24 hours, 17·3 feet, occurring in the month of February, is greater than that recorded in any of the Mesopotamian rivers.

Southern Rivers of the Persian Gulf. The Zuhra, Shahpur, Mand, Khamir, and Rud Shur all suffer from smaller rainfall. The first three are also handicapped because the gulf watershed approaches the coast owing to the Niriz and Shiraz basins having no outlet. Water becomes an increasingly difficult problem in this country, which is more sparsely inhabited in consequence.



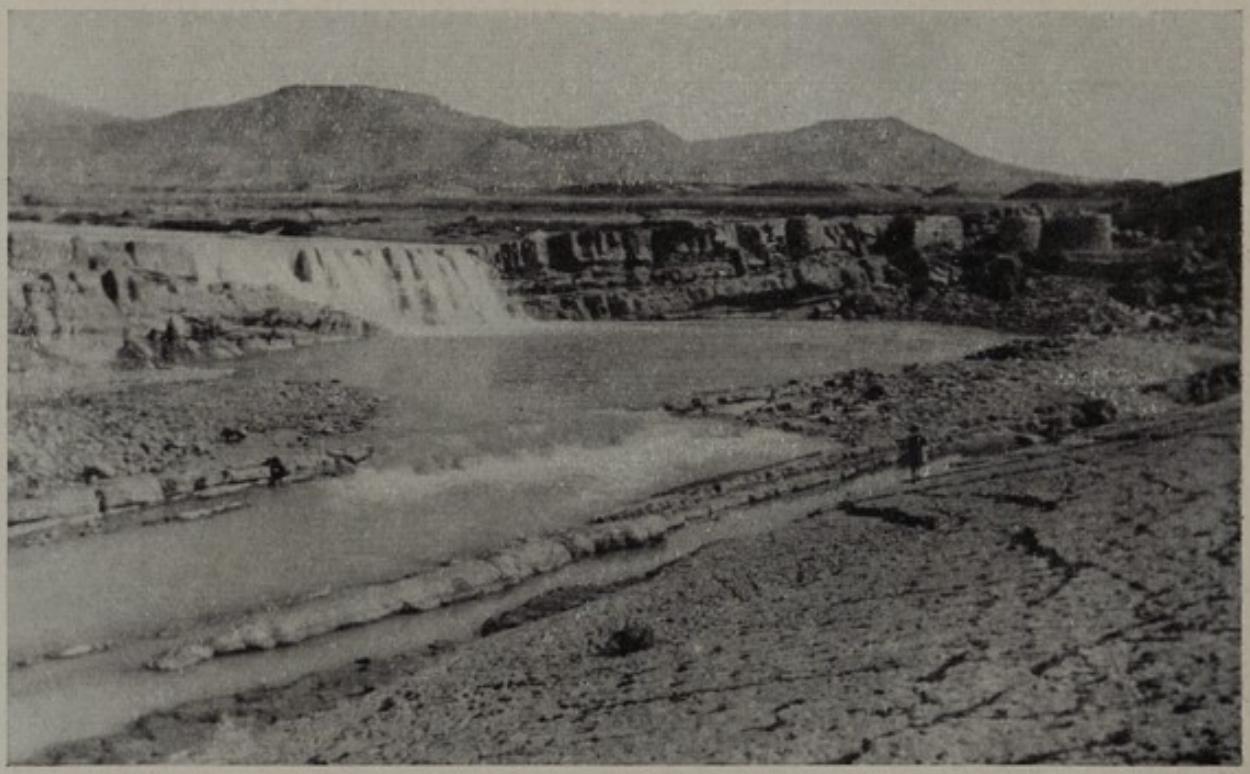
9. *Alwand (Hulwan) river near Qasr-i-Shirin, Zagros foothills*



10. *Gorge of the Sirwan river near the boundary between Persia and Iraq*



11. *Fording the Saidmarreh at Hulailan, in the Pish-i-Kuh Zagros*



12. *The Ab-i-Tembi, a foothill tributary of the Karun*

Drainage to the Strait of Hormuz and Gulf of Oman

The rivers of this coast are entirely different from those already described. None have large basins, and there are no long mountain barriers to force them to collect within the hills. The valleys are often choked with rubbish so that for long distances the streams disappear and flow underground. Most of the streams rise in the southern watershed of the Jaz Murian, and soon dry up, but there are three, the Rudian in the west, the Kaur Rapch in the middle, and the Kaur Kalu in the east, which have secured rather larger basins than the rest and therefore carry more water and have more settlements and cultivation.

Interior Persian Sumps

The interior basins of Persia fall into two main categories: those of the north-west and south-west, which are comparatively well watered, and those of the centre, south, and east which are not. The first includes the lake basin of Urmia, the two Zagros basins of Niriz and Shiraz, and the belt of drier basins from Qum south-eastwards to the Jaz Murian. In the second category fall the Great Kavir in the north, with the subsidiary kavirs which border it, the desolate Southern Lut, and smaller basins along its edges. Lake Urmia may possibly in far distant ages have been part of the Aras basin. Most of its drainage comes from the volcanic slopes of Savalan and Sahand on the east, but the southern and shorter western tributaries add to its volume and are of considerable value both for settlement and agriculture since they are fresh and perennial; the lake itself is salt (p. 52).

The basins of Niriz and Shiraz form part of the high Zagros, and are rather similar in landscape to the upland basins of the Saidmarreh (Karkheh) east of Kermanshah, and of the upper Diz and Karun; but none of the coastal rivers here—Zuhra, Shahpur, Mand, or Rud Shur—have been strong enough to capture the inland drainage of Shiraz or Niriz. The water of most of the streams is fresh, but away from them the hills begin to show more arid landscapes.

The belt of basins from Qum through Isfahan to Sirjan are intermediate in character between those just described and the desolate kavirs of central Persia. Tributaries from the high plateaux and ranges to the west generally carry sweet perennial water, but they diminish in volume lower down their courses and generally end in salt depressions or *kavirs* (p. 88), large parts of which are dry for much of the year. It is this combination of plateaux and good water that has

assisted the growth and fame of such important centres as Shiraz, Persepolis (in the Niriz basin), Hamadan (the ancient Ecbatana), and Isfahan.

The Great Kavir and Southern Lut are described in detail in the next chapter. They are desolate in the extreme, and surface water is almost always salt.

Perso-Afghan Sumps

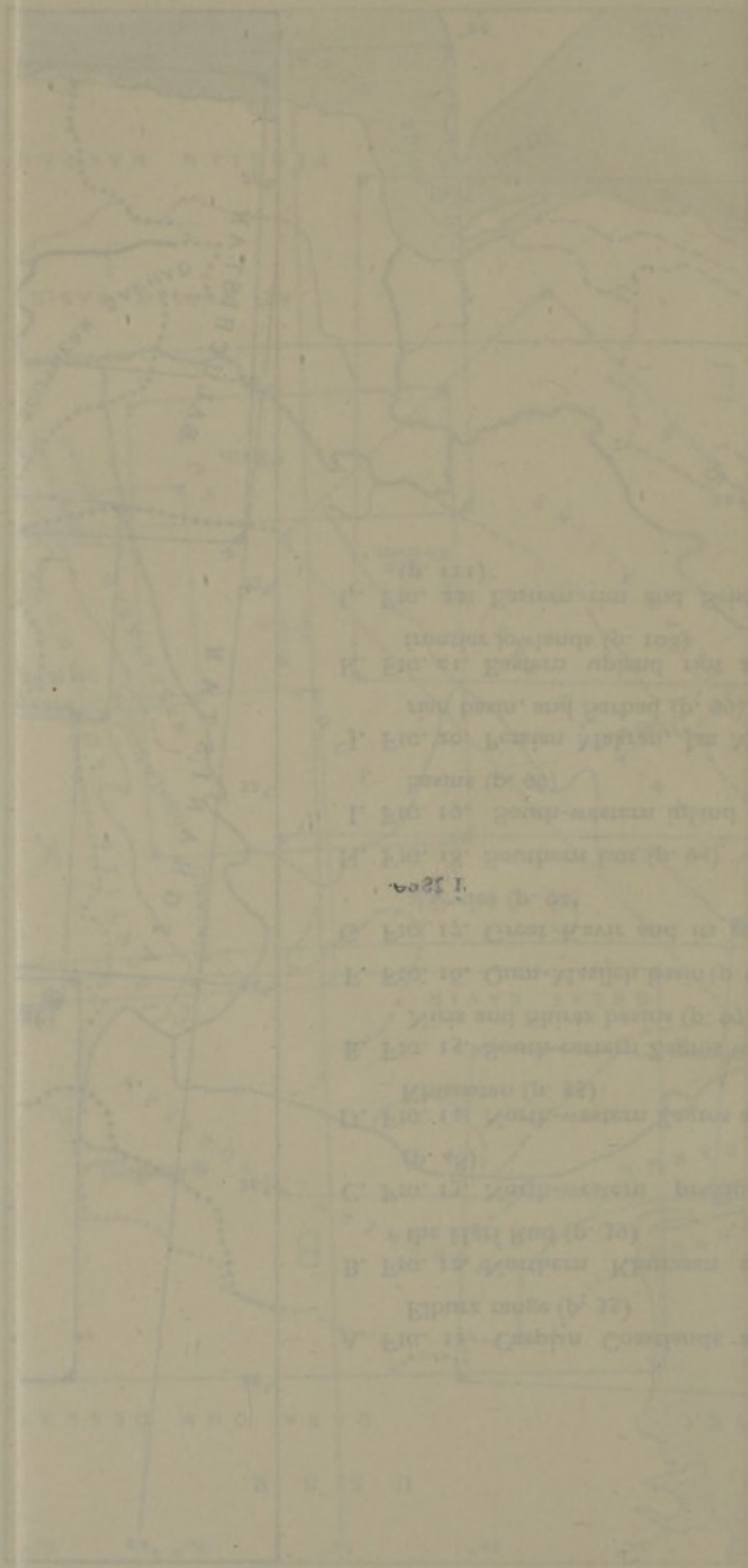
These form a chain of depressions along the Perso-Afghan border—three small salt-encrusted depressions in the north, the large Seistan Hamun in the centre, and the Mashkel Hamun in the south. The Persian watercourses which feed these sumps are often dry, but when wet they generally carry fresh water. The Seistan Hamun is by far the largest and receives almost all its supplies from Afghan rivers, of which the Helmand is the most important (p. 116).

Qara Qum Desert Drainage

Drainage in the extreme north-ea[illegible]s rather different from that of the rest of Persia. The Atrek, which reaches the Caspian, has already been mentioned (p. 26). Most of the drainage of the southern slopes of the north-eastern mountains gradually collects in salt rivers, and some of it eventually reaches the Great Kavir at its north-eastern corner. The rest drains off the northern slopes, or by eastern troughs such as that of the Kashaf Rud into the frontier river of the Hari Rud, all of which drainage is eventually dissipated in the sands of the Qara Qum desert. Here there is neither *hamun* nor *kavir*. Evaporation, absorption in the soil, and dissipation by irrigation gradually expend the water-supplies until all is lost, but the water remains fresh almost to the last.

Water-supply

The scarcity of good water over so large an area has led the Persians to develop and rely on artificial methods of obtaining water probably more than any other people in the world. Some of these methods are very ancient, and during the expansion of the empire under the Achaemenids and Sassanids, as also during the Abbasid Caliphate and the Moghul period in India, Persian inventions and practice spread throughout all the neighbouring countries, Iraq, Afghanistan, Trans-Caspia, and even India. Yet there are no great irrigation works in Persia, and none in the past which compared with the great



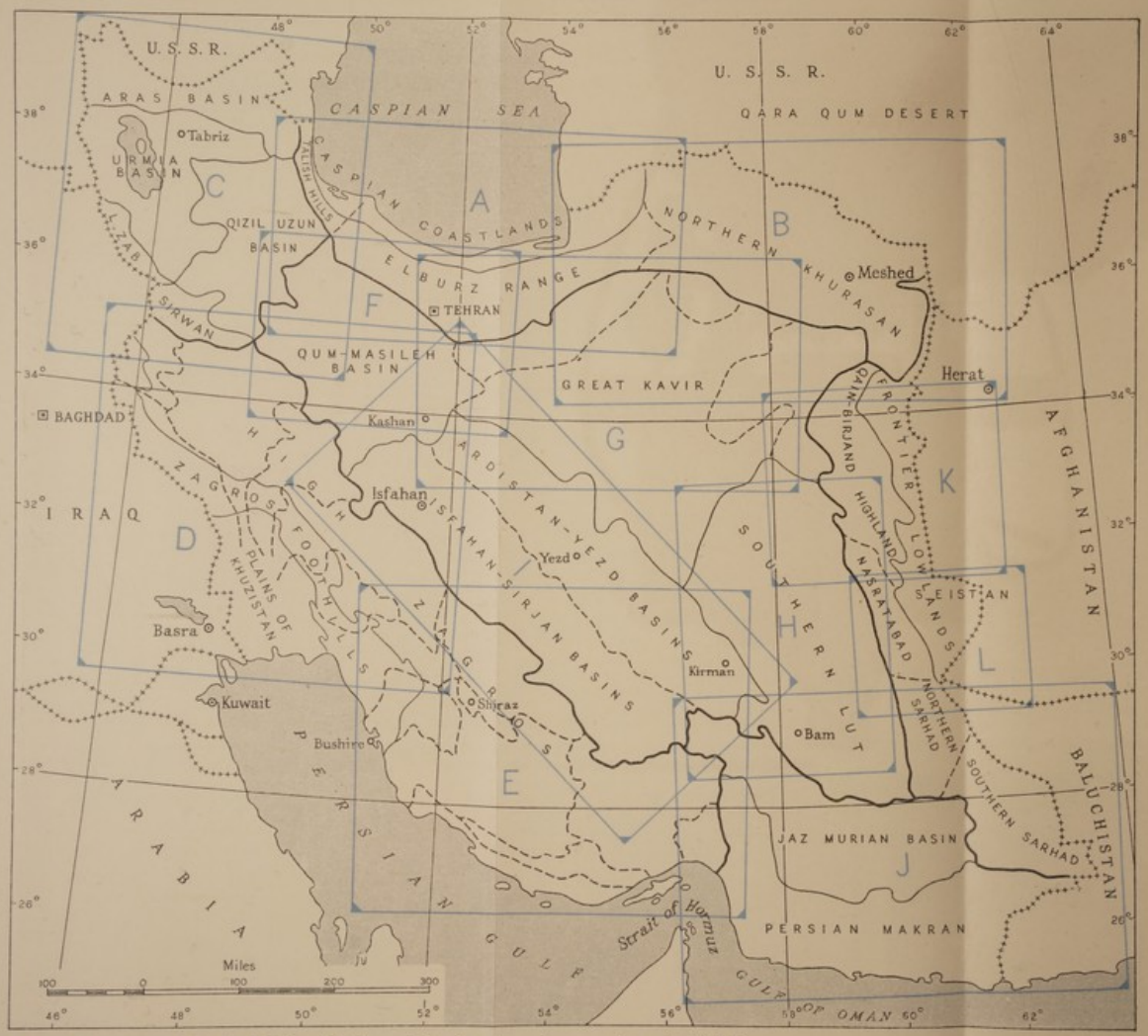


FIG. 10. *Regions and Regional Index. The boundaries of major regions are shown by thick lines*

A. FIG. 11. Caspian Coastlands and Elburz range (p. 35)

B. FIG. 12. Northern Khurasan and the Hari Rud (p. 39)

C. FIG. 13. North-western provinces (p. 48)

D. FIG. 14. North-western Zagros and Khuzistan (p. 55)

E. FIG. 15. South-eastern Zagros with Niriz and Shiraz basins (p. 67)

F. FIG. 16. Qum-Masileh basin (p. 90)

G. FIG. 17. Great Kavir and its subsidiaries (p. 92)

H. FIG. 18. Southern Lut (p. 94)

I. FIG. 19. South-western inland basins (p. 96)

J. FIG. 20. Persian Makran, Jaz Murian basin, and Sarhad (p. 99)

K. FIG. 21. Eastern upland rim and frontier lowlands (p. 108)

L. FIG. 22. Eastern rim and Seistan (p. 111)

systems of the Nile, Euphrates, and Tigris; the largest was the Karun irrigation system in Khuzistan (p. 428) and that was more properly Arab than Persian. The reason for this is that such systems are not suitable to mountain country where the enclosed valleys and basins are more easily dealt with as separate problems. With one exception, Persian water-contrivances are simple. Open channels in the hills bring water to the villages and fields. These may vary from ditches a few inches deep to troughs cut in rock round the hill-side, and to more elaborate structures of timber and masonry. The source of supply may be stream, spring, or well. Mechanical lifts for raising water are much the same as in the Arab countries of the Middle East and comprise the counter-weighted lever with bucket or skin, animal hoist with hide-bucket, rope and pulley (photos. 230, 231), and various kinds of water-wheel, one at least being entirely due to Persian invention. Perhaps the most interesting device, also purely Persian in origin though since spread throughout Arab lands, is the *qanat* or *karez*, which is found throughout Persia wherever surface water begins to fail. It is designed to tap underground supplies in regions where streams or rain quickly disappear in the accumulated silt or debris of highland valleys. The *qanat* (p. 424) is briefly mentioned here because water so obtained is used for town water-supplies as well as for cultivation. Shafts of decreasing depths are sunk at intervals along a line often at right angles to the valley wall, and an underground conduit is excavated to connect the bottoms of each shaft. Conduit and shafts are so made that the slope of the former is less than that of the ground surface, so that water is discharged above ground where the two slopes meet. This system has the additional advantage that very little water is lost by evaporation.

In still more arid parts, particularly in the south, life is possible only by collecting water from rare rainstorms into tanks. Many of these are large stone structures sunk below ground and protected by thick domed masonry roofs to prevent evaporation (*birkeh*). The great drawback to this system is that the neighbourhood is generally frequented by men and beasts, and the rain washes much filth into the tanks which become badly polluted. Local inhabitants seem to become immune from the contamination so far as intestinal diseases are concerned, but many can show punctured hands and feet caused by the guinea-worm which breeds in the tanks. Such water would more often than not be quite undrinkable by a European.

CHAPTER III

REGIONAL DESCRIPTION OF THE LAND

THE structural divisions of Persia have been summarized on pages 11–23. Though these form the basis of any description of the country, they require some modification for geographical description. Thus the northern structural division results in three geographical regions of very different character because of altitude, climate, and vegetation: the Caspian coastlands, the Talish hills and Elburz proper, and northern Khurasan. The Intermediate Zone of central Persia, by reason of altitude and rainfall, as well as because of its huge size, is subdivided geographically into the North-western Provinces (Persian Azerbaijan, most of Ardalan, and part of Khamseh), the Desert Basins of Central Persia, and South-eastern Persia. The South-western Mountains and Lowlands are best treated as one region, though subdivided into three strips—mountains, foothills, and plain. Persian Makran and the Upland Rim of Eastern Persia are satisfactory as separate geographical regions, though it is more convenient to include the Jaz Murian basin with the Makran in South-eastern Persia than with the Desert Basins, and the Upland Rim of Eastern Persia must be subdivided into mountain and lowland.

These Geographical Regions are summarized as follows, in the order in which they are described (fig. 10):

I. The Northern Borderlands
   - (*a*) Caspian coastlands
   - (*b*) Talish hills and the Elburz range
   - (*c*) Northern Khurasan

II. The North-western Provinces
   - (*a*) Aras basin
   - (*b*) Urmia basin
   - (*c*) Little Zab and Sirwan basins
   - (*d*) Basin of the Qizil Uzun or upper Safid Rud

III. The Zagros Chains and South-west Lowland
   - (*a*) High Zagros
   - (*b*) Zagros foothills
   - (*c*) Plains of Khuzistan

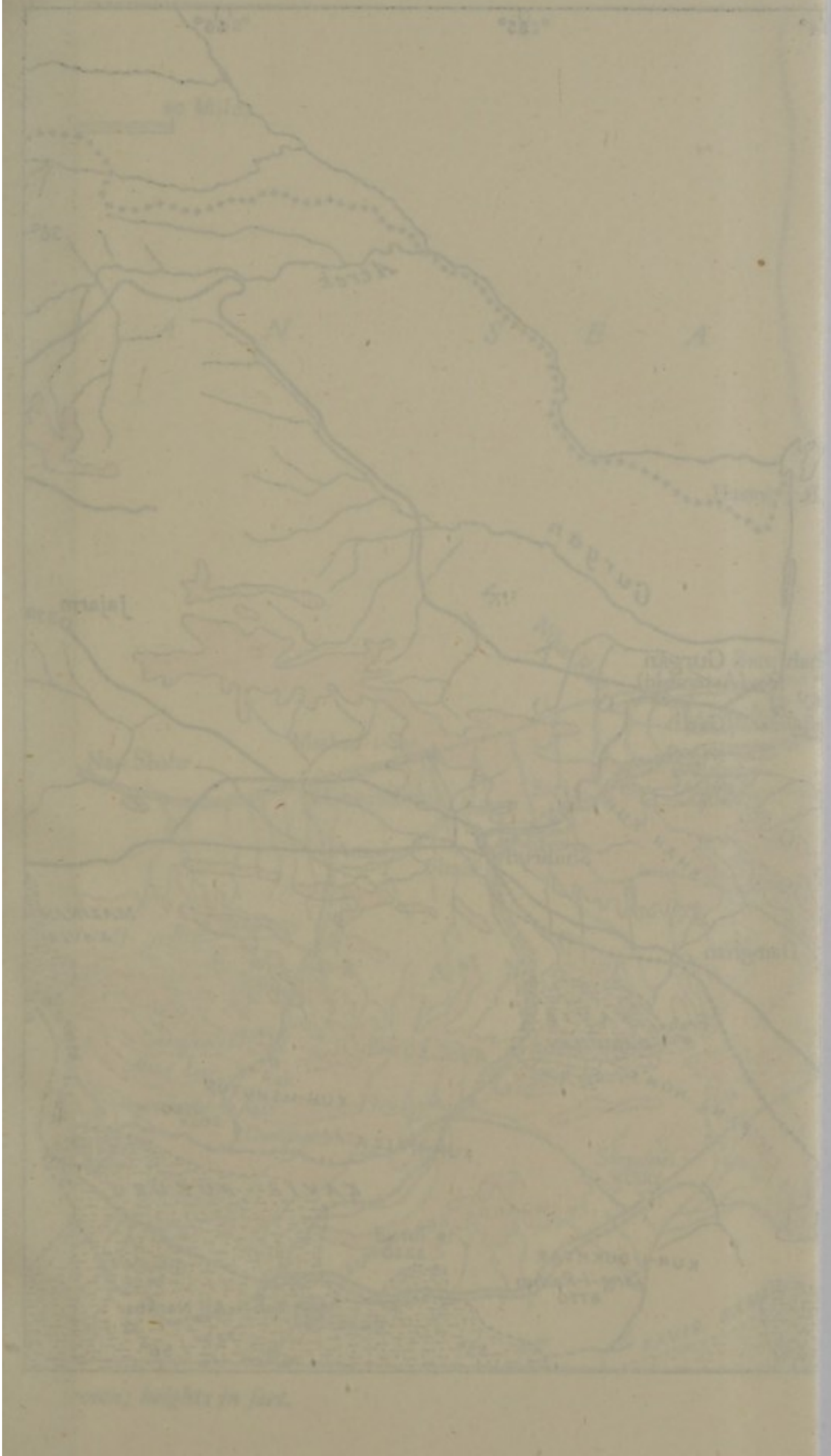




FIG. 11. *Caspian Coastlands and Elburz Range. Layers at 5,000 and 10,000 feet stippled in brown; heights in feet.*

IV. The Desert Basins of Central Persia
- (*a*) Great Kavir and its subsidiaries
- (*b*) Southern Lut
- (*c*) South-western inland basins

V. South-eastern Persia
- (*a*) Persian Makran
- (*b*) Jaz Murian basin

VI. The Upland Rim of Eastern Persia
- (*a*) Qain and Birjand highlands
- (*b*) Nasratabad-Taftan region
- (*c*) Frontier lowlands

I. The Northern Borderlands

This region of Persia is the direct result of the structure of the Elburz chain (p. 13). On the west it includes the Talish hills and the Elburz together with the narrow Caspian coastlands; on the east, the Ala Dagh and that part of the Kopet Dagh south of the Russian boundary with the Atrek trough between them. For descriptive purposes it may be divided into three sub-regions: (*a*) the Caspian coastlands, (*b*) the Talish hills and Elburz ranges, and (*c*) Northern Khurasan.

Caspian Coastlands

Most of Persia is composed of barren desert or naked rock where the sun blazes down during the long summer on a dried-up land. But the Caspian provinces of Gilan, Mazanderan, and Gurgan provide a startling exception. Swampy and malarial, they are 'so abundantly clothed with trees of the forest, that often a pathway can scarcely be forced through the intricate jungle, so riotous in colour that the traveller can almost awake with the belief that he has been transported in sleep to some tropical clime'. Elsewhere in Persia the traveller must take heed of watering-places for man and beast; here his course is impeded by marsh and stream which have to be crossed by ford or primitive ferry. Most of Persia is fortunate if it receives occasional rain during the five winter months of the year; here along the Caspian slopes, cloud and mist with deluges of rain are common at any time, and though there is a 'wet' season and a 'dry', none is rainless. The contrast between the seasons is more marked in the lowland; on the slopes behind rain falls persistently in and out of season.

The Caspian coastlands are described in detail in Chapter IV (pp. 142–154).

The Talish Hills and Elburz Range (fig. 11)

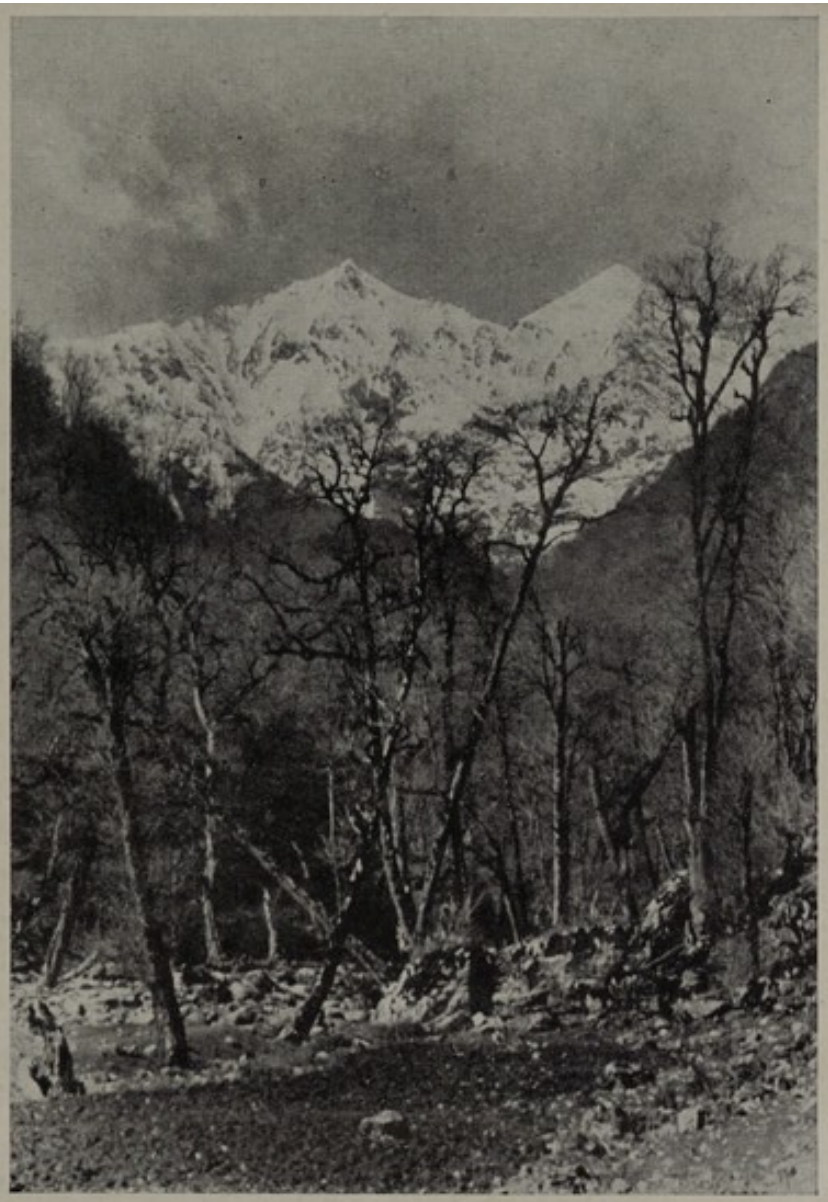
From the edge of the Caspian plain and its terraces the skirts of the Elburz mountains rise steeply upwards, the forests of the lower slopes continuing into the lowlands. In the foothills villages are hidden away amongst the trees and are surrounded by orchards and fruit gardens where grow oranges, lemons, pomegranates, peaches, melons, quinces, olives, and mulberries.

The Elburz chain is the greatest feature of northern Persia. It is more than 600 miles long from the Russian border in the north-west to Jajarm in the east, beyond which it merges into the mountains of Northern Khurasan; it varies in width from 40 to 80 miles.

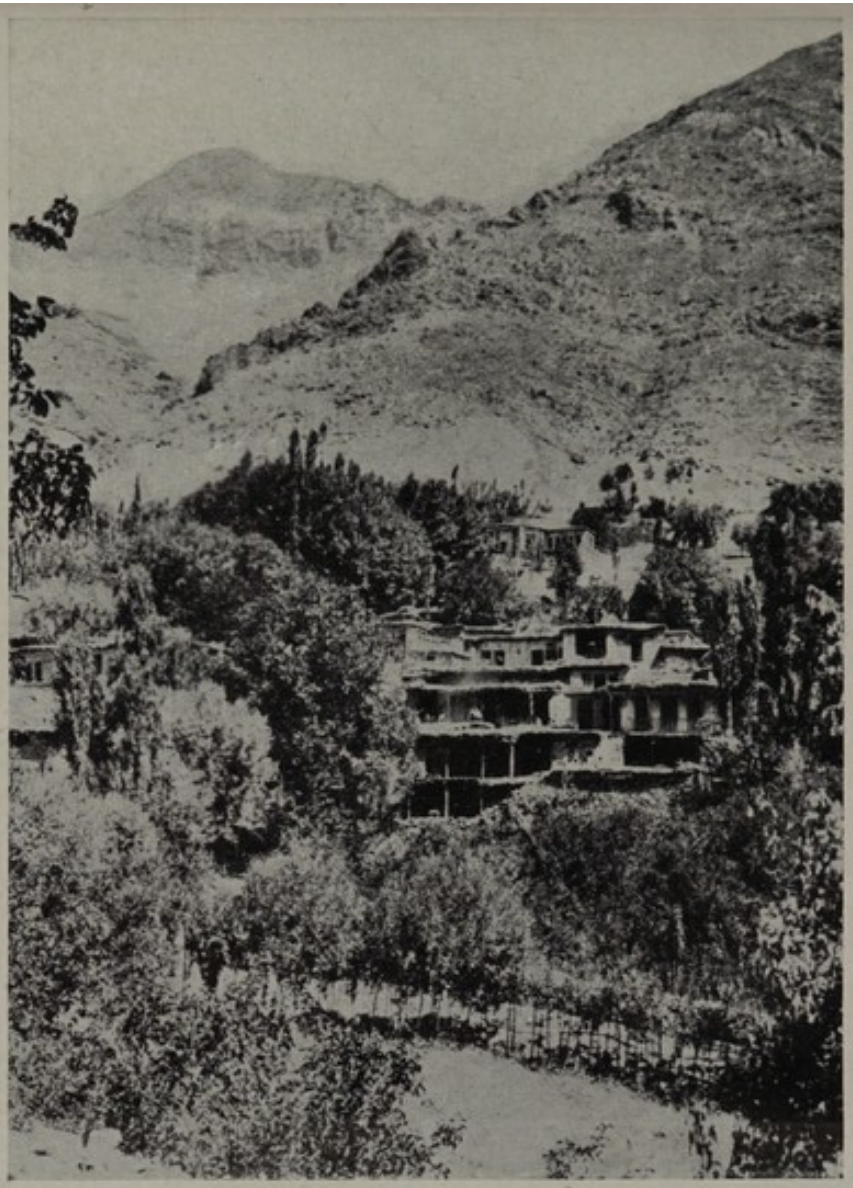
The *Talish hills* in the north-west are very little known in detail, but here the ridges rise for long distances to over 8,000 feet, the north-eastern slopes being thickly forested and cut deeply by short violent winter torrents which plunge steeply down to the sea. The watershed in the north is only 12 miles from the coast, but the coastal plain widens towards the south (p. 147). The Kargan Rud is the only stream which deserves mention. This has carved a wide basin out of the hills leaving two prominent ridges, the western of which rises to over 10,000 feet and falls steeply to the upper course of the stream. The valley is richly cultivated with wheat, the fields are separated by trees and hedges, alders line the watercourses, and there is good summer grazing. Where the ridges reunite, south of the Kargan Rud basin, there is a fairly easy pass between Herau (Hirabad) in the Qizil Uzun catchment and Siahchal on the Caspian.

At the south end of the Talish hills the Gilan Pusht-i-Kuh rises to about the same height behind the delta of the Safid Rud and the plain of Resht, which it separates from the Qizil Uzun (p. 54), draining the north-western provinces of Khamseh and Ardalan.

The Talish hills are separated from the *Elburz range* proper by the defile of the Safid Rud below Manjil. The southern boundary of the Elburz may be taken as the motor-road from Manjil to Kazvin and thence through Tehran, Samnan, Damghan, and Shahrud to Jajarm. Seen from the southern side the Elburz range appears first as a great tilted plain, covered by shingle or debris, rising gradually to the foot of the steeper slopes. Little impression is gained of the intricacies of the intermontane valleys, caused by erosion from rainfall and Caspian drainage. The forested northern slopes are deeply scored by ravines,



13. *Takht-i-Sulaiman, 15,500 feet, from Qaleh Dasht*



14. *At the foot of the Afcheh pass on the way to the Lar valley, Elburz*



15. *The Alamut gorge from the north-east*



16. *Alamut rock, valley of the Assassins, Elburz*

which are gradually cutting back into the mountains, but it is not until the Rud Haraz (Rud Nur), which issues to the Caspian plain at Amul, that a northward-flowing river has succeeded in cutting back through the range and capturing the drainage of valleys parallel to the range trends. In this section between the Safid Rud and the Rud Haraz the broad pattern is of two ridges on the west, separated by the Shah Rud tributary of the Safid Rud, and of three ridges on the east, separated by the Rud Nur and Rud Lar, tributaries of the Rud Haraz.

Of the two ridges on the west the northern soon reaches 10,000 feet east of the Safid Rud and then rises to 15,500 feet at Takht-i-Sulaiman (photo. 13); the southern ridge, 20 miles away, rises more gradually south-east of Manjil to a little over 13,000 feet. North-west of Tehran the two ridges come together and form a broad highland over which the motor-road from Karaj on the Kazvin–Tehran road picks its way to the Chalus and the Caspian plain (photos. 317, 318).

The *Shah Rud* which drains the valley between these two ridges is known in its upper reaches as the Shah Rud-i-Talaghan, to distinguish it from its northern tributary the Shah Rud-i-Alamut. After collecting minor streams it passes close under the southern foot of the Takht-i-Sulaiman group. The valley is little known, but it forms a gradually widening trough, sometimes hemmed in between great spurs, and often cut deep in its bed and flanked by river terraces. Three mule-passes cross the Takht-i-Sulaiman group, the Tanur Khan pass, about 11,500 feet, being generally passable even in winter. Bridges in the valley are mostly impermanent.

The *Shah Rud-i-Alamut* rises from a dark 13,000-foot massif about 6 miles west of the highest point of Takht-i-Sulaiman. The valley is only about 25 miles long, but is hemmed in by magnificent mountains on either side. The Salambar pass (11,290 ft.) near the head of the valley gives access to the Caspian and is usually passable at all seasons; but the Siyalan pass farther west is not practicable in winter. A few miles from its source the Alamut flows in a gorge 3,000 feet deep, in which lies the village of Garmerud, the flat-roofed houses built in tiers and dominated by the ruins of an 'Assassin's Castle'. Below the defile the valley opens out and forms a chain of fertile oases, mostly at the mouths of tributaries. Sycamore, poplar, willow, mulberry, and walnut-trees are common, the last often reaching a great size; vines and hawthorn, and higher up juniper and cedar, flourish. Rice and corn are grown in alternate years. The valley was the original stronghold of the Assassins—the 'Paradise' of the 'Old Man of the Mountain'—guarded at each end by fortresses, including that of their

founder, Hasan-i-Sabbah (p. 259), on a great rock above Gazar Khan. This fortress remained in the hands of the Assassins from 1071 until 1256, when it was sacked by the Mongol Hulagu (photos. 1, 15, 16).

The Alamut and its tributaries are violent torrents in spring, but in late summer even the main stream is rarely more than waist deep. Below the confluence of the Alamut and Talaghan, the Shah Rud passes between barren cliffs and is followed by a difficult path. In its open parts there are many villages, but there are other stretches where the river is much confined and where there is little room for fields or houses.

The Kazvin–Resht motor-road enters the Shah Rud valley by the narrow defile of the Mulla Ali tributary at Paichmar, 10 miles from the junction of the Shah Rud and the Qizil Uzun at Manjil. Most of the country here is barren, except for a few olive-groves, and Manjil is a fair-sized village with customs-post and bridge which takes the motor-road to the left bank of the Safid Rud.

The Karaj–Chalus road crosses the Elburz east of the Takht-i-Sulaiman massif. East of this road there are three parallel ridges instead of two. The northern, an extension of the Takht-i-Sulaiman ridge, rapidly diminishes in height, but has an occasional summit of 10,000 feet which overlooks the Rud Nur from the north. The two southern ridges are much broader and would be deemed a plateau but for the trenches dug by erosion. Separated by the upper Rud Lar, the ridges maintain an approximate height of 10,000 feet and a general trend from west to east. An occasional section presents this direction more markedly than others, as for instance the Kuh-i-Durud east of the Imamzadeh pass, south of the volcanic cone of Demavend. The broad base of this volcano is superimposed on the pattern of parallel ridges, its flanks and summit, 18,550 feet, snow-covered in winter, being visible from all sides (photo. 2). The Lar valley is often under snow in winter, but for some distance takes the main road from Tehran to Amul. The valley turns northwards east of the volcano, and is there so precipitous that the track has to keep high along the valley wall. In this section there are no villages or fields and travellers used to shelter in caves cut in the cliffs, but northwards the valley opens out and villages and cultivation are encountered again. The upper Lar and the Nur valleys are both rather similar to the Rud Talaghan; clusters of villages built of mud-brick houses are set near the streams amongst poplars and willows in the broader and more fertile parts, but the valleys are barren and almost uninhabited where they are constricted. In all this country a few trees and bushes are scattered on

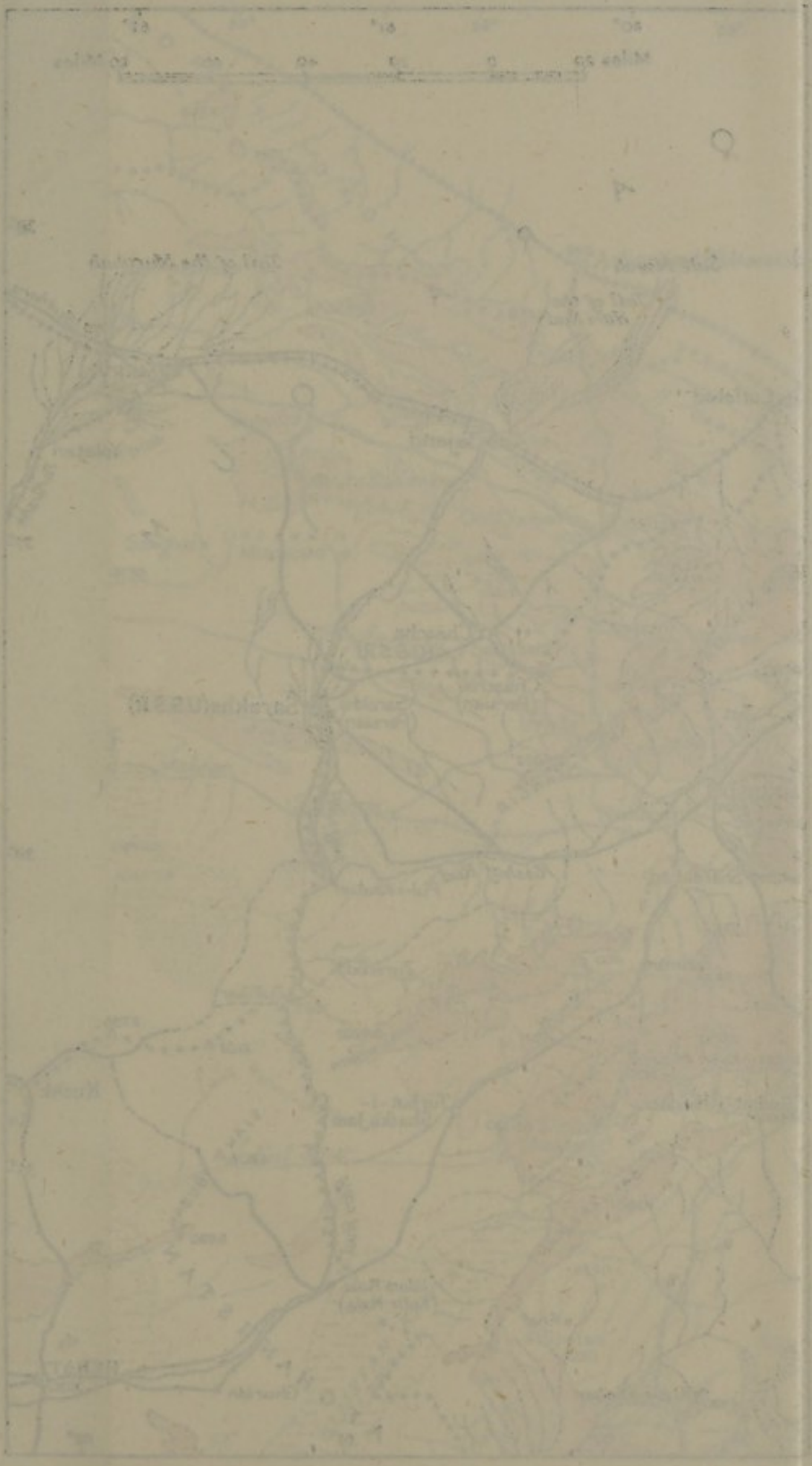




FIG. 12. *Northern Khurasan and the Hari Rud. Layers at 5,000 and 10,000 feet stippled in brown; heights in feet.*

the hill-sides, but most of the slopes are bare, rough, and craggy. The contrast between them and the northern slopes of the Elburz facing the Caspian is remarkable (photos. 17–20).

Thirty miles east of Demavend the ranges begin to plunge downwards in echelon to the comparatively low pass of Gudar Guduk, 6,950 feet above sea-level, which is now crossed by the Trans-Iranian railway. Eastwards the mountains rise again, Orim Nizva Kuh to above 13,000 feet still maintaining a general direction from west to east, though to the south the Kuh-i-Qara Aghach changes direction to north-east. The effect is gradually to reduce the width of the chain, which is only 40 miles across between Shahrud and Gurgan.

The Elburz separates the dense wet forests of the Caspian from the dry wastes of its southern flanks. Where these flanks are cut by streams, deep gullies reach back into the hills, and at their mouths stand villages of flat-roofed houses amidst trees and greenery. Some of these entrances took caravans of mules in the past; a few are now opened up to motor traffic. Most of the gullies afford very rough going and are steep. There are few villages at first, but later where the gullies open out and in the intermontane valleys hamlets reappear. Isolated dwellings are very rare; buildings are almost always in groups.

As already mentioned, the southern boundary of the Elburz region may be taken roughly as the line of the motor-road from Kazvin through Tehran to Shahrud. The drainage southwards is all towards the Great Kavir, but none actually reaches it. The southern side of the mountains is barren and brown for most of the year, although fruit-trees, poplars, and planes grow wherever there is irrigation, and both wheat and barley grow well on the alluvium. There are many villages along the streams in the mountains north of Tehran, and in the fertile Veramin plain to the south, which is drained towards the Kavir Masileh, lie the ruins of Rai or Rhagae, 5 miles from the present capital. Tehran becomes unpleasantly hot in summer and many of the wealthier inhabitants then retire into the hills to the north, Tajrish and Gulhek being favourite resorts linked by motor-road; the British Minister and his staff reside at the latter.

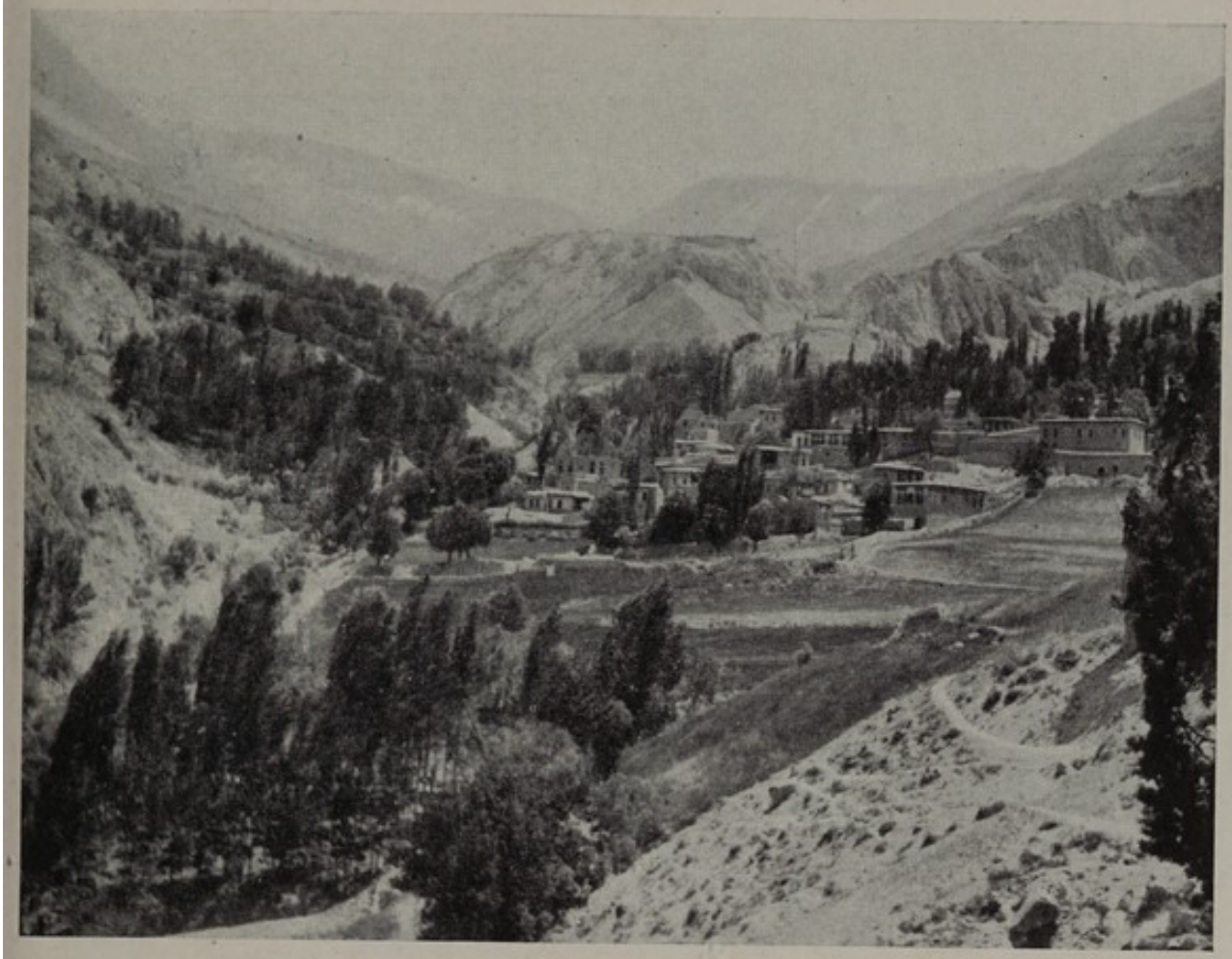
Northern Khurasan (fig. 12)

North of Jajarm the crest of the Elburz chain falls to a col under 5,000 feet above sea-level. Thereafter the mountains have an east-south-east trend and form a sheaf of parallel ranges which present a barrier at the Russian frontier to the Qara Qum desert. This

region of northern Khurasan is defined by the Russian boundary on the north (p. 2), the Hari Rud and Afghan boundary on the east, and by the mountains running through Turbat-i-Haidari on the south. It thus includes that part of the Kopet Dagh which lies within Persia, with its south-east extensions, Kuh-i-Hazar Masjid and Kuh-i-Jangir; the Atrek and Kashaf valleys in which lie the towns of Quchan and Meshed; the Kuh-i-Aleh, Kuh-i-Shah Jehan, and Kuh-i-Nishapur (Kuh-i-Binalud) enclosing these valleys on the south-west; the upper valley of the Kul-i-Mura, the Kuh-i-Jaghatai, and the plains of Sabzawar and Nishapur; and the mountain group around Turbat-i-Haidari. This region is much more arid than the Elburz chain farther west, but the valleys are well populated and fertile, particularly that in which stands the sacred city of Meshed. The total area is nearly 52,000 square miles, and excepting a few valleys on its eastern edge the whole stands above 3,000 feet.

The northern mountains are made up of strips of plateau, often tilted gently north-eastwards or south-westwards and ending at an escarpment sloping steeply to the valley floors on either side. The flanks are nearly straight and are determined by fractures, sometimes visible, but more often hidden by gravel fans piled at the mouth of every gully. Hot springs and the occurrence of earthquake shocks provide additional evidence of rupture. The southern mountains in this region are built largely of volcanic rocks and the alinement of the groups is more capricious, though their sides are sometimes defined by straight escarpments.

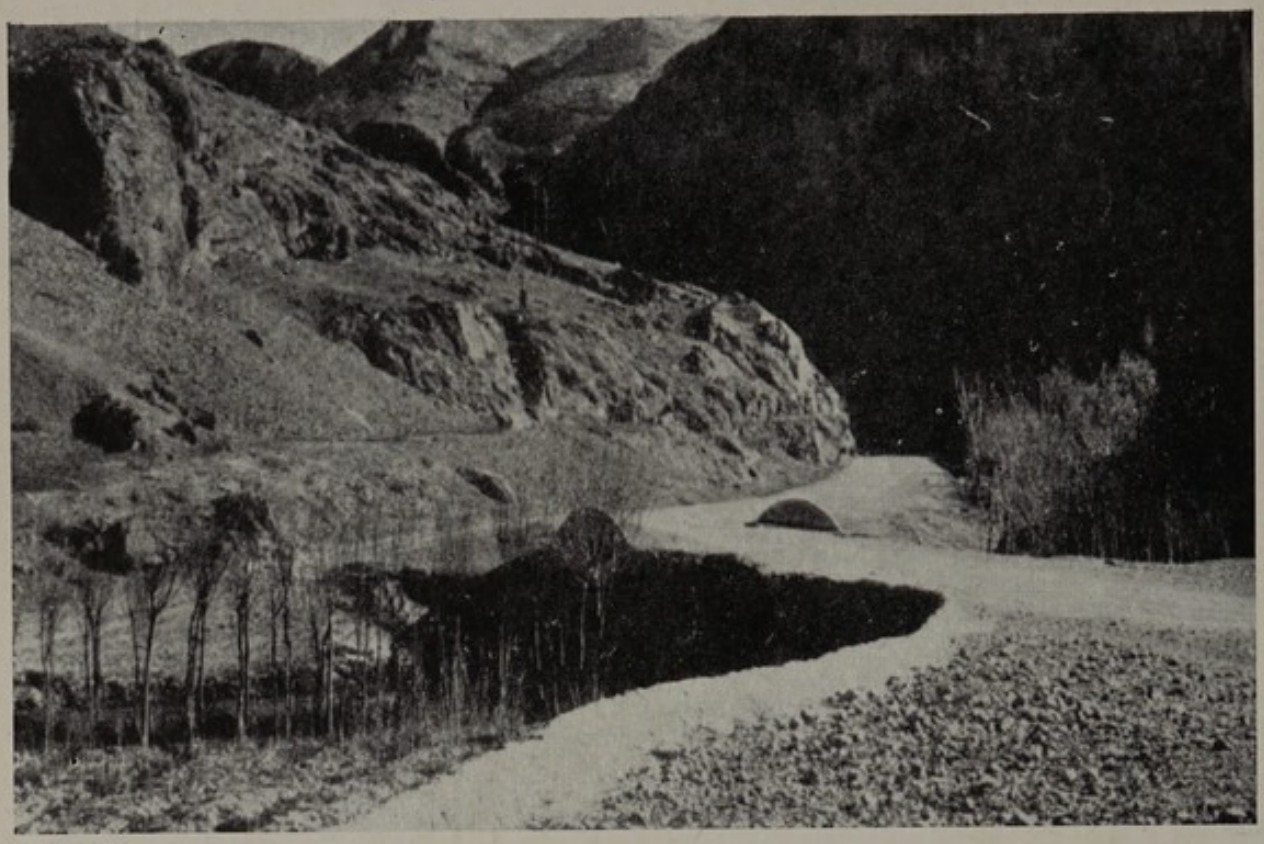
Kopet Dagh with its south-east extensions forms a range about 300 miles long and 40 miles wide. Its ridges stand above 6,000 feet for 250 miles of its length, and the rounded summits reach nearly 9,800 feet in Kopet Dagh, north of Shirwan, 10,400 feet in Kuh-i-Hazar Masjid, north of Chinaran, but less than 6,400 feet in Kuh-i-Jangir, east of Meshed. It is formed of strips of plateau separated by broad valleys in softer rocks, ridges and hollows being roughly alined with the range as a whole. The ridges finger out as spurs at the north-western end mostly in Russian territory, and are cut off by cross fractures; only the two southern prongs are mostly in Persia, and these are so rounded and smooth that horses can be ridden across them almost anywhere. Their tops are snow-covered in winter, green with grass in spring, but bare and brown during the rest of the year; juniper bushes dot the slopes, and there is abundant grass in valleys and ravines, where reeds fringe the streams. Fifty years ago this lower country was full of game—partridge, pheasant, bustard, hare, and



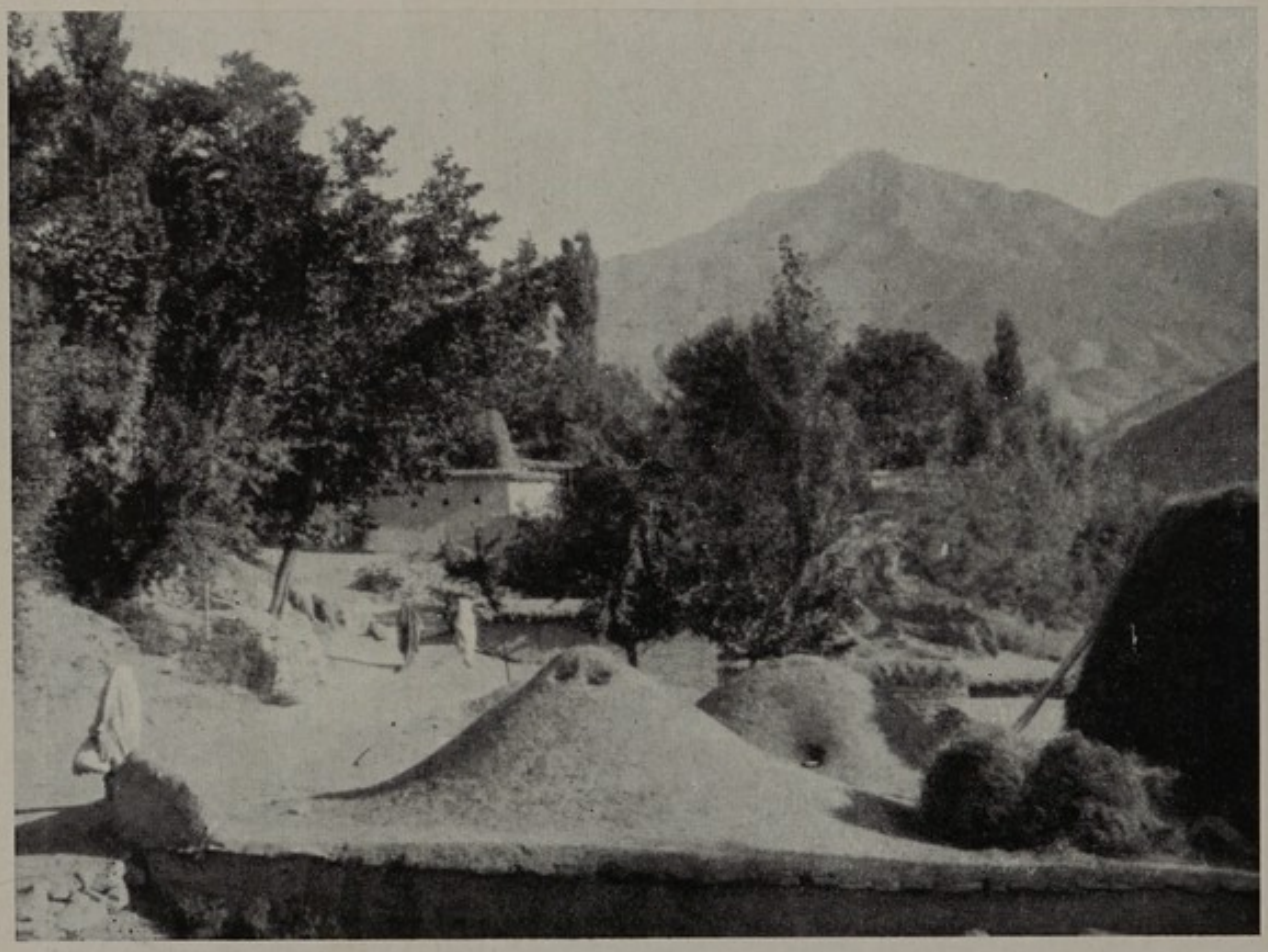
17. *Niak village, central Elburz*



18. *Nava village, 7,000 feet, at the eastern foot of Demavend*



19. *Near Firuzkuh, south-eastern Elburz*



20. *Narun village, on the road between Tehran and Amul*

pig—and tigers were reported among the reeds. The valleys were almost uninhabited, not because of wild animals, but because of the restless Turkoman tribes of the Caspian plains to the west. The upper parts are, however, inhabited by Kurds, transported from their own country in the west by Shah Abbas (p. 269) to act as guardians of the marches; they occupy a few dilapidated villages, such as Katlish and Sar-i-Kamish, north of Bujnurd. Vineyards are cultivated by some and grapes are dried and sold as raisins.

These western prongs of Kopet Dagh tend to converge north of Katlish, and then for 60 miles to the east, where the Quchan–Ashqabad highway crosses the mountains, the range rises higher, much of it being over 8,000 feet. Here the plateau is tilted southwards so that beyond the Russian boundary, which follows the watershed, the northern slope drops rather steeply to the Trans-Caspian plains. The plateau surface as a whole is undulating. The northern mountains are grass-covered during most of the year, and patches are thickly wooded with juniper. There are prosperous villages with walnut, apricot, pear, and other fruit-trees in the longitudinal valleys, the population being predominantly Kurdish. The lower plateau to the south is more bare of vegetation towards the Atrek valley, but here also there are villages in the valleys surrounded by patches of cultivation. Occasionally one of these deeper valleys becomes blocked by landslips. Tracks cross the plateaux and avoid the gorges. The Quchan–Ashqabad road follows a series of cols, considerably lower than the ranges on either side, and crosses easy undulating country. Very little engineering was required to open this route as a cart-road in 1892 and it has since been made fit for motors (photo. 22). It crosses four ridges, the most northerly being over 7,000 feet, and, although occasionally blocked by snow, is open for most of the year.

East of this road the range is known as the Kuh-i-Hazar Masjid. Here the highest ridge is to the south, above the Meshed plain, and the northern side of the mountains has the gentler slope. The Russian boundary abandons the watershed and follows the higher gravel slopes along the north-eastern foot of the range overlooking the Ashqabad desert. The heights of Kuh-i-Hazar Masjid are stony and sterile, though undulating. The cultivated valleys parallel to the range are fairly open, but transverse streams have cut deep defiles with spectacular cliffs. There are few inhabitants except towards the south side of the range. Tracks across the range are difficult, rising and falling some thousands of feet, and sometimes following narrow boulder-strewn ravines.

In the east of the Kuh-i-Hazar Masjid, and detached from the main mass of the range by a col, is the natural fortress of Kalat-i-Nadiri. It is a saucer-shaped plateau surrounded by cliffs on all sides, about 20 miles long from west-north-west to east-south-east, 5 to 7 miles wide, and bisected by a gorge with precipitous rock walls. The protecting escarpment is from 700 to 1,000 feet high and of sandy limestone. There are five 'gates' with difficult approaches by footpaths, but the natural obstacles have in the past been augmented by masonry and brickwork. This natural stronghold withstood the attacks of Tamerlane and only fell after the garrison had been weakened by disease. In 1740 Nadir Quli made it his base and later built his treasury here (p. 279), but it was pillaged after his death. Later the Qajar Shahs maintained a guard at the fortress, in fear of a surprise seizure by the Russians, but recent travellers have suggested that the limited water-supply would not maintain a very large garrison.

The eastern end of this northern chain declines gradually east-south-eastwards and dies out about 30 miles short of the Hari Rud. The crest with its summits is here known as the Kuh-i-Jangir. The 'Golden Road' to Merv and Samarkand crosses it over a neck less than 6,000 feet above sea-level, and has been opened to motor traffic during the last decade.

The *Atrek and Kashaf valleys* together provide a long narrow corridor between the Caspian and the Hari Rud. The western approach along the middle reaches of the Rud Atrek is about 150 miles from Chat to Shirwan. Near the Russian boundary on the west the river crosses the plain in a gorge, caused probably by the lowering of the level of the Caspian Sea, but farther east along the reaches north of Bujnurd the river-bed meanders about 30 feet below a grass-covered terraced plain between hills scantily covered with scrub. Turkoman raiders from the west kept the valley for nearly 100 miles uninhabited for many years, but in recent times first the Russians, and latterly the Persians under Riza Shah's rule, have quelled these unruly elements. Upstream of Sisab the valley widens and is dotted with many villages. Bujnurd, the only place of any importance on the middle Atrek, stands on a terrace at 3,400 feet above sea-level, about 8 miles south of the river. It was for long the fortress of the Kurdish chief entrusted with the protection of the fertile lands farther east against turbulent Turkoman raiders of the Yamut and Guklan tribes (p. 387). It is now a small place of little importance on the motor-road from Bandar Shah and Gurgan to Quchan and Meshed.

The central part of the corridor begins at Shirwan, and includes

Quchan on the upper Atrek and the Rud Kashaf down to Meshed. The watershed between the two rivers is not conspicuous, and all the valley bottom lies above 3,000 feet. Terraces reach to the foot of the mountains on either hand and much of the country is well populated and cultivated; it has the reputation of being the richest district in Khurasan. The abundance of ruins is remarkable, and is partly caused by successive waves of invasion, partly by disastrous earthquakes, and partly by the custom of bygone rulers of perpetuating their glory by erecting new towns rather than by improving those in being. Quchan was wrecked by earthquakes four times in forty years, and after a particularly violent shock in November 1893 the bulk of the townspeople moved to a new site 8 miles farther east. The remnant which stayed behind lives in primitive single-storied houses made out of timber from the ruins.

Ruins, towers, and villages are numerous from Quchan eastwards, particularly near Meshed. The ruins of Tus (photo. 21), forerunner of Meshed and birthplace of the poet Firdausi, are about 15 miles north-west of Meshed. Much of the grain grown in Persia comes from this valley. Meshed itself is famous for the mosque and shrine of Imam Riza (p. 328) and consequently is a place of Shia pilgrimage; it also contains the site of the tomb of Harun ar Rashid. The capital of the Persian Empire during the reign of Nadir Shah (1736–1747), it is now in population the fourth city in Persia. It stands just above 3,000 feet at the eastern end of this fairly flat section of the corridor; eastwards the valley falls to the Hari Rud, 100 miles distant. Compared with most towns in Khurasan, Meshed is fortunate in its moderate climate; a little snow may fall in winter, and fairly high temperatures may occur in summer, but the extremes are not excessive.

The mountains enclosing the Atrek–Kashaf corridor on the south comprise three ranges with many local names, but are generally shown on small-scale maps as Kuh-i-Aleh (or Ala Dagh), Kuh-i-Shah Jehan, and Kuh-i-Binalud (or Kuh-i-Nishapur). Little is known about the Kuh-i-Aleh, except that its north-western end is wooded with oak; that it rises rather steeply from the terraces flanking the Atrek valley; and that fractures have ruptured the strata near the lower slopes. Much of the crest is over 8,000 feet and is snow-covered for several months in winter. Juniper is generously scattered over the southern slopes. Considerable spurs project northwards to the Atrek west of Bujnurd, the range falling to an easy pass, Kutal-i-Siah Khaneh (6,300 ft.), but eastwards the front is straight and almost spurless, and the range maintains a height of over 8,000 feet for some 30 miles.

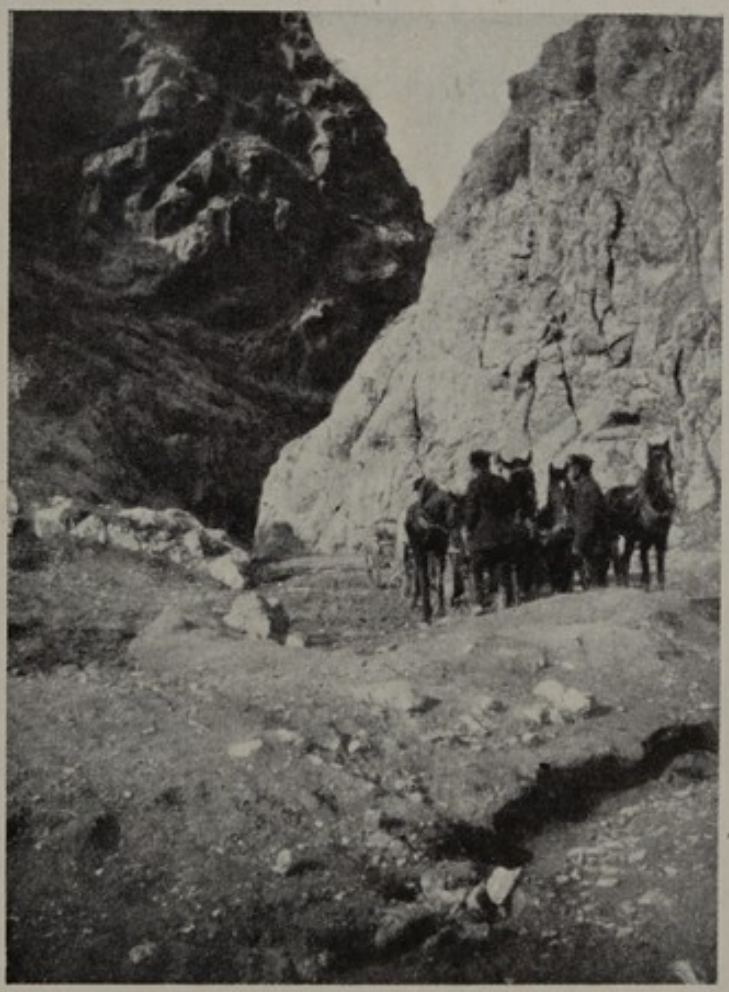
Kuh-i-Shah Jehan rises from a col at the east end of the range and then sinks gradually to a desolate undulating upland, west of Radkan, which forms a flank to the Kashaf valley. Kuh-i-Binalud, overlooking both Meshed and Nishapur, is much better known. It is about 80 miles long and reaches just over 10,000 feet at several places. The crest is formed by an undulating plateau inclined to the north and deeply scored by gullies discharging north-eastwards. On both sides, but particularly on the south, the flanks fall steeply to the edge of the plains. The plateau is stony and bare in summer and autumn, snow-clad in winter, but grass-covered in spring when tribes move up with their flocks for a month or two. The lower reaches of the gullies, from 4,000 to 6,000 feet, are clothed with almost continuous gardens and orchards, and the shady tracks along them are in sharp contrast with the glare from which the rest of the region suffers. Above 6,000 feet the fruit-trees are gradually superseded by willows and brambles, and the upper courses of the streams, usually dry, are bare except for occasional shrubs. The shady track from Nishapur over the range by the Darrud pass and through Jagharq is much used in summer by travellers and pilgrims, who prefer it to the sun-scorched motor-road which crosses many of the lower spurs at the south-eastern end of the range. Excepting the seasonal nomads who graze their flocks in spring, the population is concentrated in villages lining the gullies on the north-eastern slopes.

South of the Kuh-i-Aleh range and north of Kuh-i-Jaghatai is a nearly rectangular area about 80 miles long and 50 miles broad. Two main spurs from the western end of Kuh-i-Binalud project into it from the east, the Bam and Safiabad valleys being separated by the northern spur, and the Safiabad and upper Juvain valleys by the southern. Accumulated debris from the mountains fill the hollows between these spurs and other isolated hills, and these tongues of debris unite westwards to form the plains of Isfarain and Jajarm. Villages are numerous along the foot of the northern hills where water is locally plentiful. The large village of Bam lies in the northern valley close to the foot of Kuh-i-Shah Jehan; Mianabad with about 700 houses is the largest of a number of villages in Isfarain, and stands in a fertile re-entrant between Kuh-i-Aleh and Kuh-i-Shah Jehan; Sanghas, 20 miles farther west, is an oasis exposed to wind; Jajarm is near the lower ridge which connects the Elburz chain to the Kuh-i-Aleh, its rather scanty water-supply being used chiefly for the irrigation of cotton.

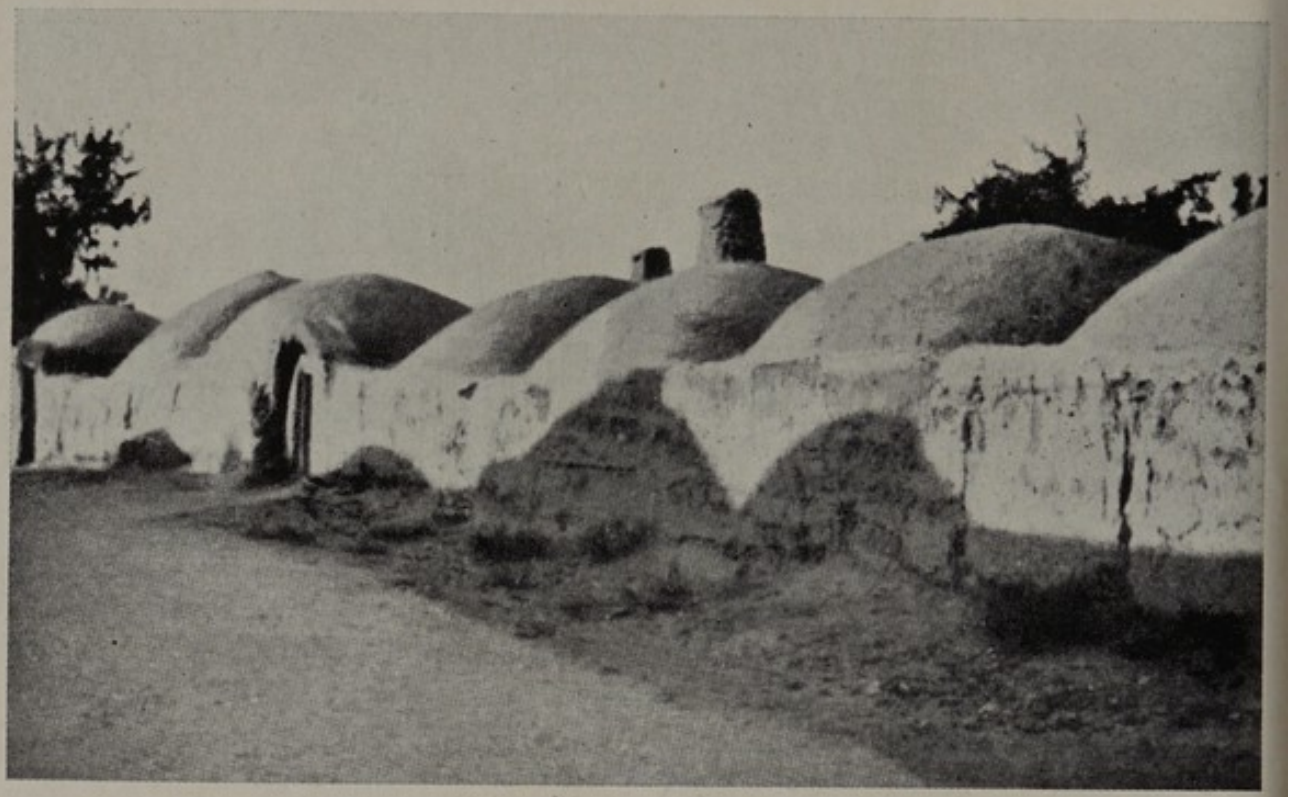
South of the Bam valley, hamlets like Safiabad on the Surkh Ab



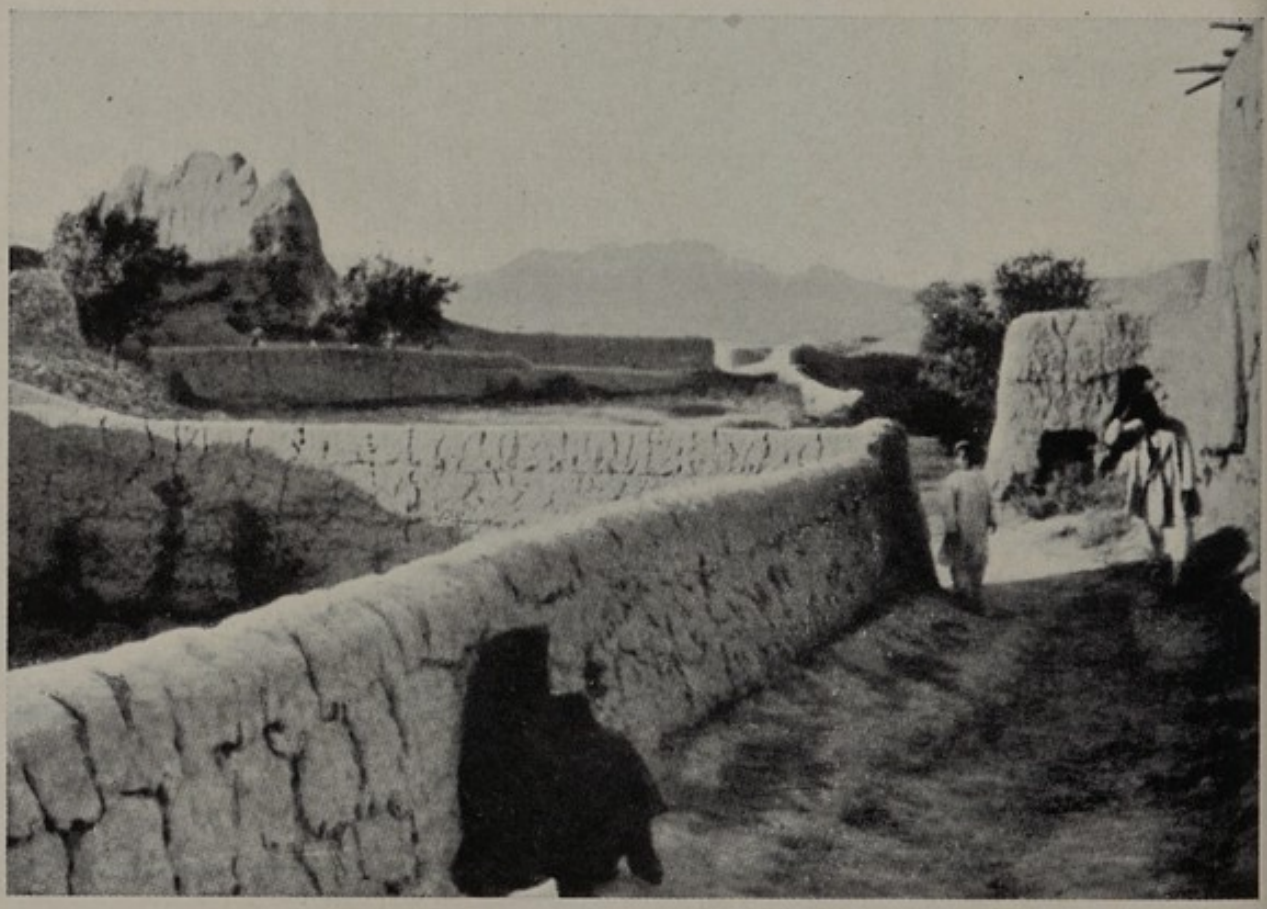
21. *The Meshed plain at Tus*



22. *Defile on the Meshed-Ashqabad cart-road before the construction of the motor-road*



23. *Khairabad village, Shaikh Jam valley*



24. *Typical village street near Turbat-i-Shaikh Jam, Northern Khurasan*

are less flourishing, but the long open Juvain plain is once more dotted with villages, each with its surrounding ring of gardens, and many with the ruins of their predecessors or of forgotten towns near them. The debris-built plains filling these wide valleys slope gently westwards, and south of Sanghas the soil becomes very saline and forms a belt of sterile *kavir* (p. 88). Beds of gypsum and salt north of the Juvain valley have contributed to this salinity, and the main stream, flowing in a bed with steep banks 20 feet below the plain, also becomes saturated with salt. *Qanats* (p. 424) are used in the lower part of the valley where the river is salt, but higher upstream the villages are directly dependent on the river for their water-supply. The railway to Meshed is being built along this valley (p. 576).

The Kuh-i-Jaghatai forms the southern boundary of these plains for 80 miles and is alined nearly east and west. The range is some 4,000 feet above the plain at its western end, but only about 2,000 feet above it in the east. The hills are little known, though skirted on the south by the highway from Tehran to Meshed; but they seem to be composed largely of sheets of volcanic rocks, darker in colour and harsher in aspect than the shale, sandstone, and limestone which form the bulk of the northern mountains. In the rolling country between the eastern end of Jaghatai and southern spurs of Kuh-i-Binalud are the famous turquoise mines of Madan (p. 466).

South of the Kuh-i-Binalud and Kuh-i-Jaghatai is a broad open plain, the upper basin of the Juba Rud which feeds the Great Kavir (p. 91). This plain falls gently westwards from about 4,500 feet above sea-level near Sharifabad, about 20 miles south of Meshed; its northern edge under Kuh-i-Binalud is fringed with cultivation and there are many villages; southwards it is at best only very sparsely inhabited and sand accumulates into dunes. West of the Juba Rud (Kul Sabzawar) and south of Mazinan, a dilapidated village on the main Tehran–Meshed road at the foot of the Kuh-i-Jaghatai, there is an area of *kavir*, at least 40 miles long and 5 broad (p. 93), although, as at Sanghas, this is crossed by a saline river. Two towns of historical interest, Nishapur the birthplace of Omar Khayyam, and Sabzawar once a flourishing market, are still the chief settlements along the northern edge of the plain. Both stand amidst extensive ruins left by conquerors, earthquakes, and apathy. Other hamlets and villages, graded in size according to the amount of water available, form a line of oases through which runs the historic highway from central Asia to western Persia.

The Kul Sabzawar is difficult to cross on account of its bed of slimy mud and its steep banks, often 20 feet high. Its water, extremely salt except when in flood, eventually reaches the Great Kavir. South of the river the plain is about 30 miles wide and rises gradually to the Kuh-i-Surkh, a range about 150 miles long from west to east, with steeper southern slopes falling to the valley of Kul Dastigan, in which lies Turshiz (Kashmar). In the gullies which break through the Kuh-i-Surkh there are fruit and vegetable gardens; beyond them is a sterile belt, but to the east of Turshiz there are villages with cultivation reaching to the small town of Turbat-i-Haidari, on the great eastern highway of Persia.

North-east of Turbat-i-Haidari and about 20 miles south of the village of Fariman, the volcanic rocks of Kuh-i-Surkh with their east–west trend impinge against the whale-back mountain Kuh-i-Bizak, and here the more familiar direction of the Persian mountains, from north-west to south-east, is again encountered. This eastern section of the Kuh-i-Surkh is a high undulating plateau over 7,000 feet in places, snow-covered and desolate in winter, locally green and not unattractive for a brief spell in spring, bare, sun-baked, and windy in summer.

The long narrow dome known as Kuh-i-Bizak rises from the rolling uplands south of Meshed and is about 70 miles long. Its summit, about 9,300 feet above sea-level, is at the south-eastern end where the range is broadest. On either side there is an open corridor between Persia and Afghanistan, along the Jam valley on the north-east side and over the Bakharz plain on the other. Both slope gently downwards from the upland at 5,000 feet on the north-west to the dreary lowland at about 2,400 feet along the Afghan frontier. Cultivation is limited to the few places where water is available for irrigation, and gardens are generally hidden away in small gullies in the mountain flanks, where the people live in huts. A sprinkling of shrubs relieves the bareness of the lower slopes. The main road from Meshed to Herat in Afghanistan follows the northern of the two corridors, through Fariman at the north-eastern entrance and Turbat-i-Shaikh Jam near the south-eastern end of the range (photo. 23). A low col at Kaleh Minar south-east of Fariman links this route with that by the Bakharz plain.

The Bakharz plain is enclosed on the south-west by the Kuh-i-Khaf. The southern end of this range has been a favourite haunt of bandits. It runs for 50 miles north-westwards from near the Afghan boundary, reaching 7,000 feet in a few places, and then bends west

broadening to a hummocky upland as it approaches Turbat-i-Haidari. West of this place it loses height and forms rolling hills enclosing the Bijistan Kavir (Kavir-i-Namak) on the north (p. 93).

II. The North-western Provinces

This region includes the whole of Persian Azerbaijan and most of Ardalan and Khamseh (fig. 13). The land-forms are the result of vigorous erosion acting on a fractured plateau, large blocks of which have sunk. The most important of these is the extensive basin of Urmia; the fertile lowland of Khoi is another but smaller. But most of the remainder is still a plateau with a high undulating surface, unlike the rest of Persia, and with much of its drainage slotted deeply in it. As a whole the plateau is tilted gently downwards from south-west to north-east; the higher edge is extraordinarily cut up and affords magnificent mountain scenery, most of it just beyond the Turkish and Iraqi boundaries, though Persia also has a small share of these wild landscapes. The north-eastern edge falls rather abruptly to the low ground of the Moghan steppe. Much of the region is a dreary stone waste, bare in summer and snow-clad in winter, but the depressions and open reaches of the river valleys present a cheerful contrast of bright green cultivation and darker orchards surrounding the towns and villages. Superimposed upon the ruined plateau stand the great cones of three volcanoes: Ararat (16,946 ft.), the giant, in the extreme north-west; Savalan (*c.* 14,000 ft.), in the north-east; and Sahand (12,138 ft.) in the centre, just east of Lake Urmia. Thus the land-forms of this region are much more like those of eastern Turkey than those of the rest of Persia. The most important town is Tabriz, which stands at the northern foot of Sahand.

The area is defined on the north by the Russian boundary which follows the Aras (Araxes) river from a point east of Ararat to Tazakend in the Moghan steppe 120 miles by river from the Caspian; on the west as far as the Ab-i-Sirwan (Diyala) by the twisting boundary with Turkey and Iraq which mostly follows the watershed between the Euphrates and Van basins on the west and the Aras and Urmia basins on the east. The southern limit lies eastwards along the divide between the Sirwan and the Saidmarreh almost to Hamadan, where it changes direction to north-north-east; the eastern follows the watershed between the Qizil Uzun tributaries of the Safid Rud on the west and those streams which drain to the inland basins of



FIG. 13. *The North-Western Provinces of Persia. Heights in feet. Layers stippled at 5,000 and 10,000 feet. The south-eastern boundary of the region is shown by a thick broken line; boundaries between sub-regions are dotted*

central Persia; it is continued by the Talish hills. Thus the region is bounded by watersheds on all sides except on the north and at a few places on the west where the headwaters of certain streams are cut across by the international boundary: the head of the Sari Su near Ararat and that of the Kotur Chai fall within Turkish territory, and both the Little Zab and the Ab-i-Sirwan drain considerable areas inside Persia before entering Iraq.

The whole region covers rather more than 60,000 square miles and may be subdivided conveniently for description into four parts: (*a*) the Aras basin, (*b*) the Urmia basin, (*c*) the Little Zab and the Sirwan basins, and (*d*) the basin of the Qizil Uzun or upper Safid Rud.

Aras Basin

The Aras basin in Persia occupies the country on the right bank of the river as far as the watershed to the south, which keeps remarkably straight for a natural feature, slightly south of east. This watershed starts high up at the Turkish frontier at about 10,500 feet and passes between Khoi and Dilman, where within a few miles of Lake Urmia and about 1,000 feet above it there are two low cols. Then the Mashu Dagh stands up as a high barrier for 40 miles to reach 10,000 feet before plunging down to the important pass (*c.* 6,000 ft.) between Marand and Sufian, over which both the railway and the motor-road between Tabriz and Julfa on the Aras have been constructed. The Qara Dagh highlands occupy the next hundred miles to the east; the divide keeps close to the southern edge and along a southern prong which at its end forms the base for the huge cone of Savalan. The radial drainage from this volcano deflects the watershed in a southward sweep to enclose the Qara Su, the most easterly tributary of the Aras, near the head of which stands Ardebil.

The Aras basin encloses about 15,540 square miles. It is made up of the plateau between Ararat and Dilman in the west and of the Qara Dagh massif, 50 miles wide, between Tabriz and the Aras. The Aras valley, from the frontier near Ararat downstream to the head of the Julfa gorge, and the Khoi–Marand and Ahar–Ardebil troughs are all formed by blocks which have been faulted and dropped downwards below these tablelands. The first forms the natural and historical route into Persia from Turkey; the last two are drained by trenches to the Aras 12 miles above Julfa and near Aslanduz. In each of these lowlands cultivation is undertaken with the aid of irrigation and supports a considerable population living in grouped or scattered villages. The green fields, the orchards, and the rows

of poplars and willows lining the irrigation ditches give to these villages an aspect of prosperity. The plateau, on the other hand, is monotonous and the journey across it tedious. The prospect near Julfa, with the squalid village near the river's edge and the Aras gorge above, where contorted ribs of rock with steep trails of rubble reach down to the river below, is rugged and barren. The lowest land of all borders the Aras downstream of Aslanduz. This is the semi-desert Moghan steppe which is uncultivated and provides only seasonal grazing for cattle.

Julfa on the Aras, Maku south of Ararat, Khoi and Marand—which are large aggregations of several villages amidst their fields—and Ardebil in the east, are the chief settlements. All except the first are market-towns for the crops of the neighbouring oases. These comprise tobacco, cotton, opium, cereals, and a certain amount of dried fruit. The population is mostly Turkish in origin and is sedentary except in the Moghan steppe, but elsewhere also the village shepherds roam the plateau with their flocks.

Urmia Basin

The Urmia basin has an area of about 19,900 square miles and is defined on all sides by watersheds. Those on the north and west have already been outlined; the southern and eastern are less easy to locate, particularly where they adjoin the basin of the Little Zab in the south-west and the headwaters of the Qizil Uzun in the south-east, enclosing the Sauj Bulagh, Tatar, and Jaghatu rivers. The eastern watershed runs north to the volcano of Sahand and turns east to include the drainage of the Aji Chai.

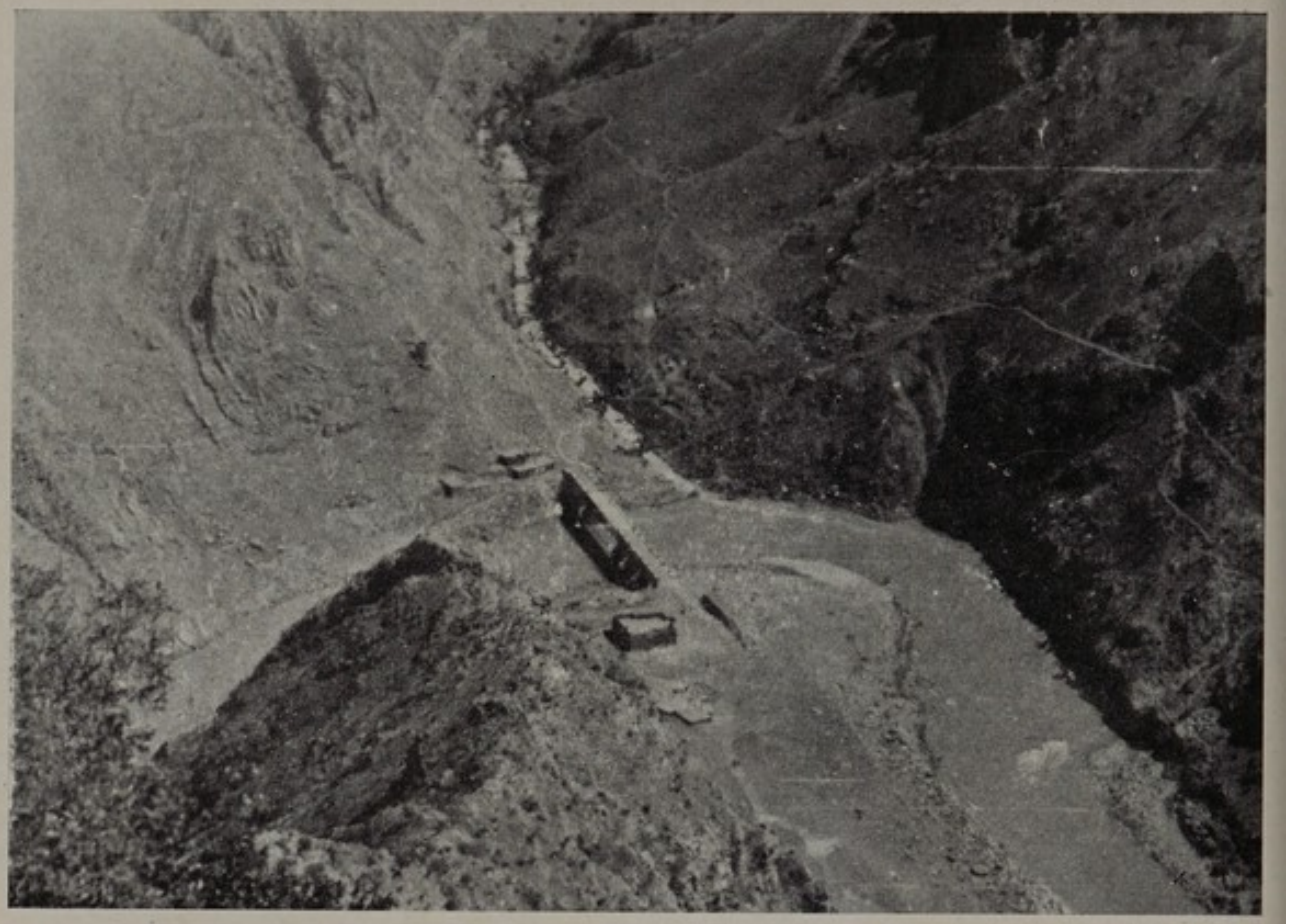
Urmia is the name best known to geographers and historians for the lake which collects all the waters of this basin, though for long it was called the Darya Shahi. More recently, since Riza Shah changed the name of Urmia town, the lake has been officially known as Daryacheh-i-Rizaieh. It stands 4,250 feet above sea-level, is nearly 90 miles long from north to south, and averages 30 miles in width. It is seldom more than 15 feet deep, the slope of the shore being almost everywhere very gentle, so that the small rise and fall caused by replenishment and evaporation causes the shoreline to vary. Thus the area is considerably greater in summer after the winter rain and the spring thaw than in autumn. A belt of sterile salty mud of varying width intervenes between the water's edge and the broad landward belt, where riverain fans and relics of high-level terraces of ancient, larger, and fresher lakes alternate with promon-



25. *The Aras valley about 10 miles above Julfa*



26. *View eastwards down the Aras valley about 3 miles above Julfa*



27. *Pul-i-Duab. Bridge over the Sirwan river carrying the road to Nausud*



28. *Avroman Dagh from the south*

tories built of white limestone and a veneer of red clays. This belt is mainly fertile, and where it can be irrigated it is intensively cultivated. Occasional towns and many villages are dotted about, looking from a distance as though they were standing amidst fields and woods, though this agreeable aspect usually results from the foreshortening effect of trees which line the irrigation ditches and the orchards planted on the outskirts of settlements.

The western wall of the Urmia depression stands back about 20 miles from the shore of the lake and is relatively steep. The streams from this side are reasonably well fed by winter rain and snow and by springs. Few survive the demands of irrigation at most seasons of the year and so have little surplus water to discharge into the lake. Each has a number of villages dependent on it. Dilman on the Zola Chai is the largest in the north-west. Urmia (Rizaieh) on the Bardesur Chai is a small town which gained some prominence in Europe on account of its Christian missions and the subsequent massacres. Like so many Persian towns it has many lanes with high mud-brick walls which make for dust, mud, and squalor, but Urmia has more orchards than most and appears attractive from the distance, the few brick houses giving it an unusual air of prosperity. Ushnu is the most pretentious village in the south-west, but is only a small place, standing on the Gadar Chai about 20 miles from the edge of the lake.

The southern part of the Urmia basin is a well-watered plateau drained by the Sauj Bulagh Chai, Tatar Chai, and Jaghatu Chai, rivers which are about twice the length of those draining the western wall and with much larger catchments. Spring grasses are more abundant on this plateau than on the drier uplands farther east, and provide grazing for numerous sheep and goats kept by the inhabitants of hamlets strung along the watercourses. Cultivation is fairly widespread along the lower reaches of the valleys, where the number and wealth of the villages are determined by the volume of water available for irrigation; it is more sporadic higher up the valleys where it depends directly upon rainfall. Most of this district lies in Persian Kurdistan. Mehabad (Sauj Bulagh) and Saqqiz are large Kurdish villages. Downstream Kurdistan ends vaguely (p. 366). Sain Qaleh and Miyanduab, occupied by tribes of Turkish origin, are small towns. Below Miyanduab the Jaghatu and Tatar combine in building a large fertile fan, which, however, merges northwards into the belt of salt-caked mud fringing the lake. Eastwards of the Jaghatu Chai spring grass is much sparser on the plateau because of a lower rainfall;

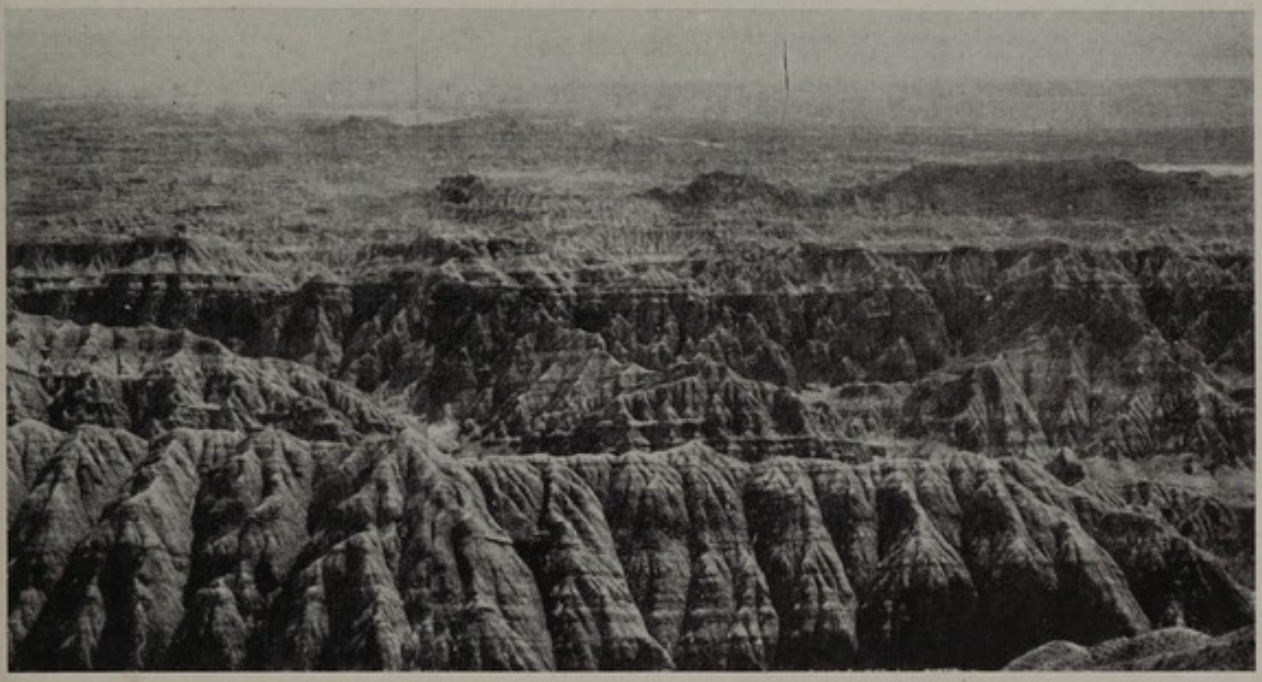
the country quickly dries up and the aspect becomes dreary and monotonous.

The eastern part of the Urmia basin acquires importance because of the town of Tabriz and its historical communications (p. 535). This district includes the long rectangular catchment of the Aji Chai, the immense cone of Sahand, and small valleys between Sahand and the Jaghatu upland. The Aji is contained between two broad plateaux running east and west nearly 40 miles apart, both relics of the original plateau of Azerbaijan. The rolling landscape between them is mostly coloured red by the soft rocks into which the Aji Chai has dug its bed. In the upper part of its course and in the tributaries the clear waters from Savalan Dagh and Qara Dagh are used for irrigation and watering stock. In these valleys there are therefore many villages. Lower down settlements become less common as the Aji Chai cuts deeper and becomes contaminated with salt and gypsum dissolved from neighbouring beds. These salts accumulate in the lake, which consequently becomes increasingly saline.

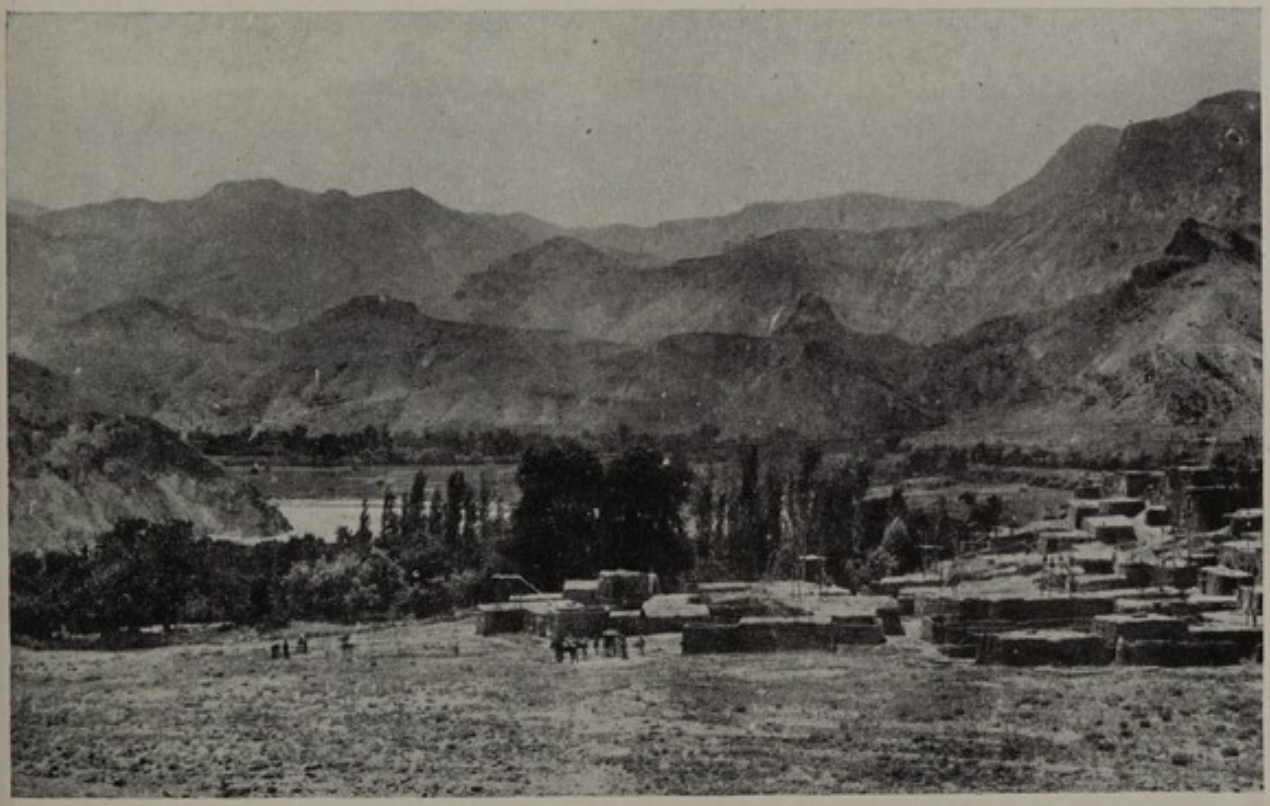
Just as Savalan dominates the upper Aji valley from the north, so Sahand commands the lower valley from the south, with its summit about 30 miles east of the lake often clad with snow. Much of the lower slope is dotted with scrub. The streams which drain it form a radiating pattern, those on the north being collected by the Aji Chai, those on the south escaping to the lake at its south-eastern embayment; only a few in the south-eastern quadrant feed the upper tributaries of the Qizil Uzun. Maragheh stands on the Sufi Chai, one of the channels draining into the south-east corner of the lake. It is a town set amid luxuriant gardens and orchards, and is famous in Persia for the ornamental stone, like banded and translucent marble, which comes from its quarries.

The northern watershed is so close to the lake that there is little to describe on this side of the basin. There are no large streams and few villages. Sufian lies close to the divide on the main road to the north; Sharif Khaneh serves as a small port at the edge of the lake, and is connected by branch-line to the railway between Julfa and Tabriz.

Lake Urmia itself is intolerably salt. No fish can live in it, and though it is less concentrated than the Dead Sea, the swimmer cannot sink. The low shores are deep in foul black mud, and the sun of midsummer so heats the shallow water that it becomes almost too hot to wade. There are, however, occasional rocky headlands with a more shelving bottom off shore. A few shallow-draught sailing-



29. *Desolate spurs bordering the Qizil Uzun valley above the Qaplon Kuh, south of Mianeh*



30. *Village and cultivation on the lower Qizil Uzun, in the Khalkhal district east of Mianeh*



31. *Tunnel at Dariwar on the Nausud road*



32. *Kuh-i-Waliar, Persian Kurdistan*

vessels ply on the lake, but trade is hampered by the difficulty of landing and discharging cargo. The large island of Shahi is sometimes connected with the mainland by a strip of mud, which even dries up at times and provides a firm crossing. Farther south a group of rocky islands project from the middle of the lake, and on them wild sheep long survived the infrequent visits of hunters.

Throughout the whole basin the climate varies very much with altitude. The heights are bitterly cold in winter and snow-covered for weeks or even months at a time; the depression is more temperate in winter but very hot in summer. Rainfall throughout is relatively liberal by Persian standards.

Little Zab and Sirwan Basins

Parts of the Little Zab and Sirwan basins form two districts of Persian Kurdistan, 1,820 and 4,200 square miles respectively in extent, detached from each other by the deep re-entrant made by the Shalar tributary of the Little Zab, this valley being Iraqi territory. These two districts differ from the rest of north-west Persia and resemble the mountain fringe of Iraq with which they are associated historically. In parts they are well wooded, in others wild and mountainous, where the tilted edge of the plateau is too high for trees and has suffered from strong erosion.

The two main natural routes from central Iraq into Persia are by the general courses of these two rivers; but the rivers themselves cannot by any means be followed throughout. In the Iraqi foothills the beds are cut in a series of rocky gorges, the depths of which increase as the frontier is approached, and the boundary has been drawn along gorges of both rivers for the very reason that they are almost impassable. The gorge of the Sirwan at Duab below Nausud is 6,000 feet lower than the summits 4 miles away (photo. 27); that of the Little Zab below the confluence of the Baneh tributary is almost as deep. The rivers change direction abruptly in this wild frontier region, at times flowing north-west or south-east parallel to the trend of the ranges in fairly open valleys, at others cutting across the mountains in canyons. Upstream in Persian Kurdistan the valleys widen and the landscape becomes more pleasant and downlike, so that in summer they become useful for grazing, but the oakwoods of the lower valleys gradually die out with increasing altitude, the mountain-sides show more and more naked rock, and the hill slopes have only tufts of grass or occasional tufted bushes. The physical obstacles in Persian Kurdistan are not so great as in the Iraqi mountains:

there are few passes over the Kandil Dagh and Avroman Dagh which form the international boundary (photo. 28); but the divide between the Little Zab and the Sauj Bulagh Chai in Persia has been described by one traveller as almost imperceptible.

The limits of the Little Zab basin in Persia are the international boundary on the west and south, and the watershed of the Urmia basin on the east and north; within this area are included the Baneh and Nirvan tributaries in the south. The limits of the Sirwan basin follow the international boundary from near Barda Bara at the head of the Shalar valley on the north to the crest of Avroman Dagh on the north-west. Across the Sirwan the district is bounded by the high ridge of Kuh-i-Shahu to Kala Kura and then by the watershed of the Saidmarreh basin on the south, which is followed for 80 miles. The north-eastern boundary is the divide limiting the headwaters of the Qizil Uzun, the great tributary of the Safid Rud; this divide is not a conspicuous ridge, but rather an array of low hill features. Towards the east of the Sirwan basin plateau prevails; farther west the landscape is open and hilly, where many broad valleys are cultivated in patches with little fields of barley and wheat. Near by are walled hamlets with a few poplars and fruit-trees showing greenery above the sombre brick walls. The rest of the landscape provides grazing for the village flocks, the higher ground serving in summer and autumn, the tributary valleys giving shelter during storm. Mule-tracks link the villages and are easy compared with those in the frontier region farther west. The winter is severe, but parts of the main valleys act as efficient sun-traps. On the other hand, the main gorges, such as that below Nausud, are swept by strong winds.

Baneh and Marivan are the only villages of any size, though there are many small hamlets. Senna (Sinneh) is the only town and is best known from the Persian rugs which are made in the surrounding pastoral districts and bear its name (p. 468). It has long been the headquarters of a Persian brigade charged with the tasks of watching the frontier and of keeping order in these restless parts.

Qizil Uzun Basin

The basin of the Qizil Uzun forms the main catchment of the upper Safid Rud, which finds an outlet through the Elburz to the Caspian Sea (p. 26). It covers an area of about 20,000 square miles. The headstreams collect the drainage of the high undulating plateau, all but bare of vegetation, from the south-eastern quadrant of Sahand volcano on the north to the outlying northern ridges of Kuh-i-Alwand

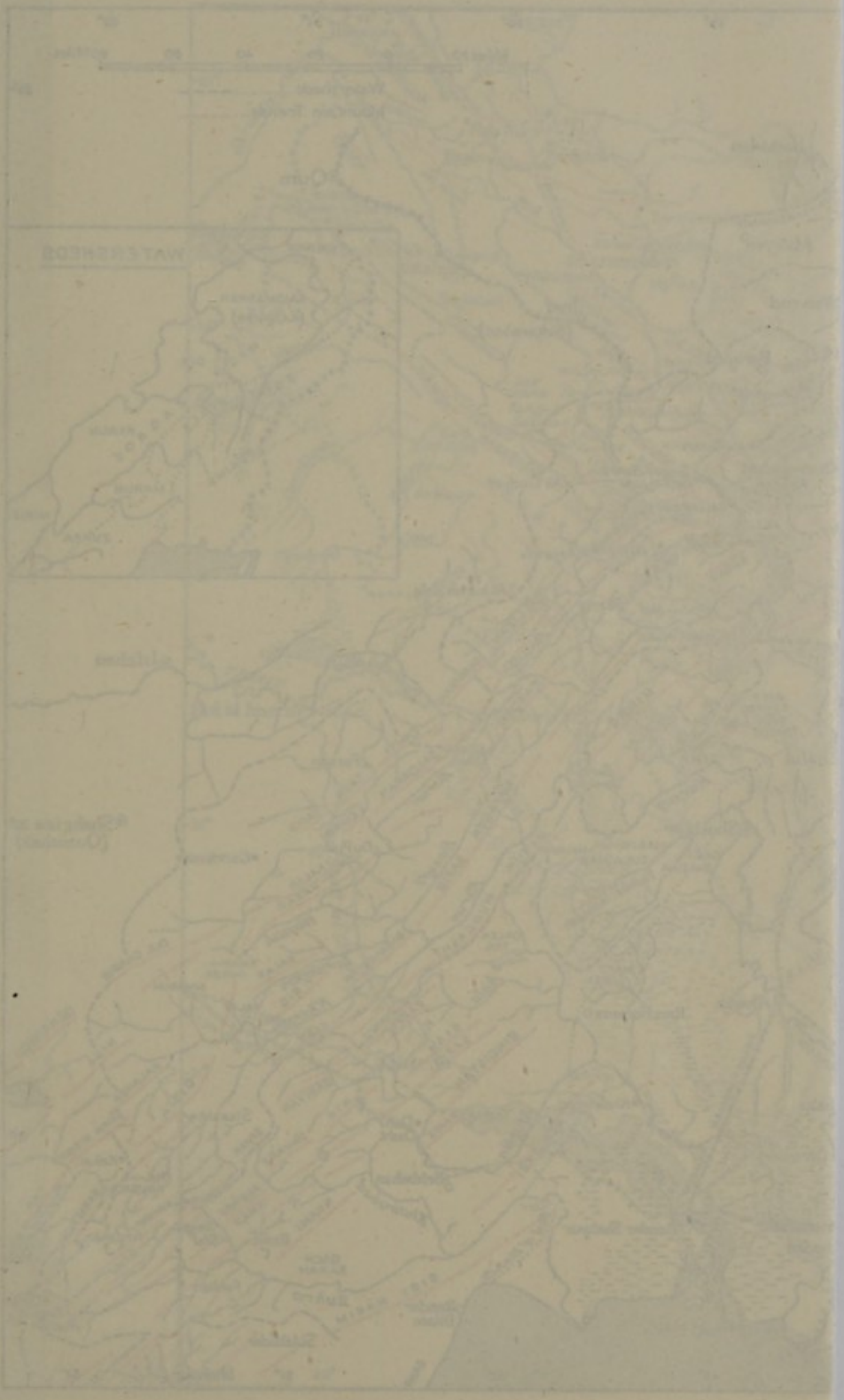




FIG. 14. *North-western Zagros and Khuzistan.*

near Hamadan on the south. The eastern watershed separates the Qizil Uzun basin from the inland drainage system of the Masileh *kavir* or Darya-i-Namak (p. 89). The landscape is monotonous with large areas tinted by a veneer of red rocks, such as are seen in the Tabriz district farther north and also in much of central Persia. The tributary valleys have no marked pattern and are generally broad and shallow as they cross the plateau; along them patches of barley are grown round the small villages. But most of the upper basin, though it affords poor grazing, would be classed as semi-desert steppe or even desert in many lands. The landscape of the plateau is generally treeless except for the occasional fringe of willows which line a watercourse leading to a village, and except in spring the only splash of green is provided by the rushes which skirt the few perennial streams. Snow lies for a spell each winter and early spring, and although there is much diurnal variation in temperature, the climate is not unpleasant except perhaps at the height of summer.

In the north-eastern sector of the basin the prospect is different and plateau no longer predominates. The Zenjan Chai and the lower Qizil Uzun lie embedded in deeper valleys and cease to wander haphazard over a nearly level collecting ground. The trend of the rock folds takes control and marshals the valleys into alinement from north-west to south-east, with hills or even mountains on their flanks. Such chains are cut through at weak spots. Part of the valley, particularly that section below or north-east of Mianeh in the district of Khalkhal, is well settled and cultivated. But much of the country which rises here to prominent mountains, although close to the highway from Tehran to Tabriz, is very little known (photos. 29, 30).

The people living in the few fair-sized villages are mostly Turks, but there is a sprinkling of Persians and Kurds who have crossed the northern or western watersheds. Several mule-tracks traverse the region, and the building of roads presents few difficulties. Bijar is the only town on the plateau and stands on the old mule-road from Hamadan direct to Tabriz; it is small, and, like Senna, has given its name to a particular class of rug woven in the district. The new motor-road from Hamadan to Tabriz takes a longer course, threading through the eastern hills to Zenjan, where it joins the trunk road from Tehran. This important road from the capital enters the basin near the village of Sultaniyeh and, after following the Zenjan valley, passes through the large but rather squalid village of Mianeh. Below Mianeh there is no place of importance along the valley of the Qizil

Uzun until the river is joined by the Shah Rud from the east (p. 37), breaks through the gap in the Elburz at Manjil, and, as the Safid Rud, makes direct for the Caspian Sea.

III. The Zagros Chains and South-west Lowland

This region of south-west Persia includes the basins of a number of rivers draining into the Iraqi lowland or the Persian Gulf and two inland basins with no outlets. The western and southern limits are the Iraqi frontier and the coast of the Persian Gulf; the north-eastern is taken as the watersheds of these basins and is shown on fig. 10. This limit therefore starts at the crest of the Avroman Dagh, above Halabja in Iraq, crosses the Sirwan (Diyala) to the Kuh-i-Shahu and Kala Kura, and then encloses the basins of the Saidmarreh, Diz, Karun, Rud Pulvar, and Rud Shur. The eastern limit runs north from Shah Bandar on the strait of Hormuz through Minab and along the Kuh-i-Zindan, enclosing the basins of the Rud Shamil and uppermost Rud Shur (figs. 14, 15).

This inner boundary is long and sinuous. Well marked in the north-west near the gorge of the Sirwan, it crosses milder country eastwards to the Asadabad pass, 20 miles west of Hamadan, skirts this city on the south by the Kuh-i-Alwand, and then follows the flat-topped hills which, as remnants of ancient plateaux, rise steeply above broad valleys and occasional plains. The northern watershed of the Diz basin also crosses undulating country, but south of Akhureh Bala it approaches the high range of Kuh-i-Zardeh, where the Zaindeh Rud, the river of Isfahan, has extended its catchment, and the water parting is more conspicuous. But the boundary is again over the less prominent hills enclosing the eastern headstreams of the Karun. East of longitude 52°, desiccation has increased to such an extent that, while the Ab-i-Khirsin waters reach the sea westwards by the Karun, those of the Rud Kur are trapped far to the south-east in the shallow muddy lake of Niriz. The north-eastern boundary of this inland basin of Niriz follows the prominent ranges of Deh Girdu and Kuh-i-Bul, but it is less well marked as it bears east to the Quli Khan (Quli Kush) pass on the Shiraz–Isfahan road north of Deh Bid. Again it becomes prominent for 50 miles south-eastwards and as it makes a sharp re-entrant near Arsinjan. Near the lake of Niriz it leaves the hills, crosses the plain near Dehna, and climbs to the mountain-crest near Darab, which it follows to Laizangan. Eastwards it crosses wild desolate country as far as Chashmeh

Safid, the pass on the Bandar Abbas–Kirman road through the Sirjan plain.

The whole of the belt of Persian territory south-west of this watershed is best described, as already mentioned (p. 34), in three strips: the high Zagros chains, the central Zagros foothills, and the lowland plains. The boundaries between these strips are shown on fig. 10. The mountain strip is divided into the chief river basins. This arrangement is summed up as follows (figs. 8, 14):

The High Zagros

(*a*) Sirwan pocket
(*b*) Saidmarreh basin
(*c*) Diz basin
(*d*) Karun basin
(*e*) Marun and Zuhra basins (Kuh Galu)
(*f*) Shahpur basin
(*g*) Mand basin
(*h*) Khamir and Shur basins
(*i*) Inland basins of Niriz and Shiraz

The Zagros foothills

(*a*) Ab-i-Zimkan to Ab-i-Gangir
(*b*) Pusht-i-Kuh
(*c*) The Karkheh to the Diz
(*d*) Lower Bakhtiari country
(*e*) Ab-i-Aala to Bushire

The Plains of Khuzistan

The total area of the region is approximately 142,500 square miles, the length about 800 miles, and the breadth not more than 220 at its widest. The High Zagros as defined above makes up about 106,000 square miles, the foothills 20,200, and the plains about 16,300. The last is sufficiently compact to experience the same type of climate throughout, but the other two divisions are so long and so affected by different conditions at their extremities as to have different climates.

The Zagros in the north-west is much wetter than in the south-east, and Hamadan, being nearly 8° farther north in latitude and 5,750 feet higher, is subject to much lower temperatures than Bandar Abbas in winter. The change from end to end is gradual, but there is a marked difference in landscape if the two ends are compared.

In the north the valleys are wooded and the plains have a seasonal flush of green—a smiling garden compared with the sterile, sun-scorched wastes of the Bandar Abbas hinterland. In the north the main rivers at least are perennial, though many of their tributaries are not; in the south only the largest reach the sea and then are generally little more than trickles of brine in the coastal belt.

The High Zagros

Sirwan Pocket (fig. 14)

Part of the Persian basin of the Sirwan has already been described (p. 53). All that falls into this region is the pocket between the ridge of Kuh-i-Shahu and the watersheds of the Saidmarreh and Alwand, on the left bank of the Sirwan, and a very small district by Nausud on the right (photo. 31), a total area of only about 1,600 square miles. A few massive ranges are alined from north-west to south-east and are cut across by deep crooked gorges, the river valleys widening to straighter troughs between parallel ranges. There is little level ground except near the south-eastern border.

The wildest and most rugged country lies closest to the Sirwan, the gorge of which is carved through the mountains leaving no space near the water's edge for even a foot-path—a tremendous gash with the limestone edges of Avroman Dagh on the north and Kuh-i-Shahu on the south. Below the gorge the Sirwan seems to wander capriciously among mountains which rise to a kind of broken platform 5,000 feet above it. Kuh-i-Waliar, Kuh-i-Makuan, and Kuh-i-Atishgar reach nearly 8,000 feet (photo. 32). Across this high ground the tributaries have cut deeply, but only the Zimkan follows the mountain trend for most of its course. In the upper reaches of this stream near the fair-sized village of Gawareh (Gavara) the country is fairly open, but as it cuts deeper in its lower course it forms a formidable obstacle. The outer rim of this basin is less broken, and in places there are rounded whale-back hills. A sheaf of these plunges downwards below the general level of the plateau near Bazan, one broad dome running south-east for 20 miles towards Nilagha and carrying the watershed with the Saidmarreh much to the east.

The high ground is mostly bare of trees, but the valleys and lower slopes are well wooded with oak. The narrow floors of some of the lesser defiles have been terraced and planted with apricot orchards near hamlets of flat-roofed houses which rise in tiers up the slopes.

Water for these settlements is generally plentiful and often runs in an open channel between the houses. In winter the animals share the houses with the people at night and graze low in the valleys in day-time, but in summer go to the upper slopes 4,000 feet higher. There is little seasonal migration excepting this movement in altitude, because the area was securely isolated from outside up till very recent times. Recently it has been penetrated by one of Riza Shah's strategic roads. This is based on Kermanshah, keeps along the southern foot of Kuh-i-Shahu, drops steeply to the bridge at Pul-i-Duab, crosses to the right bank of the Sirwan, and climbs to Nausud, where it ends abruptly (photos. 27, 31). This Kurdish village is ranged in tiers on the south-western slopes of Avroman Dagh, its stone fortress looking across the border into Iraq.

Saidmarreh Basin (fig. 14)

The Saidmarreh and its tributaries drain the largest of the basins of south-west Persia. In its lower reaches in the plains it is known as the Karkheh. It no longer reaches the sea but empties into extensive marshes on both sides of the Iraqi boundary, though in the past it assisted the Karun to build the delta barrier across the head of the Persian Gulf. The mountain basin in the high Zagros covers about 16,300 square miles, much of this area being comparatively open and comprising several high-level plains. These form the natural route of entry to the inland basins of Persia from Iraq, but tribal restlessness caused the Trans-Iranian railway to be taken by a more direct though much more difficult route through the Diz basin. Nevertheless, two important motor-roads now traverse the Saidmarreh basin: from Baghdad through Khanaqin and Qasr-i-Shirin on the frontier, and by the Tak-i-Girreh pass, Kermanshah, and Hamadan to Kazvin; and that from Khurramshahr and Ahwaz through Dizful, Khurramabad, Burujird, and Malayer, and thence either to Hamadan or to Qum (photos. 33, 34; fig. 16).

The mountain basin has two different major types of landscape: that north and east of Kermanshah, where the two main branches of the river are known as the Qara Su and the Gamasiab; and the rest of the region to the south, between the Kuh-i-Charmi—the range south of Kermanshah—and the Kabir Kuh, where the river enters the foothill zone and becomes the Karkheh.

The headwaters of the Saidmarreh gather on the flanks of the rather subdued mountains forming the Sirwan watershed and of part of the southern rim of the Qum-Masileh basin (p. 89), but the small

streams soon begin wandering across an open upland plain. There are two such expanses of plain in the north, partly separated by a chain of massive mountains which is a continuation of the Kuh-i-Shahu. The Qara Su collects the drainage in the north-west from the red plateau near Bazan and is then augmented by springs in the mountain front near Ruvansir and by a southern tributary passing through Mahidasht. A left-bank affluent, the Ab-i-Razawar, rises among rolling hills near the road to Senna, flows across the northern plain near Kamyaran at about 5,000 feet, and cuts through the chain in a gorge 10 miles long and at one point less than a mile wide, emerging on to the southern plain and joining the Qara Su 7 miles north-west of Kermanshah at about 4,700 feet above sea-level. The Qara Su then meanders sluggishly across the Kermanshah plain until 6 miles beyond the town it enters the hill region to the east-south-east.

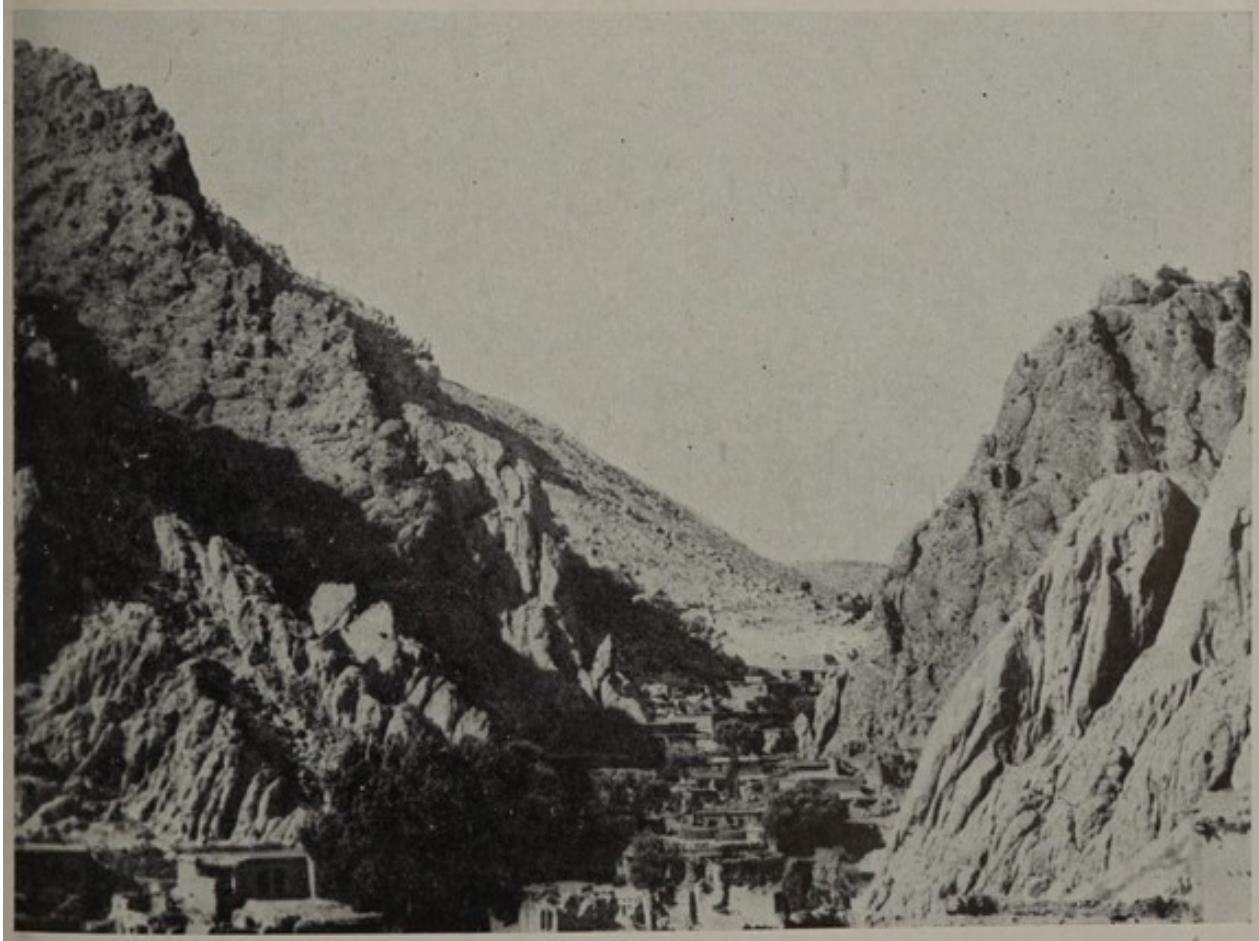
A corridor of plain unites the Kermanshah plain northwards with that of Chamchamal, and from it rise the magnificent cliffs marking the eastern end of Kuh-i-Parau which towers nearly 6,000 feet above. On these cliffs, close to a bountiful spring, are the famous Bisitun rock-carvings (p. 231). The Gamasiab waters the plain to the east and north; one branch comes from the hills to the north and enters the plain through a gravelly gorge, but the main stream has tributaries from Malayer and the Kuh-i-Alwand south of Hamadan and from Kuh-i-Nakarakhaneh, south-west of Nihavend. The latter limestone range is the eastern counterpart of Kuh-i-Parau and its southern face has a similar series of spectacular cliffs dominating the plains of Khava and Bunshira.

The Qara Su and Gamasiab converge south of Bisitun and unite amid gentle grassy hills 18 miles south-east of Kermanshah, the scene of many skirmishes between Russians and Turks between 1914 and 1917. Before their junction the two rivers occupy shallow gorges displaying many sharp bends notched into the red flint; below the junction the river, now the Saidmarreh, is joined on the north-eastern flank of Kuh-i-Charmi by another tributary which has drained the Khava and Bunshira plains. This tributary also carries the discharge from the large springs of Harsin, where were found many of the remarkable Luristan bronzes (photo. 35; p. 226).

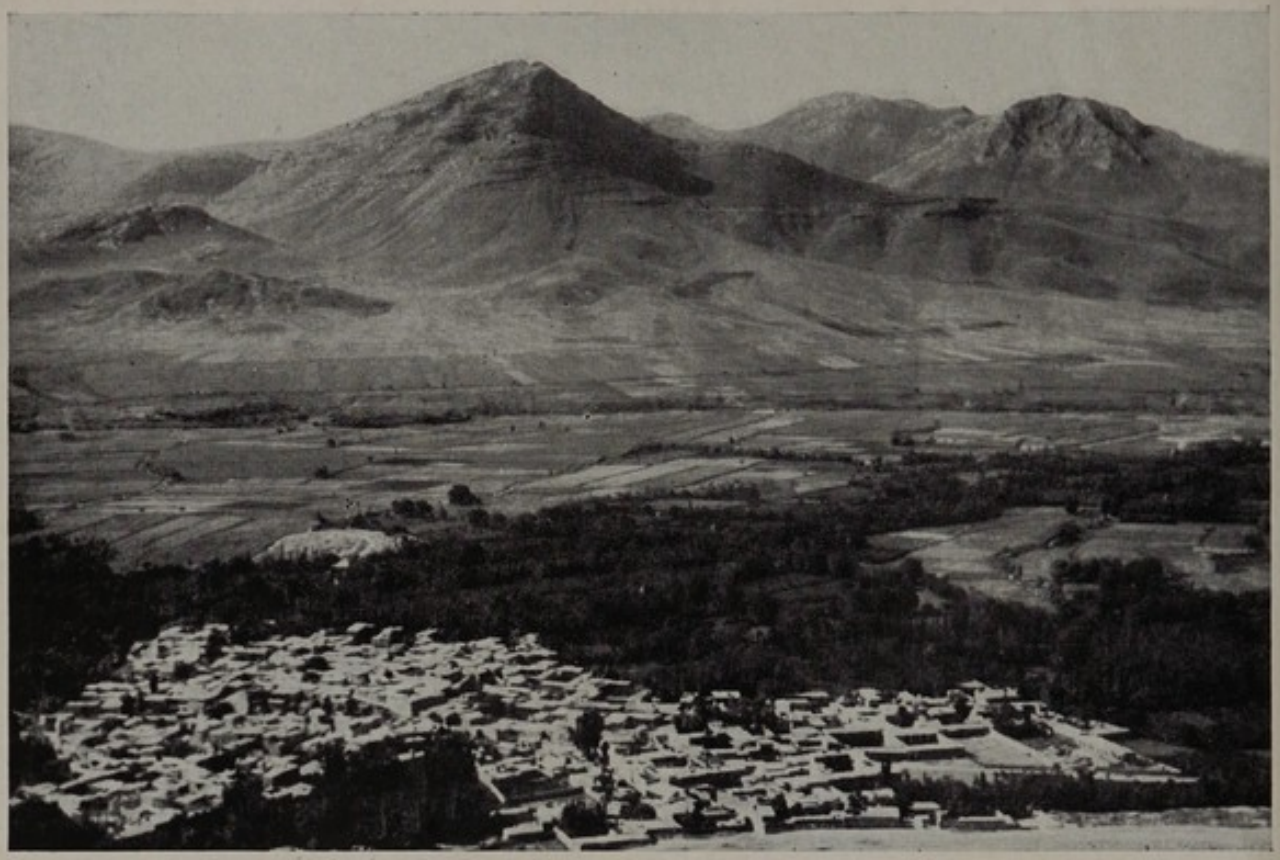
Almost immediately below this junction the landscape changes. The plains and hills come to an end and the river begins to cut a passage through a succession of mountain ranges like petrified waves, long high domes of rock sloping down to open valleys. The mountains and valleys are all arranged from north-west to south-east nearly



33. *Road climbing the Tak-i-Girreh pass from the Zagros foothills*



34. *Karind village near the Tak-i-Girreh pass, on the westernmost headwaters of the Saidmarreh*



35. *Cultivated plain at Harsin, Saidmarreh basin*



36. *View north-west from Kuh-i-Kuljar, overlooking the Ab-i-Jabar tributary of the Saidmarreh, with Kuh-i-Barazard in the distance*

parallel to each other. There are irregularities: all the domes are not the same height; all do not sink at their ends in the same neighbourhood, so that their ends often overlap; all are not perfect, some of the rock layers having been removed by erosion, leaving ridges and cliffs often on the crests of the domes; some are crowded together and have become deformed. But the general pattern is very striking, and can be traced south-eastwards beyond the Saidmarreh basin, and north-westwards into Kurdistan, though in the Saidmarreh basin it is most regular and the folds are generally less crowded and deformed (photos. 36, 43).

The river and its main tributaries cross this country in a strange fashion. They neglect the broader parallel valleys between the ranges and cut through many of the finest mountains in narrow defiles, sometimes across the highest parts of the range. Often the gorges display great loops recalling the familiar design of meanders in lowland country. Only when the river reaches the southern edge of the mountain zone is there a notable exception, and here the Kabir Kuh, an attenuated dome 95 miles long, forms a barrier which the river has not breached (photo. 53). The Saidmarreh is deflected and held in a trough along its north-eastern flank for 70 miles and only escapes where the range plunges downwards in the south-east.

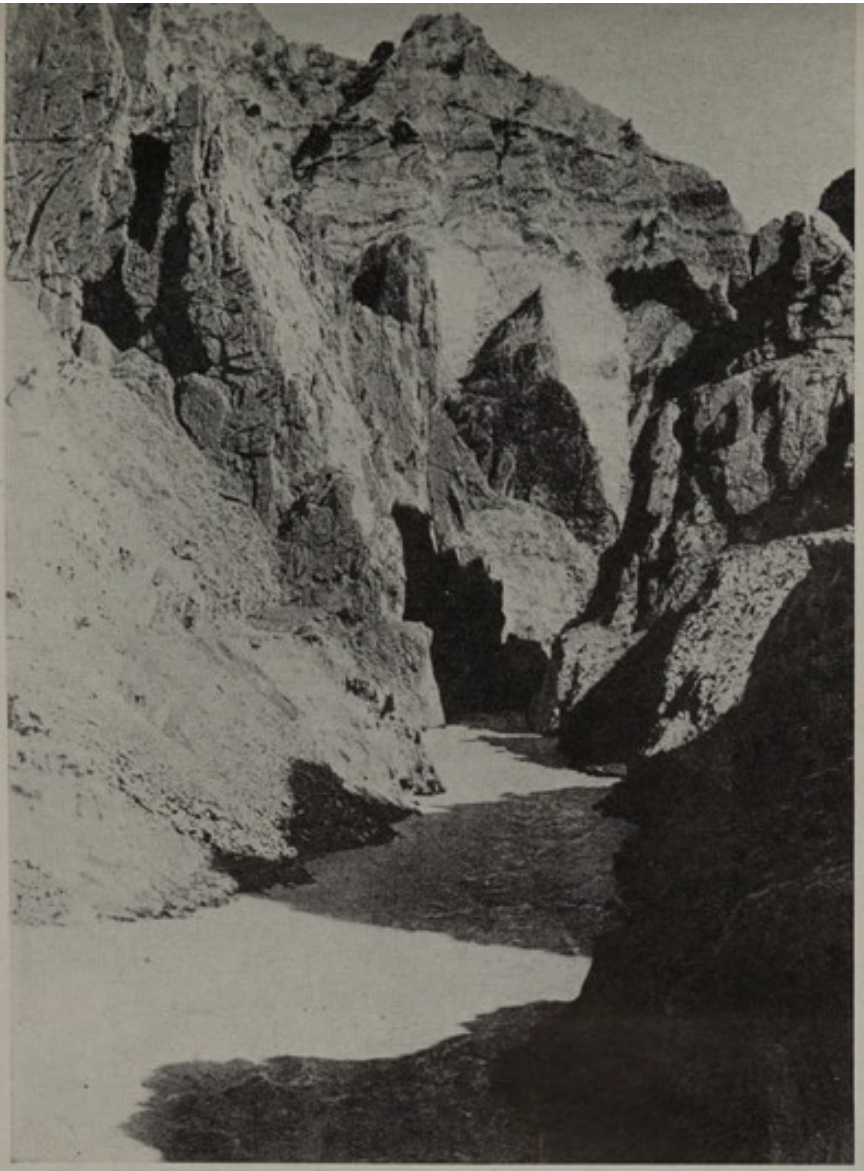
The Saidmarreh on entering the mountainous country keeps south for 20 miles through closely packed domes rising 3,000 feet above it, and then cuts a spectacular canyon through thick sheets of limestone at Tang-i-Tir. It then changes direction west-south-westwards and traverses a district where the domes are decayed, the valleys wider, and on the right bank the country opens out to the broad plain of Hulailan, bordered by pleasantly wooded hills (photo. 11). Other intermontane plains are found alined from north-west to south-east on both sides of the river and have been partly formed by alluvial debris. The Hulailan plain affords fine grazing at 3,300 feet, Diz Giran at 4,300 feet, Mahidasht (south-west of Kermanshah) and Kiast (south-east of the river) at about 5,000 feet. All these plains could be permanently cultivated if there were more security.

Below Hulailan the river makes two major changes in direction, first almost due south and then, 2 miles beyond the ruined bridge of Kuridot, sharply west-north-west. It then enters a succession of defiles through the Kuh-i-Gavah, turning south to cut the gash known as Tang-i-Saziban through the Kuh-i-Charmin. The ranges here are closely packed and the defiles impassable even on foot. Beyond the Tang-i-Saziban the river turns south-east and follows

this general direction for 85 miles, though twice in this distance it breaks south-westwards for short distances to cut through ridges. On the flank of the Kuh-i-Kuljar, 2,000 feet above the present bed, an old abandoned course of the river may be seen, a curved gorge without a river.

From Tang-i-Saziban downstream, and also for some miles north-westwards, the country is striped white and red in patches, owing to the colour of the underlying rock, the hills, particularly in summer, appearing light brown, partly because of a thin parched growth of grass and thistle. Occasional trees are dotted about on the slopes, though rarely below 3,000 feet. Two fair-sized plains occur north of the ranges east of Tang-i-Saziban: Tarhan, on the flank of Kuh-i-Gavah, and Ramishk, a few miles farther south-east beyond the Kuh-i-Dagila. A broad terrace at 2,200 feet is prominent above the river for 25 miles in the neighbourhood of Saidmarreh village. Downstream the river is deeply entrenched and later cuts a steep gorge through very rough country strewn with enormous rocks. Opposite this jumble in the valley there is a great notch 9 miles long on the north-east flank of the Kabir Kuh, from which these rocks have broken away.

It is just above this place that the Kashgan Rud joins the Saidmarreh. In contrast with the course of the Saidmarreh, which is very little known between the Kuh-i-Charmi and Saidmarreh village, that of the Kashgan has been traversed by many Europeans, since it is now followed by a motor-road. The route is ancient, having been used by Achaemenids, Sassanids, and later dynasties, as may be seen from relics of their engineering skill. Very little of the Kashgan Rud basin lies north-east of the region of regularly alined mountain domes, but south of the Kuh-i-Chihil Naulakan, where the river rises, the Alishtar plains are set among lesser hills and the landscape is similar to that near Kermanshah. The two main branches of the river then skirt each end of the dome of Kuh-i-Safid and begin their erratic course through the other mountain domes. By the eastern end of the Kuh-i-Safid near the junction of the two types of landscape is the old fortress town of Khurramabad, once the secluded market for turbulent Luristan to the south, the scene of countless lootings and murders, now the government base for the maintenance of order. The two head branches unite near Tang-i-Tir about 20 miles west of Khurramabad; and thence to Pul-i-Dukhtar, a ruined bridge within sight of the Kabir Kuh, a direct distance of 25 miles, the river wanders in graceful sweeps as it carves a passage through the mountains. The



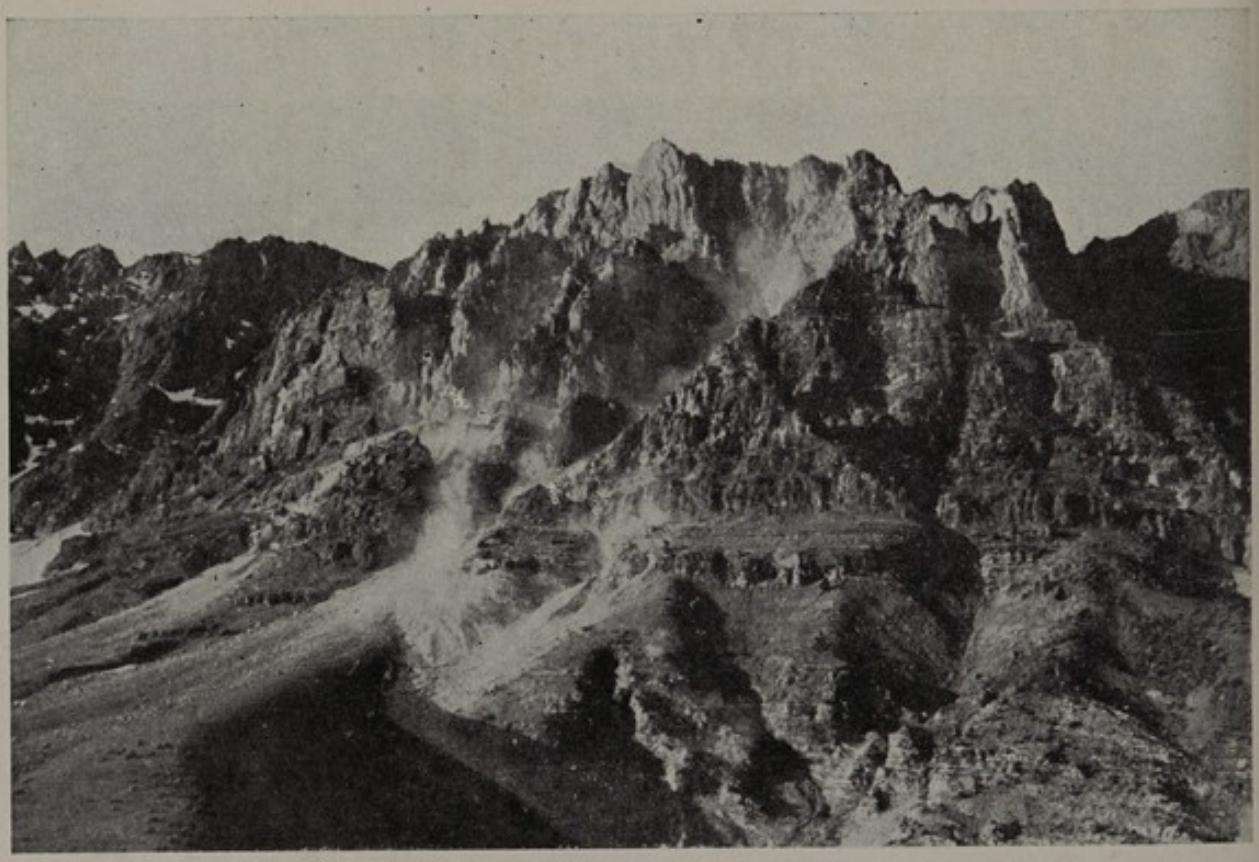
37. *A narrow gorge of the Diz river*



38. *Tang-i-Bahrein on the Diz river, about 90 miles north of Dizful*



39. *South-west front of Dul Gharib, Karun basin*



40. *Rock falls on Kuh-i-Dina, Karun basin*

scenery is attractive from the alternation of gorge and spacious valley, and from the variety in colour and form of the rocks.

All this mountain region is part of Luristan and is called Pish-i-Kuh ('before the mountain') to distinguish it from the foothills beyond the Kabir Kuh called Pusht-i-Kuh ('beyond the mountain'). Until recently there were few villages, the tribes dwelling in black goat-hair tents and moving from valley to valley as dictated by climate and grazing. The only buildings not in ruins were a few tiled shrines and very occasional forts. But in the latter part of Riza Shah's reign small settlements sprang up as part of his policy of tribal pacification. Between the valleys the passes are narrow and ascents steep, but amongst the hills there are glens with ample oakwoods, and for a short time in early summer there is a carpet of grass and wild flowers.

The motor-road keeps close to the river's left bank from Pul-i-Dukhtar to Tang-i-Tir and then crosses more open country to Khurramabad, thus making the eastern branch of the river above Tang-i-Tir the more important. In times of greater security the fertile plains of Dilfan and Alishtar were the centres of an agricultural population.

Diz Basin (fig. 14)

The Diz river collects the drainage in a mountain zone covering 6,800 square miles. It used to be known as the Sehzar on account of its formidable chasms, some said to be no wider than 3 yards (*sehzar*). Except near the central Persian watershed, the whole basin is mountainous and steep, but it is along this unpromising route that the Trans-Iranian railway was built by British engineers.

The river has two principal branches, Ab-i-Sehzar, which rises near Burujird in the north, and Ab-i-Zaliki, which has sources near Akhureh Bala far to the east. Both rise in highlands of comparatively gently rolling hills with wide valleys and occasional plains, the sites of former lakes. This district is dotted with villages, each with its own patch of cultivation; around the town of Burujird the fields cover a considerable area. There are few trees, which have been mostly cleared by charcoal-burners. From this north-eastern district, at from 6,000 to 8,000 feet, a fine view of the long wall of barrier mountains to the south-west can be obtained. Once amongst them views are too restricted, except from the summits, and it is difficult to gain a true picture of this fine alpine land. Barrier after barrier crosses

it from north-west to south-east, each cut through by winding fantastic gorges, and all combining to make the scenery as fine here as anywhere in the Zagros (photos. 37, 38, 323–328).

This mountain belt begins on the north-west, where Ushtarinan Kuh rises to 14,000-foot peaks standing up about 8,000 feet above the plain. Kuh-i-Gallizan and Kuh-i-Shahin continue the alinement south-eastwards to the basin of the Zaindeh Rud, which waters the gardens of Isfahan. South-west of these outer ranges occur several mountain masses, Qalah Kuh being one of the finest. Between this and Ushtarinan Kuh the valley has been blocked by a landslip which has impounded the lake of Galleh Gah, one of the few deep fresh-water lakes of Persia. A contrast to the prevailing landscape of crowded ridges is presented by the open valley running east from Pul-i-Hawa, the upper part of which is appropriately named 'the place of the waters of Repose'. It is among the pastures here that certain tribes rest awhile after their difficult journey across the mountains, with the great bulk of Kuh-i-Rubat overlooking them. Farther down the Sehzar the ridges are crowded together on either hand and generally reach about 7,000 feet. They are particularly rough and stony; remains of lake terraces on the hill-sides above the river testify that its gorge has been blocked by some obstacle. In the past there were few bridges across these rivers, but the ruins of two over the Ab-i-Zaliki at Baznui and Pul-i-Kul are notable. The sites of others were determined by natural features and the structures are impermanent, usually built of wattle mattresses laid on rough poles as road-bearers with an island boulder as central pier; in the flood season all are swept away or removed.

Hot in summer, cold and draughty in winter, all of it rugged and bare, this region is emphatically desolate. In the past it was too rough near the river to form even the poorest tribal route, and it was only used by occasional marauders. The tributaries are also deeply entrenched near their junctions with the main streams, so that tribal routes must cross them some distance up their courses. In such country the grazing is only just sufficient to support the passage of migratory tribes and their animals, moving from winter haunts on the borders of Iraq to summer pastures on the rim of central Persia. Never a village and scarcely a hut was to be seen until the building of the Trans-Iranian railway.

For the construction of this railway a motor-road was built from Khurramabad to the gorge. This section is the most difficult on the whole line. Tunnel after tunnel, sometimes connected by a lofty



41. *Barley cultivation at Hana near Simarun*



42. *Extensive cultivation in the Simarun plain near the head of the Ab-i-Khirsin, Karun basin*



43. *Looking south-east up the Tang-i-Gunjau defile, with the Khirsin gorge on the left. Anticlinal domes of Kuh-i-Rig on the left; Kuh-i-Siah on the right*



44. *View north-west from the head of the Zuhra towards Kuh-i-Barm Faruz on the watershed of the Zuhra and Niriz basins*

bridge or viaduct, had to be driven along the gorges, and several bridges built across the main stream (p. 558).

Karun Basin (fig. 14)

The Karun reaches the Shatt al Arab as a wide navigable watercourse and is therefore entitled to a principal place amongst the rivers of Persia, although it drains no more than 12,300 square miles of mountain basin and 5,200 square miles of foothills and plain. Almost the whole of this mountain basin lies south-east of the point where the Karun breaks into the foothill zone, the river and its main left-bank tributary, the Rud-i-Khirsin, flowing in a trough for 180 miles parallel to the mountain trend and collecting all the drainage of the basin north-east of it. Its principal mountain tributaries are the Ab-i-Bazuft on the right bank, the Ab-i-Wanak, Rud-i-Khirsin, and the Ab-i-Tembi on the left. Much of its perennial water comes from copious springs, for example, Chashmeh Kuran which gushes out of the flank of Zardeh Kuh and becomes a fair-sized river at once. Other springs, often marked by a shrine, add to the volume of water, which is also greatly increased in spring by the melting snow in the high mountains. The devastating spates which very occasionally occur are, however, usually caused by localized downpours of rain, rather like cloudbursts. The Karun has several fine gorges, that downstream of Du Pulan being 8,000 feet deep, but, though there are broader valleys with arable land and room for movement, there are none of the spacious flats which are seen in the Saidmarreh basin. Grazing in the Karun basin is richer and more accessible than on the Sehzar pastures, but security was no greater before the reign of Riza Shah. The region is, however, fairly well known, since an attempt was made to keep open a trade-route for British and Indian goods destined for Isfahan, though such settlements that existed were mere hamlets, except along the north-eastern sources where villages sprang up near the summer residences of tribal chiefs.

Tributaries of the Karun rise on the watershed of the Zaindeh Rud south-west of Isfahan, but the extent of open country beyond the high ranges is curtailed by the embayment of this river southwards; there is, however, a strip extending from Farsan in the north-west to Haft Dangan below Dul Gharib (photo. 39). Some of the villages dotted about on the high plains are inhabited by industrious Armenians. Towards the south-east there are also some high intermontane plains: Falat, Khan-i-Mirza, Lurdagan, and Malamir near the Karun proper, and Simarun, Hana, and Tul-i-Khusrovi

near the Rud-i-Khirsin. Some are far above the present river-level and may be the beds of ancient lakes. On the Simarun plain a large spring accounts for an oasis of gardens, orchards, and irrigated fields (photos. 41, 42).

Mountainous country predominates in the rest of the basin. The Karun drainage forms an arresting pattern. Long tributaries lie parallel to the prevailing trend, north-westwards and south-eastwards, with short crooked transverse sections. Zardeh Kuh and Kuh-i-Dina are the two great north-eastern ranges (photo. 40). They overlook a welter of ridges to the south-west where long chains with many summits above 12,000 feet reach almost from end to end of the basin and form a rampart 250 miles long; Kuh-i-Kainu stands at the north-western end and Kuh-i-Ranj at the south-eastern. Farther to the south-west, and parallel to this rampart, is another which overlooks the foothills: Kuh-i-Sarland, Kuh-i-Garpi, and Kuh-i-Mungasht.

Besides the gorge between Du Pulan and the Lurdagan junction, the Karun makes a magnificent cut through Kuh-i-Landi, where there is a canyon 3,000 feet deep, reminiscent of the Grand Canyon in Colorado, and another farther down leads the river to the foothills through the gash at Bard-i-Qamchi. The Ab-i-Khirsin, which drains 3,600 square miles, also passes through some profound gorges, that through the Kuh-i-Dina being a canyon with 5,000-foot walls, while lower down several of the gorges bordering the district of Kuh Galu are also spectacular. Even the Ab-i-Bazuft, which follows the trend of the ranges more persistently than any other stream, often flows in steep-sided chasms more than 3,000 feet deep.

Most of the country is pleasantly wooded with oaks up to 30 feet high, and by the springs there may be a few great walnut-trees and an occasional mulberry-tree, suggesting that the land might be better cultivated had it only climate to contend with. Snow covers the mountains in winter, sometimes to a considerable depth, but in summer few patches of snow remain, except in deep and sheltered spots on northern slopes. One or two small corries and small moraines high on the north-eastern slopes are evidence of prehistoric glaciers. In mountain valleys the tribesmen cultivate small crops of barley, wheat, and even rice where conditions are particularly favourable, but in parts of the country, especially in Kuh Galu, the people supplement their food with acorns. There are no towns or permanent villages, and only a very few dilapidated hamlets of flat-roofed houses of the Kurdish pattern; the only other buildings are the few shrines and mills standing alone in the deserted countryside, some small





FIG. 15. *South-eastern Zagros with Niriz and Shiraz basins.*

masonry water-tanks, usually ruined, and an occasional fort useful to protect the garnered grain.

Progress across the mountains is difficult and the valleys rarely afford easy passages even when parallel to the trend, for the streams sometimes forsake the easiest course to gouge a channel out of the mountain-side. Consequently the tracks wind and climb, often steeply, over the obstructions, and it was the task of tribal chiefs, before the time of Riza Shah, to make such tracks passable for their beasts of burden and their flocks. Upkeep was needed each spring, and neglect meant accidents and losses. Galleh Shah across the Zardeh Kuh is one of the sternest passes; the ascent from the south of Darreh Shu (8,000 ft.) is by a zigzag stony path to the col at 13,000 feet; the descent on the north is by a snow-filled gully between steep crags and leads down to the uppermost valley of the Karun not far from Karkunan. Another pass over the Kuh-i-Kainu farther west starts from Bard-i-Davit by passing through a tunnel formed by massive rocks which have fallen and jammed the mouth of a narrow gorge. Many of the passes can only be tackled in spring after the tribesmen have beaten a track through the snow with their bare feet, so that their floundering animals can follow. This happens, for instance, at the pass over the Kuh-i-Dina north-east of Sisakht where the local chief takes toll from travellers crossing to the eastern headwaters of the Ab-i-Khirsin.

Marun and Zuhra Basins (*Kuh Galu*) (figs. 14, 15)

The long south-eastern trough of the Ab-i-Khirsin beyond the Kuh-i-Sivak and Kuh-i-Ranj, reaching almost to Ardakan, leaves a narrow strip of wild mountain country between its watershed and the foothills. The Ab-i-Aala and the Marun, the Khairabad and the Zuhra rivers drain mountain basins measuring 500, 2,050, 1,500, and 2,250 square miles respectively, the first pair uniting in the plains and the second just within the foothills. These rivers rise on the south-western slopes of the barrier ranges, Kuh-i-Mungasht, Kuh-i-Barfi, the northern Siah Kuh, Kuh-i-Kavisht, and Kuh-i-Barm Faruz, and cross a rough mountain region recalling the Sehzar country (photos. 44, 45). This is the reason why it provided a sanctuary for some of the tribes which long resisted the forces of Riza Shah. The rivers have to break through two or three major whaleback ranges which are not continued farther north-west. Many of the gorges are inaccessible, but occasionally one that affords an easier passage may be barred by a fort held by a tribal chief.

Outstanding among the many fine ranges are those of Kuh-i-Safid and the southern Kuh-i-Siah between the Aala and the Marun, and the Kuh-i-Nir between the Marun and the Khairabad. All these are almost symmetrical domes 40 miles long or more, 4 or 5 miles broad, and rising to about 10,000 feet. A feature of the region is the extreme narrowness of some of the rocky defiles cut through the ranges. If they contain water, they may be passable only with great difficulty or a long detour may be necessary; if not, gravel or fallen rocks may have so blocked the passage that a crude staircase and gallery has been built over the obstruction by the tribesmen. Occasionally the debris has so filled the gorge that the passage has been made easier, as for instance where the Tang-i-Shu affords a convenient passage through the Kuh-i-Anah in the Zuhra basin, just north of one of the few expanses of level fertile ground in south-eastern Kuh Galu, where copious springs furnish water for cultivation. Ruins and a group of works where the river breaks out to the south-west show that this spot has long been a prize in the district. A few miles to the west the imposing range of Kuh-i-Khami forms a dome 30 miles long and 6 miles broad and overlooks the foothill zone to the south-west. The castle of Basht near its eastern end is sufficiently remote from the outside world to have been the centre of its own little settlement and feuds.

The most easterly headstream of the Zuhra reaches round the south-eastern end of the Khirsin basin and probes farther inland than others, though rising at about the same height. A wide area of high plains, formed by ancient lakes, occurs along its upper course between Ardakan, a village which has survived generations of fierce inter-tribal strife, and Tang-i-Rudian, a defile dug into the rocky basement below the lake beds (photo. 46). Not far below was a second ancient lake whose site is now marked by terraces covered by woodland, the surface once flat being scored by gullies cut into the soft deposits. The river outlet from this basin, dug deeply into rock, runs straight to the plain of Fahlian, a village now connected by motor-road with Shahpur, and a track leads almost direct from Fahlian to Ardakan; the route it follows is the line of large fractures which here break the Zagros domes and leave a gash sufficiently wide for a road without great detours or gradients.

Kuh Galu in the past was the territory of several small tribes. Each had its chief with a fortress and village hidden in some notch in the hills: Dishmuk, Auriz, Qaleh Kalat, Qaleh Gul. These forts are different in design from any built farther north, and resemble



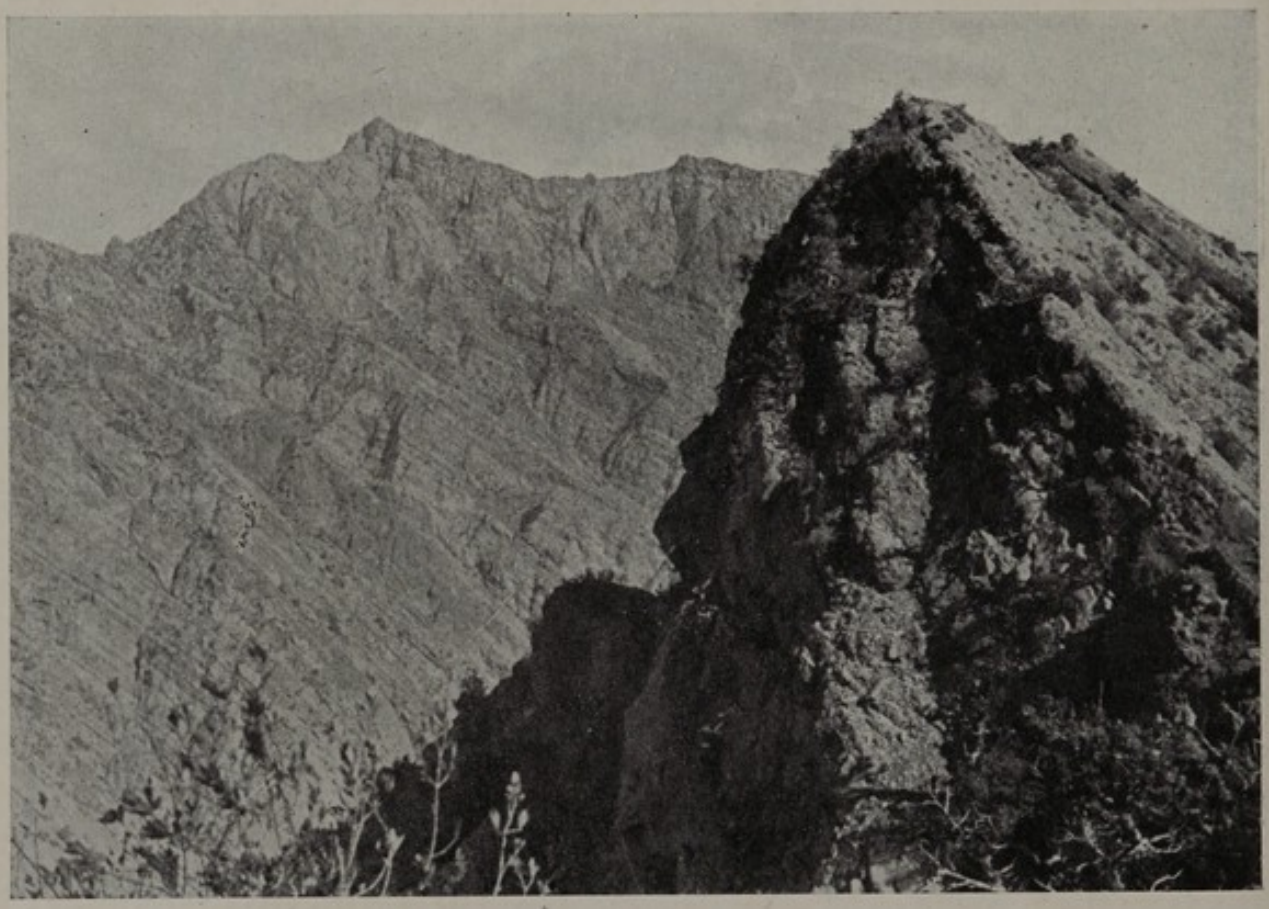
45. *The head of the Marun basin, central Kuh Galu, in November*



46. *Tang-i-Rudian, near the head of the Zuhra basin, from the south-east. Gorge through Asmari limestone; Ardakan in the far distance*



47. *Gahkum salt-plug, Rud Shur basin*



48. *Crags of Kuh-i-Furgun, Rud Shur basin*

the box-like plan of early ferro-concrete structures. One tribe based on Chin, a small hamlet far up the Marun where it emerges from a deep narrow chasm, had no fort. Telaspid, a village on the plain not far from Fahlian, is probably ancient, being built, like Erbil in Iraq, on a ruin-mound. Elsewhere the people live in black tents, shelters made of branches, and occasional caves; excepting these villages, the only buildings are a few shrines.

Shahpur Basin (fig. 15)

The gradual change from the wild scenery of the Marun basin to milder landscapes in the south-east of the Zuhra basin becomes accentuated southwards in the Shahpur district. The mountain domes are still long and massive, but more spacious valleys lie between them with floors so buried by debris that they become plains. The decline in rainfall is so marked that the country has much more the aspect of desert. Water is increasingly scarce, so that most of the sparse population has settled down and become sedentary wherever there is a perennial supply; semi-nomadism is almost limited to spring. Primitive engineering works for irrigating fields are visible everywhere in south-west Persia, mostly little canals (*jubes*)—ditches only a few inches deep, troughs cut in solid rock, or rather more elaborate masonry or wooden structures. Here there are also *qanats* (p. 424), the familiar underground water-channels; farther south-east, particularly between Lar and Bandar Abbas, water from the occasional rainstorms has to be stored in stone tanks (*birkeh*) sunk below ground and protected by domed roofs from evaporation by sun and wind.

The Shahpur and its tributaries, the principal of which is the Ab-i-Daliki, collects the drainage of about 3,500 square miles of mountain country, but most of its running water comes from springs. The Sassanid reliefs and ruined city of Shahpur stand close to one of these; above it the river bed is generally dry. Another branch comes from Kazerun, and its tributaries are also seldom filled with running water. Kazerun and its gardens depend on a large spring, but after the demands of irrigation have been met there is little left to swell the Shahpur river. The north-eastern watershed is a lofty oak-clad ridge, Kuh-i-Pazanun, but the streams from it mostly peter out as they cross the wide valley north-east of Kuh-i-Dashtak, the rocky dome north-east of the Kazerun plain. The watercourse keeps along the north-east foot of Kuh-i-Dashtak and then cuts across it, which is surprising. The Shahpur plain was once elaborately

irrigated, but the canals have become ruined and cultivation is now much restricted. The river meanders through fields and then enters a deep gorge with red and white striped walls.

The Ab-i-Daliki flows through a group of lofty domes, too congested for plains to lie between them. It rises in the high ground near Dasht-i-Arjun, within a mile of the upper Rud Mand (below). Another feeder comes from the swampy lake close to the Shiraz road a few miles east of Kazerun; a third starts as a large sulphurous spring gushing from the rocks on the edge of the plain near Daliki. Though close to a well-trodden road, the countryside of the lower river is little known, partly because of its reputation for brigandage, partly because the valleys are narrow, immoderately hot, and waterless.

Kazerun is the only town; among the few villages Shahpur alone is notable by reason of its carvings. A cave high on the hill-side above the village contains a fallen statue of a Sassanid king and a cool cistern constantly replenished by the gentle dripping from the stalactitic roof. The motor-road from Kazerun to Fahlian passes the ruins.

Mand Basin (fig. 15)

The next large basin to the south-east, that of the Rud Mand, covers nearly 20,000 square miles, one of its long upper tributaries lying behind the Shahpur basin. Its catchment area is one of the largest in Persia, but the volume of water collected is small, for the rainfall is low and there is insufficient snow to feed the rivers in spring or summer. The main stream rises on the slopes of Tasak Giru, a mountain overlooking a broad valley crossed by the Kazerun–Shiraz road beyond Dasht-i-Arjun. The mouth on the Persian Gulf is almost 120 miles to the south, though the river, even ignoring minor bends, is about 380 miles in length. The long reaches of this branch are conspicuously parallel to the mountain trend from north-west to south-east. The Ab-i-Fasa affluent comes from the mountains south of Lake Niriz, but it is poorly fed and as it crosses more open plains much of its volume is lost by seepage and evaporation. A third tributary drains the east and south-east; the northern branch of this in particular also loses much by evaporation and seepage. Lesser tributaries join the right bank near the mouth, one more important than the rest draining the country north of Firuzabad, the winter headquarters of the Qashqai tribe.

The north-western part of the basin contains broad valleys at heights of 6,500 feet near Khan-i-Zinian and 4,300 feet near Asmangird. The mountains rise from them in sweeping curves for perhaps

4,000 feet—bulky rounded features generally showing naked rock, sparse spiky grass, thistles, and a few low bushes. Pasture is better in the valleys where small villages, each with a patch of cultivation and a few gardens, lie at intervals close to the river. Nineteenth-century forts with high mud-brick loopholed walls and bastions are fairly frequent, though in various stages of decay. The river keeps to one plain for long reaches before slipping through a narrow rocky cut to the next. Just below the village of Asmangird it turns sharply south-west, cutting through the Kuh-i-Safid in a transverse rocky gorge, though the mountain plunges downwards only 2 miles beyond. The river shows the same surprising feature near the north-west end of the next range, Kuh-i-Garm, which it has cut through rather than go round.

The north-eastern affluent, Ab-i-Fasa, flows at first mostly across plains at about 5,000 feet and only becomes entangled in hills west of Jahrum, after which it soon joins the main river at 3,000 feet. The size and number of intermontane plains diminish seawards, where long reaches of the lower river are penned in defiles between ranks of wearisome brown cliffs. It has built only a small delta on the shore of the gulf, and the coastal plain is narrow.

In the interior many villages and a few small towns are dotted about, some like Jahrum with extensive date-plantations having an apparently prosperous aspect. Fields of grain ripen in early summer on the plains of Fasa or Jiyum; shady gardens mark the several villages along the river north-west of Asmangird; the harvests at Firuzabad have long been important to the Qashqais. Occasional ruins, for example south of Jiyum, show that these plains were perhaps more populous in the past. Towards the coast conditions deteriorate; villages are fewer and Tangistan is a difficult barren country held by difficult people. Kuh-i-Mand on the right bank, a mountain oval in plan, 40 miles long, rises to 2,680 feet and falls to the coastal plain within 5 miles of the sea.

Khamir and Shur Basins (fig. 15)

A narrow desolate strip, 200 miles long, mostly within 35 miles of the coast, forms the basin of the Rud Khamir, the area of 3,600 square miles including a few minor valleys on the left bank towards Lar. The watershed near the source is only 5 miles from the coast. Well-moulded mountain domes on each side of the main valley are often over 5,000 feet and at one point reach 7,000 feet. The lower reaches cross barren mud-flats near the coast opposite the island of Qishm,

but the gentle lower slopes are dotted with thin scrub which affords a little grazing. Occasional small settlements are scattered in the valley, Gilehdar being the best known. They raise a few crops each spring and with their goats and a supply of dates in autumn eke out a bare livelihood.

The Rud Shur, or 'salt river', lives up to its name. It drains 15,600 square miles of country studded with salt mountains. Two principal branches collect the northern drainage, the one rising on the bold hump behind Darab in the north-west, the other among the crags and pinnacles of the rugged highlands between Kuh-i-Khabr and Gahkum. These two branches unite in the plain a little south of Gahkum (photo. 47). A third large tributary from Lar joins the main river only 15 miles from the sea and drains the western part of the basin.

The mountains through which these rivers pass consist mostly of long bold limestone domes and plugs of salt, but in the north-east jagged and sugar-loaf peaks of entirely different type take their place. It is noteworthy that the axes of the domes no longer maintain the usual north-west to south-east arrangement. All gradually swing to an easterly alinement, but those farthest inland then bend east-south-east, those in the centre turn east-north-east, and those nearest the coast, north of Bandar Abbas, maintain their easterly trend. Thus the pattern changes, though in an orderly fashion.

The salt plugs,[1] unlike the elongated domes, are nearly circular in plan and of variable height. The boldest rise 3,000 or 4,000 feet above their surroundings, occasionally having a tongue of mingled salt, gypsum, and rock debris recalling the glacier tongue of an ice-cap in shape and position. Most of the salt-masses are pink, but with conspicuous patches of dark blue or green volcanic rocks lying loose or capping a pedestal; a few have dark or light grey bands streaked with gleaming white where runnels have evaporated and left a trail of crystalline salt. These salt plugs may occur by the sea-shore, or rise from an inland plain, or even break through the side, centre, or end of the big whale-back domes. One of them is worked, not for its salt, but for sulphur which accompanies the salt in that locality; another, on the island of Hormuz, for oxide of iron.

The main branch of the Rud Shur rises in the fine massif of Darab, whose naked rock sides are scored with narrow gullies. Springs occur

[1] These are often known as Kuh-i-Namak, 'mountain of salt'. They are salt eruptions, best likened to gigantic inverted tea-cups in form, sometimes as high as the neighbouring domes. The larger plugs are shown on fig. 2.

at a few points near the foot; the edge of the plain is well covered with small bushes which gradually disappear away from the hills. The few huts that pass for villages are also found at the edge of the plain, each cluster dependent on a spring. The alternating desert basins and rocky hills of this district give it a desolate aspect, but a small population is made possible by the springs and the hardihood of the goats.

The north-eastern tributary which rises in Kuh-i-Khabr is better nourished, though it passes through a district where some of the villages are dependent for water on *qanats* (p. 424). The jagged rocks and ridges show no resemblance to the alined domes farther south, which are first met where the river passes round the north-west end of Kuh-i-Gahkum. This dome and its neighbour eastwards, Kuh-i-Furgun, are rounded on the north, but broken with steep crags on the south, and their summits rise about 9,000 feet above the plains in this direction (photo. 48). Their higher slopes are wooded—a pleasing contrast to the treeless region around them. Both command fine views: to the north, the sandy plain of Jain immediately below, that of Daulatabad beyond a jagged ridge, and the confusion of hills towards Kuh-i-Khabr which seem to merge into a high plateau in the far distance; to the south, the Gahkum plain, bare in the centre but punctured by salt eruptions and crossed by the meandering river as it makes for the next group of domes. On a clear winter's day the sea coast and distant islands are visible, and beyond them are silhouetted the mountain peaks of Oman.

South of the Gahkum plain the Rud Shur keeps unusually direct to the coast, often cutting through the plunging end of a dome. Except near Fin there is little plain, and the lowlands between the mountains are a waste of troublesome hills. The best-known dome here is probably Kuh-i-Ginau, which rises 7,700 feet in full view from Bandar Abbas and the sea beyond.

The western tributary rising near Lar seldom holds running water, but passes through broad plains with the mountains at some distance from its banks. Its course is marked by domed water-reservoirs or *birkehs* (p. 33), and there are often groves of date-palms by the tributaries where they leave the hills. Near Cha Benu the river makes an S-bend to avoid the mass of Kuh-i-Shu, and then works its way for a few miles of rough broken country to the Jihun plain. There is a similar passage through broken country before Birkeh Sultan, but from there to the junction near Latidan the course is through plain and palm-groves. Two bridges with several arches

stand on an abandoned course of the river, and none replace them over the present channel, which is fordable at most times of the year. The very scanty population lives mainly in the mouths of the gullies which break from the hills, where rain-pools can be deepened to form shallow wells. Bandar Abbas (p. 500) is the port, and Lar on the watershed the only other town; the villages, like Furg and Gahkum, are merely collections of a few huts tending a group of date-palms, with a dilapidated fort to protect them.

The area east of the lower Shur is drained by two small rivers which rise in or near Kuh-i-Furgun and reach the plain east of Bandar Abbas after rounding the several domes. There is a small plain with fields and date-groves near Ahmedi, but elsewhere the plains, though originally well formed and level, have been trenched by the rivers to a depth of 100 feet and their surfaces have been scored by the weather. The population is more scanty than ever, the grazing poor, and date-palms are only dotted for short distances along the streams. There are, however, date-plantations on the edge of the coastal plain and near them stand a few villages. The old caravan road to Kirman followed its eastern side; its tedious miles of grey-green rock along the Tang-i-Zindan defile mark a startling change in the landscape, for the pattern of regular domes which have been so distinctive a feature of the Zagros now come to an abrupt end. On the east the dark sombre range Kuh-i-Zindan runs from north to south, and forms the boundary with Persian Makran. Seldom are two regions so clearly marked by so sudden and unexpected a structural feature.

Inland Basins of Niriz and Shiraz (fig. 15)

Both the inland basins included in south-west Persia are famous in history: that of Niriz as the cradle of the ancient Persians with the Achaemenid palaces of Pasargadae and Persepolis; that of Shiraz containing the homeland of Persian poets. The Niriz basin has a catchment of 11,300 square miles, the Shiraz basin only 1,600 square miles; both have their lower ground at about 5,000 feet above sea-level, and their rivers flow through pleasant country.

The *Niriz basin* is watered by the Rud Pulvar and Rud Kur which unite on the south-west side of the Persepolis plain. The Rud Pulvar drains the northern section through a broad valley between substantial chains: Kuh-i-Deh Girdu and Kuh-i-Bul are at the ends of the north-eastern chain which is built of individual oval domes, though they have rougher, sharper profiles than those to the south-west. The mountains forming the south-west chain, from Kuh-i-

Nisa to Kuh-i-Qarum, appear rounded and smooth from the Pulvar valley, though more broken from the south. The drainage from the higher inner slopes of these two chains soon soaks into the thick silt of the broad valley floor, a grass-covered plain with an occasional swamp, as at Dasht-i-Namdun, or shallow lake, as that lying 15 miles south of Kuh-i-Bul. This broad flat-bottomed valley continues for nearly 80 miles and is then joined by a stream flowing from near Deh Bid with a steeper gradient and faster current. In all this high open country the villages are small and keep along the mountain foot, though a few tombs and mounds stand out in the plain. After leaving this plain the river enters the hills, cutting across them south-westwards before emerging on to another plain where stand the Tomb of Cyrus and the neighbouring ruins of Pasargadae (photo. 162). Sugar-beet is grown on the fertile soil in place of grain, and motor-trucks instead of human or pack transport carry the crop away.

South-west of Pasargadae the river again enters the hills and winds first westwards and then south-eastwards under the influence of domed structures before entering an open plain with the ruins of Persepolis on its left bank and the Tomb of the Kings on its right. These splendid monuments stand on the rock at the mountain's foot and overlook a wide expanse of cultivation (photos. 163, 164). Mountains of bare rock rise from the plain to the north-east and south-west, leaving a broad corridor, 10 miles wide, which extends to Lake Niriz 25 miles away to the south-east. The plain closes in towards the north-west, but before doing so two flat-topped hills stand as natural fortresses 2,000 feet above the plain and command it.

The Rud Kur proper rises in the knot of mountains near the south-east end of Kuh-i-Dina, not far from the forts of Kakan and Diz-i-Kurd. The headwaters assemble in open rolling country to form the river, which flows south-east in a broad gravelly bed lined with a tangle of scrub and small trees; the grass-covered flanks of Kuh-i-Yar rise from the left bank, and a long line of cliffs bound the plateau of Saran on the right. The affluent that brings in the most water collects the drainage of a parallel valley between Kuh-i-Shah Nishin and Kuh-i-Nisa and that from two valleys between the Kuh-i-Yar and Kuh-i-Qarum, before cutting a gorge through the north-west end of Kuh-i-Yar. The largest of these tributary valleys is 50 miles long and in places 10 miles wide; it is rather like the upper part of the Rud Pulvar, flat and sometimes swampy, but it flows north-west instead of south-east. One swamp protects the approach to Asupas, a small village guarding an easy pass to the upper Rud Pulvar.

Below the junction of this affluent, the main valley of the Rud Kur is dotted with small villages and forts.

The Rud Pulvar and Rud Kur unite on the south-west side of the Persepolis plain. The Pul-i-Khan ridge overlooks the river from the south-west and commands the fertile Dasht-i-Baiza from the north-east. The divide south of Dasht-i-Baiza is the site of a long ruined wall, said to have been built in Achaemenid times as a protection against marauders.

South-east of Pul-i-Khan bridge the broad Niriz valley declines gently towards its terminal lake. A few miles below the bridge the river has been dammed, partly for irrigation and partly to drive mills at Band Amir. The volume of water in the river decreases as the lake is approached. Lake Niriz is shallow (photo. 49); salt lines its bed and edges, and its water is undrinkable; but not far from its shore the land is productive, and sweet water from shallow wells is lifted by animal hoists for irrigation.

The small *Shiraz basin* is only separated from the Mand drainage by a gentle rise near Pul-i-Fasa, but elsewhere it is well enclosed. Fine mountain domes seal it off on the west, between two of which the road from Shiraz passes over a col to Dasht-i-Arjun and Bushire. Reddish-brown crags impinge on the domes which form the north-eastern watershed, and other valleys, excepting that between Kuh-i-Naqsh and Kuh-i-Gar, are enclosed. The Darya-i-Maharlu is a shallow muddy lake almost half-way along the basin, increasing in size after a wet winter, but little more than a saline marsh when a hot summer and autumn follow a season of low rainfall.

The oasis of Shiraz lies north-west of the town (p. 534) and is composed of irrigated gardens (photo. 50), now mostly small market-gardens, but a few on which the fame of Shiraz depends, such as Bagh Elam, are still preserved. In it stands a lofty pavilion with tiled frieze looking across an oblong tank to tall cypresses and a few noble pines with lines of orange-trees formally arrayed beside them. But it is the contrast with the barren miles, the dusty road, and the sun-scorched earth that makes a paradise of Shiraz. This green oasis suddenly bursting on the traveller from the east means shade and leisure and ease. Shiraz is famous for its rugs, with their background pattern of flowers and birds.

The Zagros Foothills (fig. 14)

The High Zagros merge into foothills towards Iraq and the head of the Persian Gulf. The foothill belt from the Iraqi frontier near the



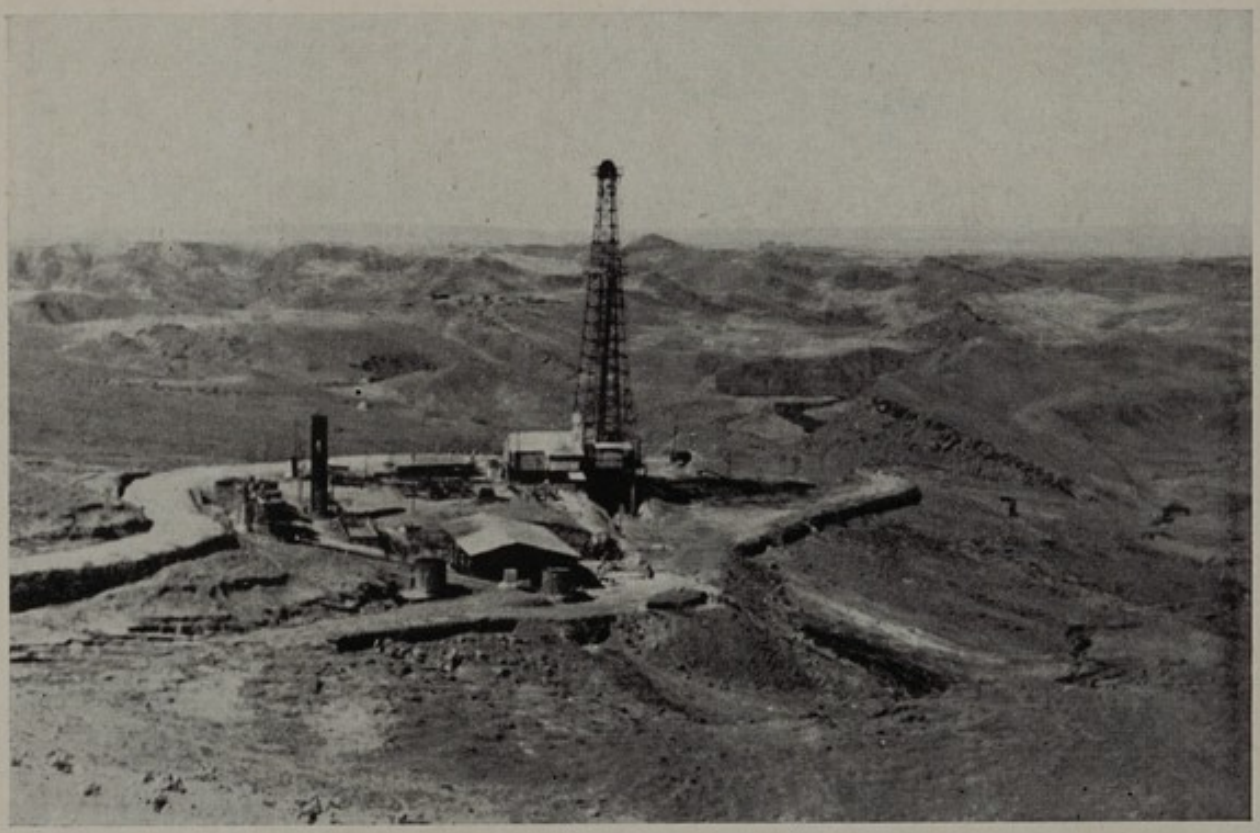
49. *The Niriz lake*



50. *North-western fringe of the gardens of Shiraz*



51. *The foothill terrace of Qasr-i-Shirin*



52. *Oil rig at Chia Surkh near the Iraqi boundary*

Sirwan (Diyala) river to Bushire is 530 miles long and often 40 miles wide. The north-eastern boundary has been indicated when describing the structure (p. 19), and is shown in fig. 10. The south-western limits are the Iraqi boundary from the Ab-i-Zimkan to the Persian Jabal Hamrin (lat. 32° 15′ N., long. 47° 35′ E.), thence eastwards across the Karkheh, Diz, and Karun rivers just north of the towns of Dizful and Shushtar, and south-south-eastwards to the Persian Gulf near Bandar Dilam. The whole area, including the plain near the coast between Bandar Dilam and Bushire, which is more conveniently described in Chapter IV, amounts to a little over 20,000 square miles (fig. 14).

The brightness of some of the rocks and the striking colour-contrasts between neighbouring formations are marked features of the foothills. There are a few areas of good soil in the more favoured valleys, and in the north-west some districts have a fair cover of oak-trees; elsewhere there are only a few almond-trees and a thin crop of thistles and wild barley whose irritating barbs find their way into the skin through all kinds of footwear. But most of the hills expose bare rock, each type producing characteristic scenery. Conglomerate masses form dull khaki-coloured hills, sometimes sculptured into upstanding peaks, but more often moulded into rounded slopes which are scored by steep-sided gullies. Thick beds of red sandstones and clays often result in very broken country; when lying flat they may form conspicuous hills, but in their more common tilted position they form broken country, a tiresome succession of low saw-toothed hills, steep and untidy on one side, smooth and slippery on the other. Occasionally, towards the south especially, similar broken country is produced by dull green rocks. A third landscape results from beds composed partly of gypsum, partly of red clays, with occasional layers of salt. Here the colour-contrasts are most striking, and whilst such regions are always cut by gullies of spectacular steepness, usually there are fairly easy paths across the red and white plateaux. A few limestone ranges emerge like basking whales from the sea of red and white, though they too are often notched by erosion.

It is amongst such surroundings that large oilfields have been discovered by the Anglo-Iranian Oil Company. During the four or five summer months the shut-in valleys, grilled all day by a brassy sun, part slowly with their heat at night, and the air may still register 110° F. at 10 p.m., though by sunrise the temperature may fall to 85°. Because of this trying climate there are almost no towns or

villages. Tribes in the past used to desert this district in April or May and only returned for the winter.

The foothill zone may be divided into five sections: (*a*) from the Ab-i-Zimkan to the Ab-i-Gangir; (*b*) the Pusht-i-Kuh, the more pleasing belt bordering the Kabir Kuh; (*c*) the hills from the Karkheh (Saidmarreh) to the Diz, a kind of gateway between the plains and the mountains; (*d*) the lower Bakhtiari country from the Diz to the Ab-i-Aala; (*e*) from the Ab-i-Aala to the Bushire–Shiraz road in the south-east, partly the domain of the Qashqai.

Ab-i-Zimkan to Ab-i-Gangir (fig. 14)

The northern section lies within the southern limits of Kurdish country and is well known to travellers between Baghdad and Kermanshah. Where the motor-road enters Persia there are undulating gravelly swells which are soon replaced by terraced features. The ruined Sassanid castle of Qasr-i-Shirin stands on one terrace (photo. 51), and fragments of another form low hills in the Quraitu, Hulwan (Alwand), and Gilan valleys. Usually these terraces have been cut up by streams, but the old surfaces are still recognizable in spite of the present roughness of the country. The large Zuhab plain, north of the road near Sar-i-Pul, an old caravansarai with a few huts haunted by a particularly virulent species of malarial mosquito (p. 419), lies between the frontier range on the west and spurs of the Karind mountains on the east and north-east; its wide expanse of fertile soil is little tilled, but grows so dense a crop of thistles as to be almost impassable to man or beast. North of this plain is the basin of the Ab-i-Zala with its network of watercourses, generally dry, reaching into the waste of barren grey-green rocks under the scree-covered flanks of Kuh-i-Girreh.

A little east of Sar-i-Pul the road crosses the floor of a very fine natural amphitheatre and climbs over its edge at Tak-i-Girreh, the 'Zagrian Gates' (photo. 33). Massive limestone forms the girdle of cliffs, while a series of dark and light grey shales below them have been worn into the gentler lower slopes. Between the road and the Ab-i-Gangir to the south three mountain prongs forming the blunted north-western ends of limestone humps gradually lose height north-westwards and finally disappear beneath the plains. They are capped by red and white rocks and separated by embayments of red rocks which towards the frontier form a dreary covering of low 'bad land', except where parts of the old terraces remain. Gilan stands at the head of the long valley south-east of Qasr-i-Shirin, but is no more

than an old Kalhur fort and a few small huts. Yet this unattractive land has its uses, for where the Iraqi boundary follows the Ab-i-Naft through the red desert drilling for oil has met with success. Before the present oilfield was developed, oil from the seepages at Naft Khaneh was collected in goatskins and carried to market on camels (p. 493).

Pusht-i-Kuh

Pusht-i-Kuh was for long an almost independent province of Persia under an autocratic Vali. This district consists essentially of two long valleys trending north-west and south-east, separated by a broad-topped range, and shut off from the Iraqi plains by a second range. The outer range reaches a height of nearly 5,000 feet and provides a superb view over the plains to Ali Gharbi in Iraq. Its grassy top, studded with shady oak-trees, forms an oasis of temperate comfort even at midsummer (photo. 152). One of the two valleys lies at the foot of the Kabir Kuh, the other some 15 miles to the south-west, but though these are parallel to the ranges, the chief rivers mostly rise on the flanks of the Kabir Kuh and cut across the grain of the country transversely. Only the two rivers near the south-eastern end conform to the structure for any distance before breaking into the plains. Thus the general pattern gives rise to deep narrow gorges, mostly impassable, especially through the outer range. The rivers from north-west to south-east are as follows: Ab-i-Gangir, which feeds Mandali in Iraq; Ab-i-Gwarkhash (or Galal Tursaq); Ab-i-Kunjan, which flows from Ilam, and Ab-i-Gawi from Arkwaz —these two uniting to water the village of Badra just beyond the boundary; Ab-i-Tima, draining the central district and cutting a passage through the outer range near its highest point to become the Galal Chankula beyond the boundary, and the 'Wadi' of the campaign for Kut in 1916; Ab-i-Maima, which follows the second long valley for about a dozen miles before breaking through the outer range; and Ab-i-Donan, which also occupies the same long valley for a short distance. The south-east end of the Pusht-i-Kuh is less hilly, and there is a stretch of level plain reaching to the westerly loop of the Saidmarreh river below Pul-i-Zal.

A small wedge-shaped strip of mountain country from Ilam (formerly Deh Bala) along the upper slopes of Kabir Kuh is best included in this foothill zone, though it is mostly higher than the foothills. It is generally thinly wooded, but the feature of most interest is the broad cultivated plain near Ilam under which the

great range of Kabir Kuh gradually plunges and disappears. Ilam now consists of flat-roofed stone shacks and a few streets laid out on a rectangular plan, with fields around it (photos. 53, 54).

Elsewhere in these Pusht-i-Kuh foothills the only other buildings until very recently were an occasional shrine and ancient ruin; but during the last few years scattered hamlets of terraced houses appeared by order of Riza Shah and the black tents of the Wali's tribesmen disappeared. Flocks of sheep and goats still make the most of all available pasture, but many small strips of arable land are ploughed and sown with grain.

Karkheh to Diz

The area between the Saidmarreh and Diz rivers is harsh and uninviting. Red rocks prevail over its western part; cliff-fronted hills are formed of brown conglomerate to the east beyond the road and railway. There are no towns or villages, no pleasant little plains as in the Pusht-i-Kuh, only a few watch-towers, and until the road was built there was no permanent population. Now a few families have settled near some of the road-bridges and keep small tea-shops. The role of this district has always been that of an entrance to the mountains of Luristan, a bottle-neck through which tribes must pass with their flocks between winter and summer pastures. During the pacification effected by Riza Shah it was used as a centre for tribal control.

Lower Bakhtiari Country

The lands of the Bakhtiaris lie east of the Diz river. The longitudinal pattern is most marked close to the mountain border, where a long narrow strip of easy country is seriously interrupted only where the Karun river breaks through the Kuh-i-Piyun. South-west of this strip several small upland plains or shallow valleys may be traced with the usual south-east trend, but they are often isolated from one another by hills or ridges of conglomerate. The Karun zigzags across this district in a deeply cut trench and is joined by its right-bank tributary the Rud Shur from the opposite direction after breaking through the Kuh-i-Sarland.

A broad plain with rolling hills, part of it known as Sar Dasht, lies between the Rud Shur and the Diz river. This is the winter camping-ground of some of the principal Bakhtiari clans. On the north it is separated from the corridor formed by the Rud Shur by a great mass of conglomerate worn into jagged teeth and known as



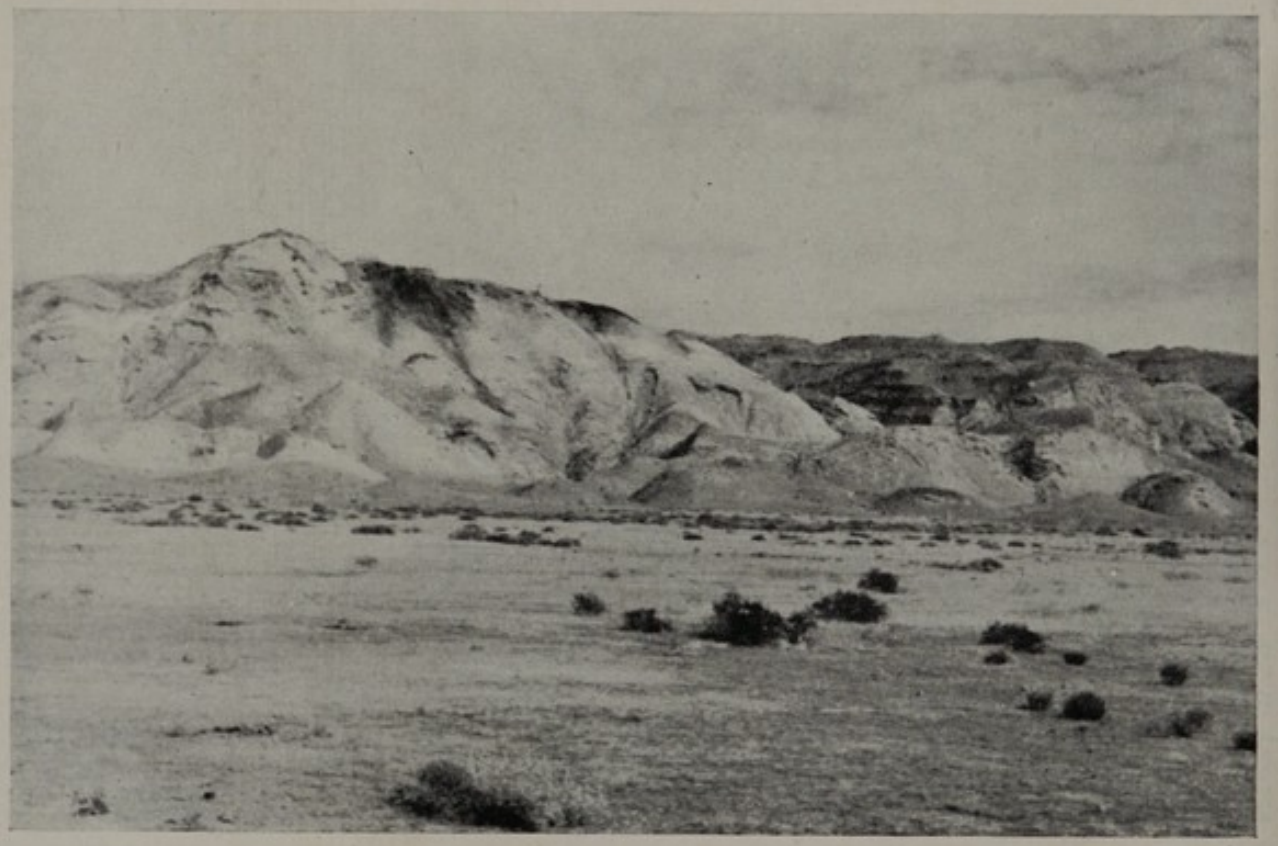
53. *View from Ilam south-eastwards to the Kabir Kuh*



54. *Ilam, a modern village of the Pusht-i-Kuh*



55. *The Karkheh leaving the foothills near Pa-i-Pul*



56. *The Kuh-i-Agajari blackened by a burning gas seepage in days gone by*

Seh Tanan; towards the south-east it rises to tongues of rough red desert separated by low hills. A strip of lowland leads out south-eastwards to the elevated plain of Lali which continues to the edge of the Karun valley on the south; this is mostly coloured white, but red rocks reappear in the sides of the Karun gorge. Red rocks also enclose the Lali plain on the south side, though a steep narrow ridge of conglomerate bounds it on the north. The last of the foothills on the right bank of the Karun, overlooking the plains between Dizful and Shushtar, is formed of gypsum. From Lali the Karun turns sharply south-west and follows a crooked course to Shushtar. On both banks there is little vegetation excepting almond bushes.

The corridor which runs along the mountain foot and takes the Karun for nearly 40 miles north-westwards is continued along the front of the Kuh-i-Piyun and opens out into high open plains from Malamir to Qaleh Tul. A century ago Qaleh Tul was a centre of cultivation and tribal activity, but political disasters shifted the tribal centre to the Malamir plain. Here it remained each winter until Riza Shah broke the power of the Bakhtiari Khans less than 10 years ago. The Malamir plain is now cultivated near its edges and provides good grazing towards the central swamp that forms in winter. Broken country extends south-westwards to the foot of Kuh-i-Asmari, a fine limestone whale-back mountain rising from red and white rocks. The country from Kuh-i-Asmari north-westwards for 50 miles to the Karun is mostly underlain by white gypsum, which tends to be rucked up into raised masses with steep sides and nearly level tops. Under one of these lies part of the famous oilfield of Masjid-i-Sulaiman (p. 490). At the north-west end of the field a group of red hills extends for about 20 miles to another gypsum expanse which persists to the Karun plain. The junction of foothills with plain runs nearly south-south-east from the Karun near Shushtar to the Ab-i-Aala by Ram Hormuz; but the hills run south-east so that a variety of formations abuts the plains; gypsum plain near Shushtar, brown conglomerate hills near Dar-i-Khazina, red sandstone hills near the oilfield of Haft Kel, white gypsum thence to Ram Hormuz.

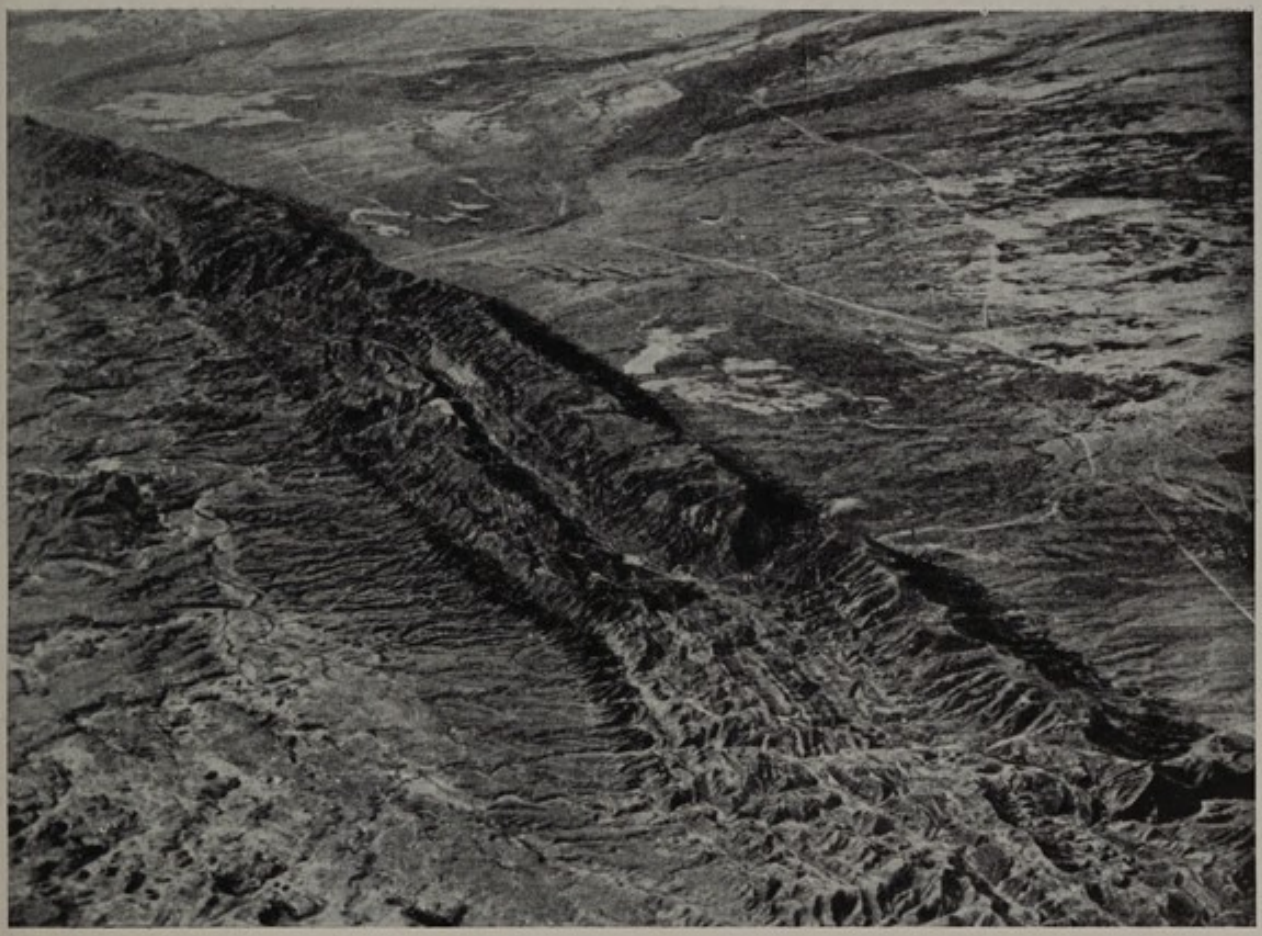
Ab-i-Aala to Bushire

The longitudinal pattern parallel to the trend is emphasized in the next section of the foothills, south-east of the Ab-i-Aala, by the occurrence of long fingers of low plain between the ranges of hills. The usual corridor at the foot of the mountains follows the

south-west flank of the whale-back range of Kuh-i-Bingistan, with cliffs of the spectacular brown peak of Qaleh Nadir enclosing it on the other side. This peak was a stronghold in the past, when besieged made tenable by a water-tank built near the top; it has a wide view of the hill country stretching for 40 miles south-east from the Ab-i-Aala. A belt of plain runs along its south-west side as far as the right bank of the Marun, and links up with the lowland corridor near the old ruined town of Tashun with its arched hall or 'elephant house'; it is almost treeless and little cultivated now, but must formerly have furnished all the grain necessary for the town. A copious hot spring issues from the end of the neighbouring range, Kuh-i-Khaiz. The plain is now used only for grazing.

A narrow pass between Kuh-i-Bingistan and Kuh-i-Khaiz leads eastwards to a plain fringed by mountains. Much of the plain is a gypsum plateau cut into by the Marun river on one side and the Khairabad on the other. Three small groups of red hills rise above it, and the deserted town of Deh Dasht stands on a fertile part near the eastern edge. Its supply canal has been damaged and the ground is untilled, but its gypsum-mortared houses and mosques could be repaired and made habitable. It stands at one end of a fairly easy but disused route to Isfahan. Access to Behbehan and the plains is through a gorge cut by the Marun across the Kuh-i-Khaiz; a mule-track passes along the east side of the defile. In the cliffs above, seepages of pitch issue from cracks in the limestone core, from which small quantities were collected in the past with much difficulty and sold as an ointment or drug called *mumiyeh*.

The great mountain of Kuh-i-Khami reaches from the Khairabad river to the Zuhra. The strip of plain at its south-west foot joins up with that of Behbehan to the west and with intermontane plains to the east, thus forming a natural route, which took the ancient Achaemenid road between Shush (*anc.* Susa) and the palaces of Persepolis and Pasargadae. The Marun, Khairabad, and Zuhra have traces of bridges on this historical road. South-west of this strip of plain is a belt of country about 10 miles wide, mostly composed of white gypsum streaked with red and of occasional ranges of red hills. In this belt is the oilfield of Gach Saran (p. 490). The similarity of the courses of the Zuhra and the Marun is remarkable; both after breaking through the mountain zone turn first south-west and then west-north-west, the Zuhra being forced to do so by the Bibi Hakim range, the Marun by the Agajari hills. Both these ranges are low, have smooth slopes as the beds dip to the north-east, are jagged at

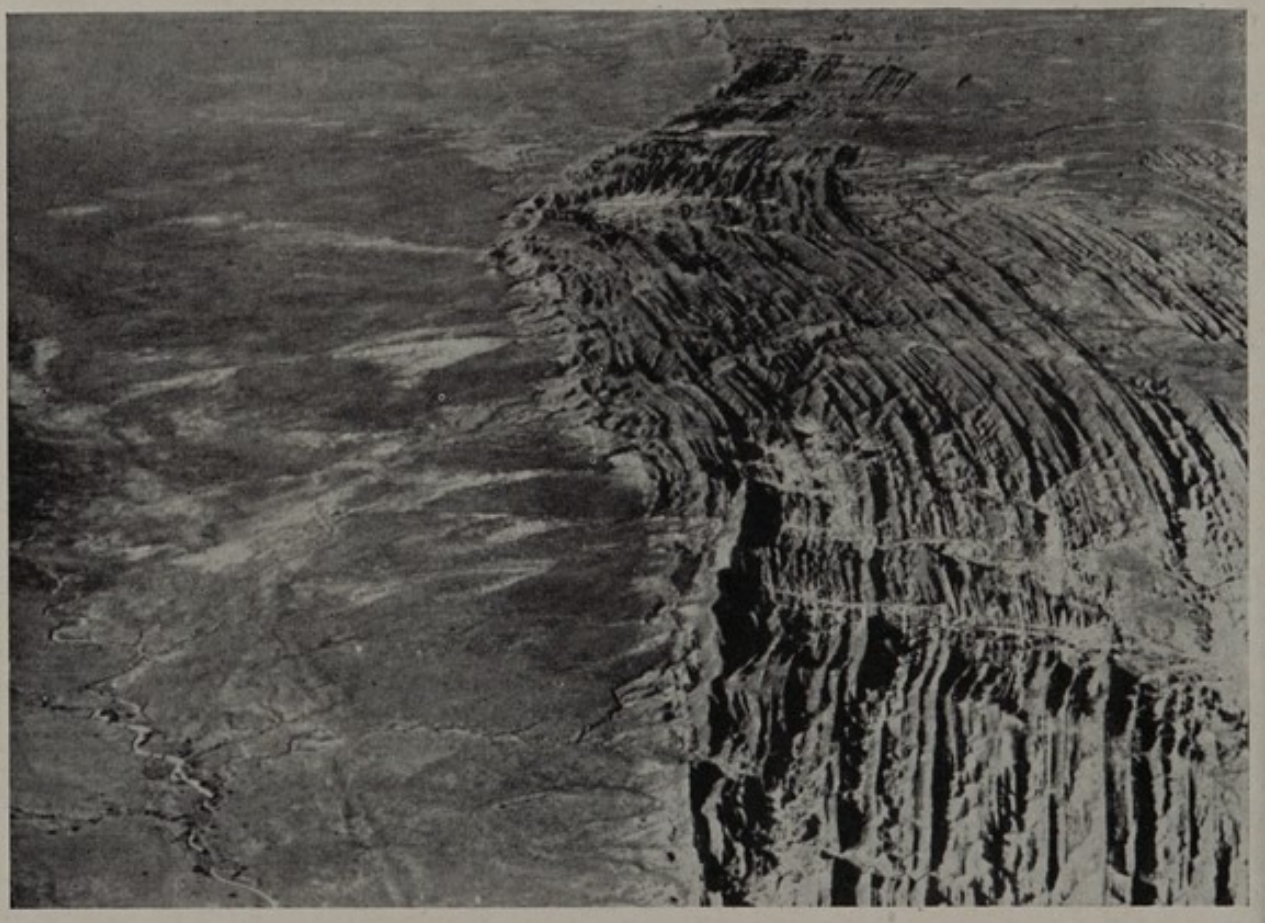




57, 58. *Pazanun, the south-eastern end of the Agajari foothills, seen from the air*



59. *'Badlands' at Kilu Kerim, about 60 miles north of Bushire, seen from the air*



60. *The Mishdakh hills, the north-western end of the Ahwaz range, seen from the air above the Iraqi-Persian frontier*

their tops, and have rough steep faces towards the plains on the south. Each river has a small plain developed along its course and turns suddenly south-westwards round the ends of the ranges. It is strange that such low hills should effectively deflect two rivers which in the mountain belt have carved their courses through high ranges with no apparent difficulty. The courses of the rivers are marked by fringes of jungle, in contrast to the bareness of the neighbouring country (photos. 56–58).

South-east of the Zuhra the mountain front is lower than elsewhere, but the corridor is again noticeable and beyond it to the south-west is a rolling plateau of white gypsum hills freely dotted with oak-trees. This gypsum belt is about 50 miles long between the Zuhra and Shahpur rivers and nearly 30 miles across. Its limestone 'whale-back' is the Kuh-i-Dira. Grey-green hills make rough going on its south-west edge, and one gypsum hump appears beyond them above Sulabadar. Then comes the continuation south-eastwards of the Bibi Hakim, country with a surface like a magnified file (photo. 59), bordered coastwards by a strip of smoother country up to 10 miles wide, followed by a small area of red hills and then the coastal plain. This country is crossed by a small watercourse which rises on the flanks of the gypsum hump by Sulabadar, and which was the natural path for traffic between the coast and mountains before the motor-road was made by the Anglo-Iranian Oil Company. The rest of this district is plain or swamp, with the exception of the Kuh-i-Bang hills which rise from the shore of the Persian Gulf. The plain is grassy in spring and some cultivation of grain and dates is carried on. There is little other vegetation, excepting the scattered thorny *kunar*-trees. The villages of Bandar Dilam and Bandar Rig, both of Persian origin, serve as small ports, and Ganaweh has been fitted up by the Oil Company. The larger port of Bushire (p. 502) lies on a low terrace slightly higher than the flat to the east which connects it with the mainland and becomes boggy after rain.

The Plains of Khuzistan (fig. 14)

The plains lie between the foothill zone on the north and north-east, the Iraqi boundary between the Jabal Hamrin and the mouth of the Shatt al Arab on the west, and the shore of the Persian Gulf on the south. They cover about 16,300 square miles and are almost entirely composed of fine river silt, a soil which once grew fine harvests of grain in the north where the drainage is best. There are large areas of swamp in the south, and salt-marshes form a broad

no-man's-land between land and sea along the gulf, a desolate region of muddy creeks, the haunt of crabs, mud-turtles, and sea birds.

The plains are watered by five main rivers, the Karkheh, Diz, Karun, Marun, and Zuhra, and are mostly dotted with shrubs known generally as 'camel-thorn' to the uninitiated. Movement is easy in fair weather, but after heavy rain all traffic except by railway is immobilized. On the other hand, the lack of drinkable water, especially in summer, restricts permanent settlements. The whole region is roughly divided into two parts by the range of low hills running north-west just north of Ahwaz (photo. 60). After escaping from the foothills the rivers cross low fans of coarse gravel and sand more or less directly, but over the silt plains they meander in shallow beds which are constantly changing (photos. 61, 62). From the air the older courses can be seen, abandoned loops with little lakes in them, others already filled in with silt and levelled off.

The Karkheh (Saidmarreh) has a surprising course and no longer reaches the sea. After flowing southwards for 40 miles from Pa-i-Pul, it meanders south-east for another 30 miles as though to join the Karun, but then turns at right angles, cuts through the Ahwaz hills, and doubles back north-westwards, to discharge its waters on both sides of the Iraqi border into the Hawiza marshes east of Amara. The Diz river enters the plains above Dizful, where it is crossed by a new concrete bridge. It is joined by the Bala Rud 10 miles south of the town and then meanders through the ancient Elamite plain south-eastwards, skirting the western end of a low ridge south-west of Shushtar. Within 20 miles of Ahwaz it turns east and flows into the Karun, abandoning an old course which was once joined by the Karkheh. The Karun after leaving the foothill zone heads south for Shushtar, but forks above the town (p. 428). The eastern branch is used by numerous mills, the western passes the old castle and under the remains of a many-arched Sassanid bridge, before winding over the flats to the south. The two branches reunite where the Diz river joins them, 30 miles directly south of Shushtar, and the combined river meanders on through the Ahwaz hills, past the town of Ahwaz and across the deltaic plain. At Saba it changes direction south-eastwards and its behaviour becomes rather remarkable. It has long straight south-south-west reaches joined by meandering courses in a generally south-east direction. It is suggested that these straight sections may have been artificially cut to make navigable channels in Sassanid or earlier times, just as was done in Abbasid times with the last reach above Khurramshahr, and that, after the river was forced

into these channels, the more easterly meanders were abandoned and became silted up. Some such explanation would support the theory that the Karun discharged at one period south-east from Dorquain into the Khor Musa estuary. To-day firm ground builds the right bank of the Karun, but swamps and marshes, traversed by muddy creeks, lie close to the left. It is noteworthy that two such creeks connect with wadis or depressions running towards Ahwaz; these also may mark still earlier courses of the river. The interesting fact is that the whole of this deltaic tract has been built out from the edge of the foothill zone and has gradually formed a barrier across the head of the Persian Gulf, behind which the waters of the Tigris and Euphrates have been trapped and forced to drop their silt in the great natural settling-tank thus made.[1]

The first watercourse east of the Karun is the very small Ab-i-Gopal, which rises in the group of hills near Haft Kel but peters out through dispersal and seepage beyond the south-eastern end of the Ahwaz hills. The Marun, which leaves the hills at the north-west end of the Agajari hills, carries much water in spring, and from Khalafabad, as the Jarrahi, makes directly for the Khor Musa, which sends up a channel as though to receive it; but when about 15 miles from this channel the Marun turns aside westwards and empties into marshes near Dorquain. A considerable volume of water is lost by evaporation before the remnant reaches the Khor Musa, partly by small creeks and partly by seepage. The bend made by the Marun may be due to a barrier, possibly formed by the silt brought down by it each spring.

The Zuhra or Hindian is the last of the five rivers of the plains. From its abrupt bend beyond the Bibi Hakim hills at Deh Mullah it meanders to the Persian Gulf, building a normal delta, meeting no apparent obstacle, and with a strip of tidal flats at its mouth. Of all the five rivers this alone seems to have had little share in forming the barrier across the Gulf. Immediately to the west of its mouth shoals and creeks develop and all the other rivers have suffered many changes of course. There are not, however, the same historical data available in Khuzistan as in Mesopotamia, and the only river for which discharge data are available is the combined Karun and Diz at Ahwaz (p. 28); there are no detailed records of the other rivers, so that it is almost impossible at present to unravel their history.

[1] For the regime of the Karun see pp. 27-30. The recession of the head of the Gulf has been dealt with more fully in *Iraq and the Persian Gulf* (B.R. 524), pp. 21, 22, 53–5, fig. 14 (p. 51).

Nevertheless some interesting facts may be mentioned. Khor Musa with its port and railway terminus at Bandar Shahpur is an example of a deep-water channel through a mud-flat which remains open and clear of sandbars. How is this possible? It may be that there is a fairly steady current of seepage water to the sea. At least three old channels reach out from the Khor Musa: one north-eastwards towards the Marun, a second northwards towards the Karun rapids near Ahwaz, a third westwards to the old Bahmishir channel of the Karun 8 miles north-east of Khurramshahr. The last of these is now silting up and carries little water; the other two are now overflow channels from marshlands and discharge clear water to the sea, but at one time there was much cultivation below Ahwaz irrigated by canals drawing water from a weir at that point, and the northern channel may have originated from that area.

There are now six towns in these south-western plains: Dizful, Shushtar, Ram Hormuz, Ahwaz, Khurramshahr, and Abadan. Dizful, Ram Hormuz, and Shushtar are markets and milling towns close to the foothills commanding strategic river crossings. Ahwaz is the river port on the Karun; steamers can reach this point, but a rock bar prevents them from going farther upstream. It was for long the emporium of Khuzistan, with roads through Dizful, Shushtar, and Ram Hormuz into the wild tribal country and even to Isfahan, Hamadan, and Kermanshah. It has taken a new lease of life as an oil station and more recently as the headquarters of the Trans-Iranian railway in the south (p. 514). Khurramshahr (p. 504) is the port for ocean-going ships and for the export of dates. Abadan (p. 496) has grown during the last 30 years from a small village to a large Persian town; it is the terminus of an oil-pipe line, and has one of the largest oil refineries in the world.

The famous town of Susa, the Elamite capital, now marked by the village of Shush, stood in the fertile plain in the north. During the present war an attempt was made to increase its cornlands under the security and industry of the British.

IV. The Desert Basins of Central Persia

Almost half of Persia is made up of basins from which there is no outlet and of which the collected drainage is removed by evaporation. These form part of a greater system extending from beyond Tehran in the north-west far into Afghanistan in the east. At some time in the prehistoric past, when the volume of water was greater than now,



61. *Ferry on the Karun at Shushtar*



62. *Looking up the Ab-i-Diz at Dizful*





63, 64. *Stages in the development of polygonal plates of white salt-crust, south-east end of the Great Kavir, April 1933*

these basins enclosed extensive lakes. After many centuries of low rainfall the lakes have contracted or dried up, though in the north-west the run-off from the mountains is still considerable. Over much of the area the old lakes have been replaced by expanses of silt and mud overlaid by a thin skin of crystalline salts. The edges of these areas are often buried by a wide fringe of gently sloping rock waste which has slipped from the mountain ribs bounding the depressions. These piles of boulders, pebbles, sand, and silt, all mixed together, are steepest near the mountain foot but are almost level near the edge of the salt marsh. Sometimes, however, they end above the general level of the plain in a step or terrace with almost vertical edge, marking the shore-line of the ancient lake. In the basin known as the Southern Lut, which is the driest, most of the salt-marsh has not only dried up but the bed has been deeply eroded into fantastic forms which have led travellers to describe them as 'deserted cities'. Elsewhere in this basin there are great piles of sand, chaotic in the south-east but marshalled by the wind into gigantic waves and troughs farther north.

The climate in these basins is extreme. They are not quite rainless, but rainfall is rigorously confined to winter, and even then the number of wet days is very limited. Summer temperatures are very high, and it has even been suggested that the inner part of the Southern Lut is 'the hottest part of the earth', though, since there are no meteorological stations either here or in its rival regions, the claim obviously cannot be proved.

The basins fall into three groups: (i) the northern group comprising the Great Kavir and its subsidiaries, (ii) the Southern Lut, and (iii) the south-western group in a line from Hamadan in the north-west to Bampur in the south-east, which includes the Jaz Murian. These last are much less spacious than those east of them, and are better known and less dangerous to travellers; they have not, however, been subjected to the same scientific examination as their neighbours. There is some confusion regarding names. Maps compiled by British cartographers refer to the first two groups mentioned above as the 'Dasht-i-Kavir' and the 'Dasht-i-Lut', but these names are considered inaccurate by modern travellers. The word *Dasht* applies to desert where there is a firm surface, either of gravel or of a mixture of gravel and silt; it has no salt-crust and does not become mire when moistened. *Kavir* is the name given to each individual waste of salt-slime and mud, large or small. *Lut* refers to the whole group of basins from Tehran to Taftan, and to the whole uninhabitable wilderness in general. *Rig*

enters into the names of districts where there are deposits of sand, and *Namak* sometimes where there is salt-crust or salt-lake. Thus the whole central region including the two great basins should be known as the Lut, and each basin generally contains both *dasht* and *kavir*. Probably the best names for the two groups are the Northern Kavirs and the Southern Lut. The south-western group of basins are best known by their individual names.

The northern group and the Southern Lut together cover a vast area of central Persia. The Southern Lut is the lowest and most dangerous. Most of the knowledge gained is the result of fearless journeys by Dr. and Mrs. Alfons Gabriel, who have added greatly to that of earlier travellers. More recently the use of motor vehicles has facilitated study of the edges, but kavir is impassable to them and can only be crossed by camel caravan with considerable risk.

These two groups are walled in by mountains so that little rain reaches them. In the north the Elburz chain almost completely stops the rain-bearing currents from the Caspian (p. 156); the eastern rim is made up of mountains occasionally rising to 8,000 feet (pp. 107 ff.); the granite massif of Kuh-i-Jamal Bariz shuts in the basins on the south-west (p. 106); a naked but not very lofty range separates them from the south-western basins, but these are walled in by the higher Zagros mountains beyond. The total area of these two groups is about 90,000 square miles, of which about one-quarter is covered with salt-encrusted mud.

The surface of the kavirs differs in detail from place to place, but generally it is divided up into polygonal sheets of salt-crust about half an inch thick and resting on dark slime. As the salt crystallizes, the sheets grow, and either their edges are forced up and break off leaving sharp jagged fragments littering the ground, or their centres are arched upwards free from the mire. Occasionally the salt mingles with the mud forming black salt-marsh (photos. 63–66). During summer all these different types of kavir may be traversed by camels, though the splintered salt-crust damages their feet. The great danger in the kavir is the presence of channels of ooze beneath the salt, which never dry. These 'rivers' of ooze are known as *shatt*, and though relatively narrow, they may completely check a caravan, and both men and animals have been lost in them. They are found especially on the north and east of the Great Kavir, where they seem to be the collected residues of the drainage into the ancient lakes. Their persistent wetness is partly caused by the presence of magnesium chloride in the salt mud, and it is this constituent which makes the whole of

the Great Kavir dangerous in autumn when the dry salt surface becomes churned into mud after rain.

The kavir is a desolate wilderness bare of vegetation. The change from one type of surface to another is often abrupt, and the 'shore' where the kavir meets sandy desert is also well defined. At rare intervals near the edge of a kavir a tooth of rock projects above the silt and forms an isolated stack. Gabriel visited three such stacks and found each of them separated by a *shatt* from the shore. A crossing in one place was indicated by the tracks of wild asses.

A study of the heights given on Gabriel's map shows considerable variation from point to point, but in all probability the salt surface of each kavir is fairly level. Heights by barometer taken on large flat areas, subject to considerable diurnal variation of temperature and to sudden changes of weather, must be inaccurate in the absence of fixed control stations.

The Northern Group of Basins (figs. 16, 17)

This group comprises seven separate sumps:

(*a*) the Qum–Masileh basin, with three perennial salt-lakes, south of Tehran;

(*b*) the Great Kavir, or Kavir Buzurg, mostly covered with a sheet of salt-encrusted mud;

(*c*) and (*d*) two or three small depressions, with kavirs in them, north of the Great Kavir and south of Garmsar, Samnan and Damghan;

(*e*) the Mazinan depression, north-east of the Great Kavir;

(*f*) and (*g*) the Bijistan and Bahabad depressions on the east, with Tabas between them.

The *Qum–Masileh* basin lies about 50 miles south of Tehran and has been crossed without much comment by many travellers between Qum and the capital (fig. 16). It is enclosed on the south-west by low hills near the Qum–Kashan road, and on the north-east by some minor outlying hills, including the Siah Kuh and Dowazdeh Imam, with a north-westerly trend; on the east it is separated from the Great Kavir by a col at Safid Ab, about 400 feet above the Kavir Masileh. On the north-west it is much more open, and though there are mountains about 100 miles distant, the valleys behind them are drained by two long rivers, the Qara Chai which rises in the neighbourhood of Hamadan, and the Rud-i-Shur or Qara Sit which drains the eastern side of the watershed of the Qizil Uzun basin. Compared with the

rest of the central depression this western extension is well watered; snow lies on the mountains in winter, and the rivers are fed by numerous springs. The main road between Hamadan and Kazvin crosses both rivers, and after traversing the watershed between them at Sultan Bulagh follows the Aveh Chai through deeply cut and finely stratified country.

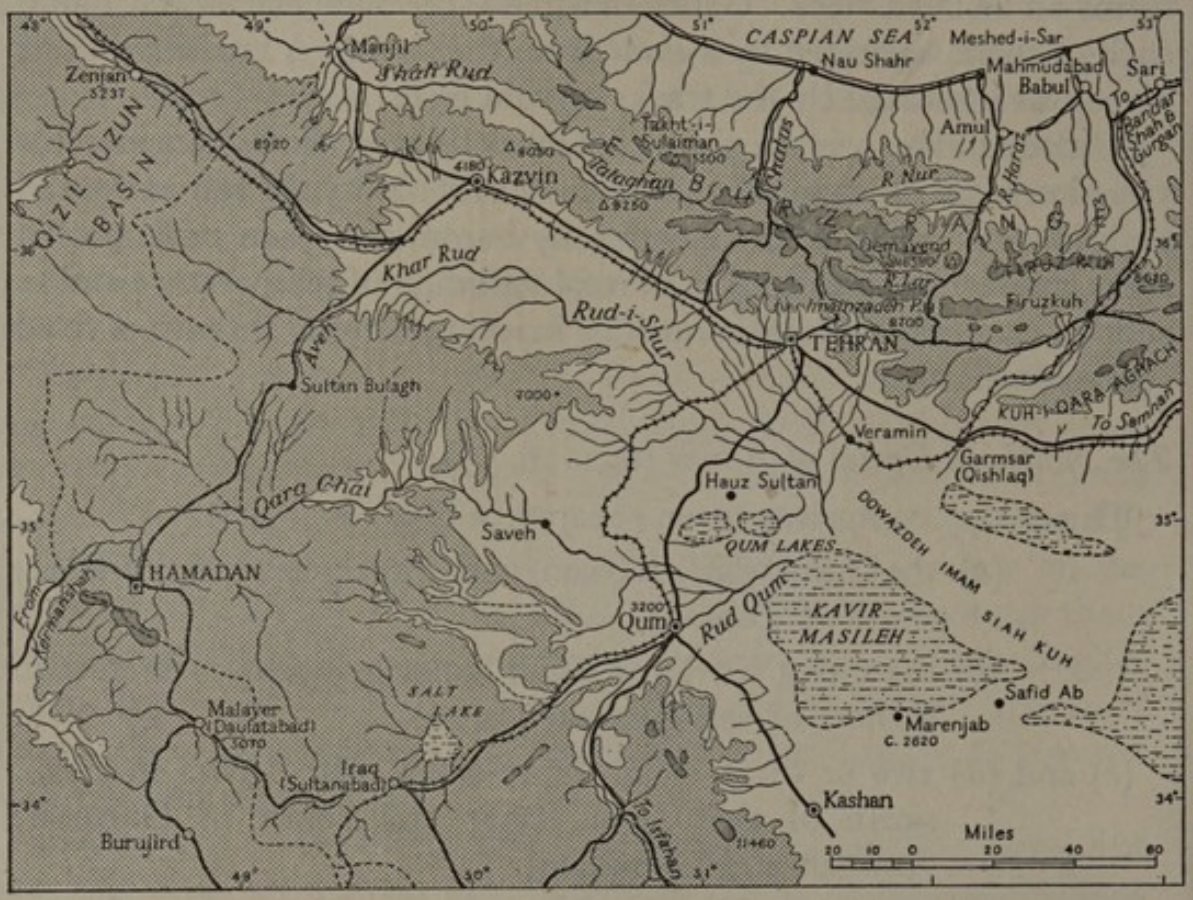


FIG. 16. *Qum–Masileh basin. Layers stippled at 5,000 and 10,000 feet; heights in feet.*

The basin itself contains three lakes, the Kavir Masileh or Darya-i-Namak east of Qum, and two much smaller north-west of it. All receive their water-supply from streams from the Elburz on the north, or from the mountains to the west. The two small lakes are separated by a narrow neck of firm ground across which there is a track from Qum to the ruins of Hauz Sultan, but the eastern of the two sometimes discharges into the western, so that the main motor-road between Qum and Tehran skirts the western side of the kavirs. The Kavir Masileh receives much more drainage and the proportion of lake to kavir varies from year to year and from season to season, but the shore of the kavir is defined where the yellow edge of the silt meets the white salt-crust under which lies the treacherous black mud.



65. *Salt-crust arching up in the Great Kavir*



66. *Black and white salt-crust mixed with mud, Great Kavir, April 1933*



67. *Northern border of Great Kavir basin at the site of ancient Rai (Rhagae), 6 miles south of Tehran*



68. *Yangi Imam on the Kazvin–Tehran road from the Zoroastrian temple mound*

There is a little scattered vegetation around the edge, and in the south near Marenjab a belt of sand-dunes nearly 100 feet high and about 10 miles long is fixed by a sparse growth of grasses. The area covered by kavirs and lakes in this basin is about 1,300 square miles. The streams feeding them traverse flat alluvial country covered by sparse bush and diverge delta-wise into distributaries as they approach the kavirs.

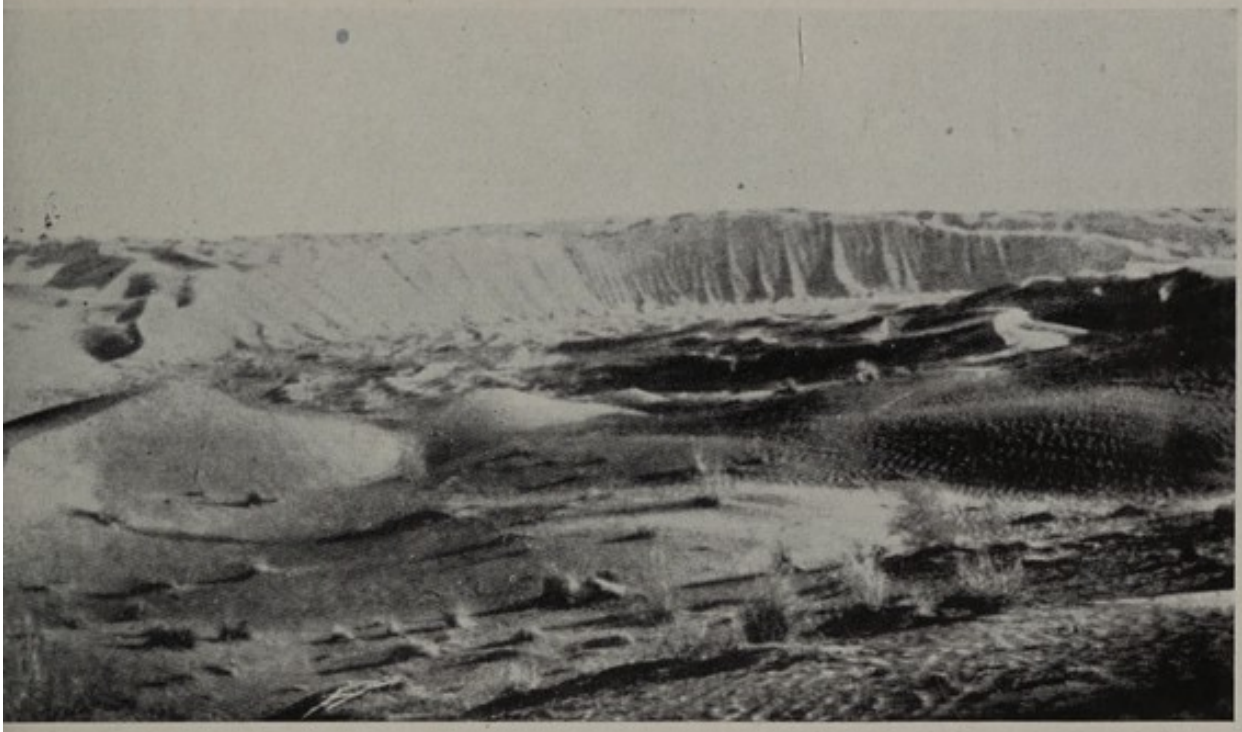
The *Great Kavir* or *Kavir Buzurg* (fig. 17) is 230 miles from west to east. Its southern 'coastline' is so irregular that its breadth varies from 40 to 150 miles, the average being nearly 100 miles. It is roughly at the same height above sea-level as the Kavir Masileh, a little less than 3,000 feet. Parts of the kavir 'coast' are known in fair detail, for instance in the south-west, south, and north-east; elsewhere the coast is only roughly delimited. Hills keep fairly close to the edge of the salt-crust along the south, and Kuh-i-Domdar, east of Jandaq, projects like a jetty, leaving a gulf-like sheet of kavir to the south of it. There is a channel of mire or *shatt* close under the end of Kuh-i-Domdar, but the salt-crust from here across the mouth of the gulf to Halwan is particularly harsh and broken, tending to lame camels. Elsewhere the gulf is easy to cross and the direct crossing between Halwan and Kuh-i-Domdar seems only to be used when brigands are active. Patches of sand occur occasionally on the southern shore. The largest is Rig-i-Jinn, north of Anarak, which is about 50 miles long and about 10 across (photo. 69). Another accumulation lies east of Jandaq, and there is a strip on the south of the 'gulf' of Domdar.

Generally the shore of this kavir where known rises very gently from the marsh region, though at some places terraces overlook it and occasional rocky teeth rise near its edge or even within the kavir. Thus Kuh-i-Ali Narkhar (south-east of Turud) and Kuh-i-Airakun (north-east of Khur) are two granite stacks, and Kuh-i-Kahriyar (Gurial) is of sandstone, all three rising out of the salt-crust. Each has a *shatt* at its base. Only two surface channels of any size are known to discharge into the kavir: the perennial Kul-i-Mura reaches the north-eastern bay and keeps an area permanently marshy; the saline Kul Shur discharges intermittently into the kavir on the east and has built up a considerable delta.

A caravan road from north to south keeps close to the western shore and along the Safid Ab ridge, and another lies near the eastern shore ioining Mazinan and Tabas. Routes also lead from Jandaq and Khur on the south across the kavir to Turud in the north, but a *shatt* near the northern shore makes the crossings difficult and the routes are



FIG. 17. *The Great Kavir and its subsidiaries. Layers stippled at 5,000 and 10,000 feet; heights in feet. The railway east of Shahrud is not yet completed* (1944)



69. *Rig-i-Jinn sand-dunes, south-west of the Great Kavir*



70. *Sangfarsh 'rock carpet' across the Kavir south of Tehran*



71. *Kul Shur, the northern feeder of Namak Sar, Southern Lut*



72. *Gudar-i-Barut, on the Kul Shur, Southern Lut*

seldom used, and then only in the dry season. Caravans avoid the kavir in the hottest part of the year.

The northern shore of the kavir, westwards of Turud, is not well known. Between the hills which border it and the main Tehran–Meshed road which passes through Samnan, Damghan, and Shahrud, there are three small kavirs. The most westerly, south of Garmsar (Qishlaq), is only a narrow strip of morass, less than 10 miles wide, but it is notable for the causeway which crosses it. This causeway, known as *Sangfarsh* or 'rock carpet', was built in bygone days as part of an all-weather road from Qishlaq to Kashan, and runs straight across the sheet of salt-encrusted mud. It is built of stone blocks set in the mud and is from 12 to 15 feet wide and about 18 miles long (photo. 70). The kavir extends at least 15 miles west of the causeway, but its limits are not yet mapped. Presumably it continues for some distance, otherwise it would not have been worth while constructing the causeway, the stone for which must have been brought a long way by pack transport.

Two other kavirs in this zone lie south of Samnan and Damghan. That near Samnan is about 20 miles wide and is rendered dangerous by slime-belts; its east and west limits are not known, and it is possible that it joins the kavir south of Garmsar. The kavir south of Damghan and east of Frat is certainly detached, since it is skirted on the west by the road from Damghan to Turud, and it does not reach the road from Shahrud to Turud.

The perennial Kul-i-Mura has already been mentioned. Upstream is the *Mazinan depression*, which has all the attributes of a kavir, except that the Juba Rud or Kul Sabzawar flows through it to join the Kul-i-Mura (p. 45). It is about 300 feet higher than the Great Kavir and has an area of about 200 square miles. There are extensive sand-dunes to the south of it. Between Turshiz and Bijistan, and south of the Kul Shur, is the Bijistan Kavir, about the same height as the Great Kavir but separated from it by a low ridge. The plain at its eastern end and that around Turshiz are populous and well cultivated. Little is known of the kavir about 20 miles south of Tabas except that it is desolate and bordered by sand-dunes on the south.

The Southern Lut (fig. 18)

The Southern Lut is the deep oval depression, mostly between latitudes 29° and 32° N., and lying between the roads through Ravar, Darband, and Naibandan to Birjand on the north and from Bam through Fahrej to Nasratabad-Sipi on the south. The basin is

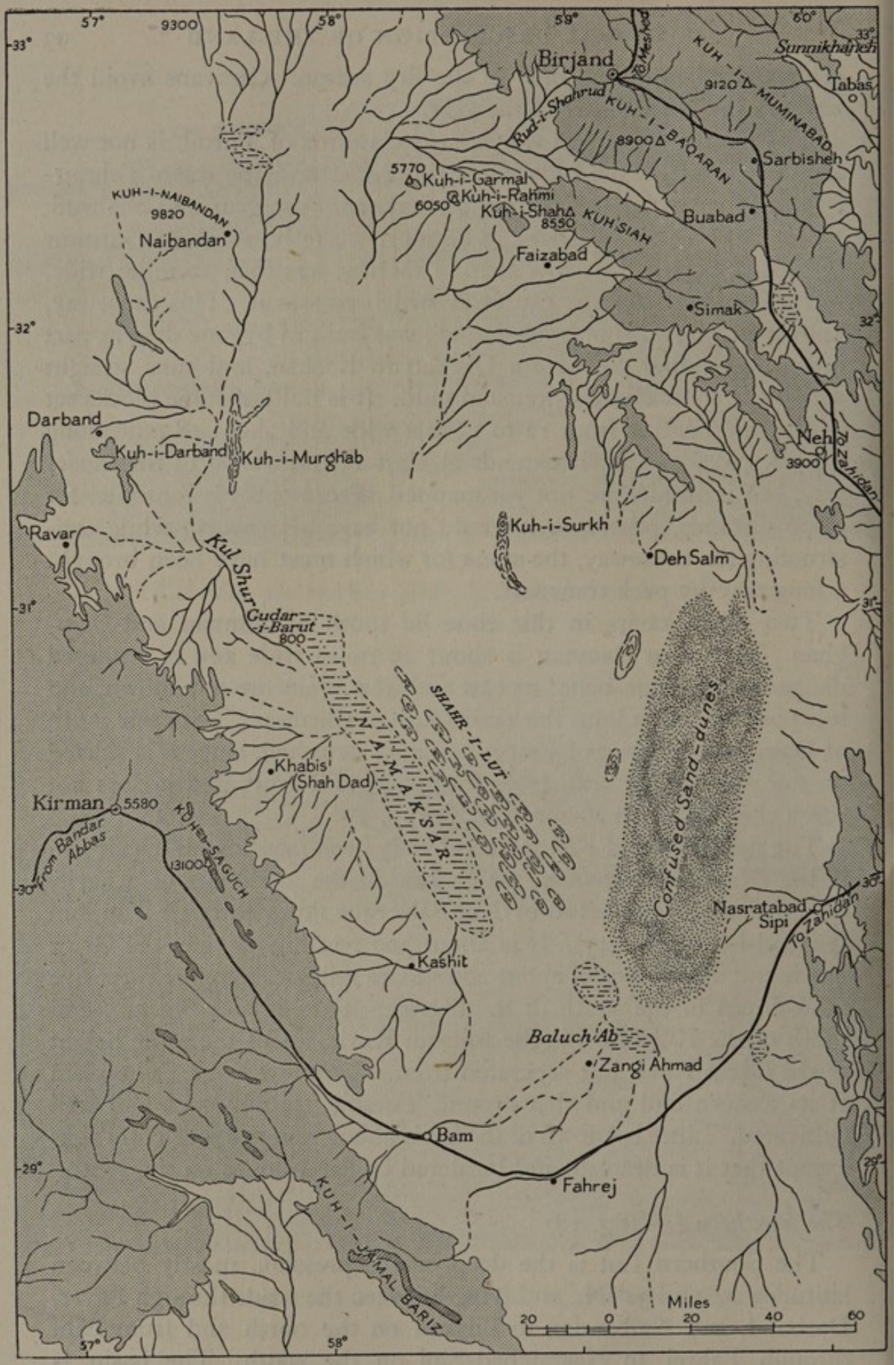
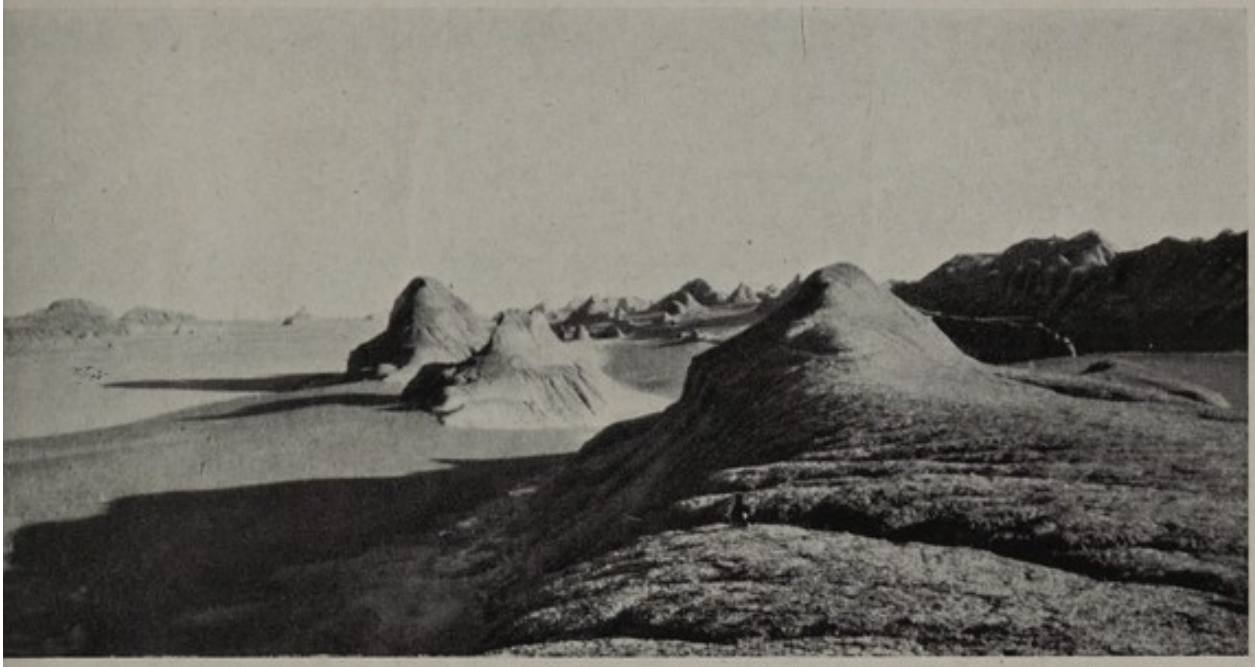
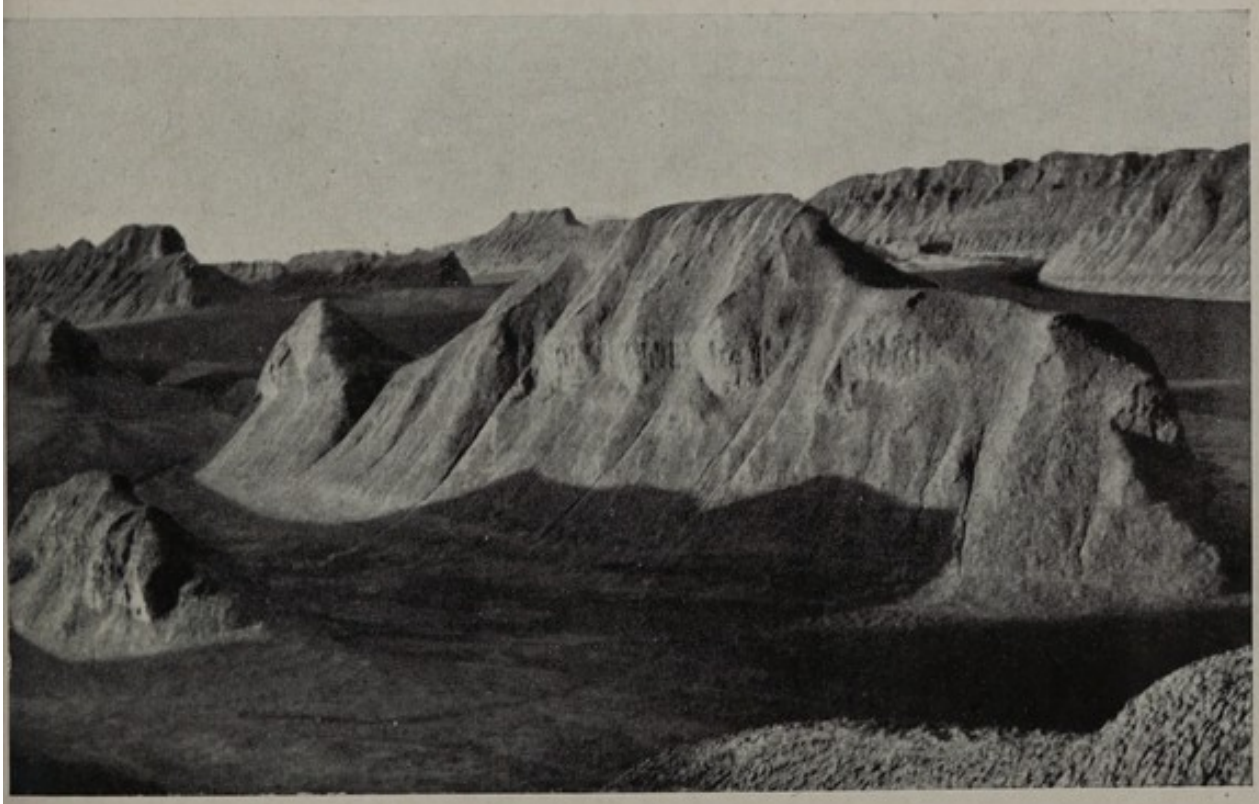


FIG. 18. *The Southern Lut. Layers stippled at 5,000 and 10,000 feet; heights in feet*



73. *The southern end of the Shahr-i-Lut*



74. *Broad passages between the ridges of the Shahr-i-Lut*



75. *View westwards of the Kuh-i-Jamal Bariz, from the road north of Ab Barik*



76. *Five lake terraces on the northern side of Kuh-i-Jamal Bariz, east of Ab Barik, southern edge of the Southern Lut*

bounded on the west by the high range Kuh-i-Saguch (13,000 ft.) east of Kirman, on the south-west and south by the Kuh-i-Jamal Bariz (12,450 ft.) and Bazman Kuh (11,470 ft.), on the east by the eastern rim of Persia, and on the north by lower hills separating it from the Great Kavir. The well-used roads of Persia pass round the Lut on the east, south, and west, but one track crosses the basin almost direct from Shah Dad (Khabis) to Neh. This track crosses the salt river Kul Shur at a slippery ford, Gudar-i-Barut, one of the lowest points in central Persia (800 ft.), overlooked by friable hills (photos. 71, 72). The Kul Shur collects the spasmodic drainage from the northern hills between Darband and Birjand and discharges into a long narrow kavir, the Namaksar ('salt-lake'), about 20 miles east of Shah Dad. Between the foothills bordering the dasht and the central kavir there is a fall of nearly 3,000 feet; much of the fall is very gradual, but near the centre the wind has carved furrows of considerable size out of the old lake bed, leaving great ridges standing up between them. The number and size of these increase southwards, and their bold, steep, stepped sides recall the forms of castles and buildings; hence their name, Shahr-i-Lut, 'the cities of Lut' (photos. 73, 74). Between the ridges are wide smooth passages running from north-north-west to south-south-east making travel easy in this direction but impossible across it. There is, however, one trail crossing the Southern Lut from south-south-west to north-north-east which was first mentioned by the Arab geographers and has been confirmed by Dr. Gabriel, who made a traverse from Garr Safid to Kashit across the heart of the Lut, though he was deflected southwards from a direct crossing by the Shahr-i-Lut and nearly came to grief among sand-dunes south-west of it. It is now known that the Shahr-i-Lut ridges extend between latitudes $29\frac{1}{2}°$ and 31° but are clear of the great mass of confused sand-dunes which occupy the east side of the Lut, and that there is a trail, between the Shahr-i-Lut and the sand-dunes, along the firm silt bed of the old lake which has been swept bare of sand by the wind. The southern entrance to this corridor is close to the shore of a small kavir lying just north of Zangi Ahmad near the Bam–Zahidan motor-road, and the trail runs to Deh Salm about 120 miles to the north; it is still occasionally used by raiding tribes.

The drainage in the Southern Lut comes from the rains falling on the lofty Kuh-i-Jamal Bariz (photos. 75, 76) or its extension around Deh Bakri. This drainage is collected by the river which passes through Bam, but lower down this river is joined by other watercourses from the south. All this drainage feeds a marsh at Baluch Ab and its

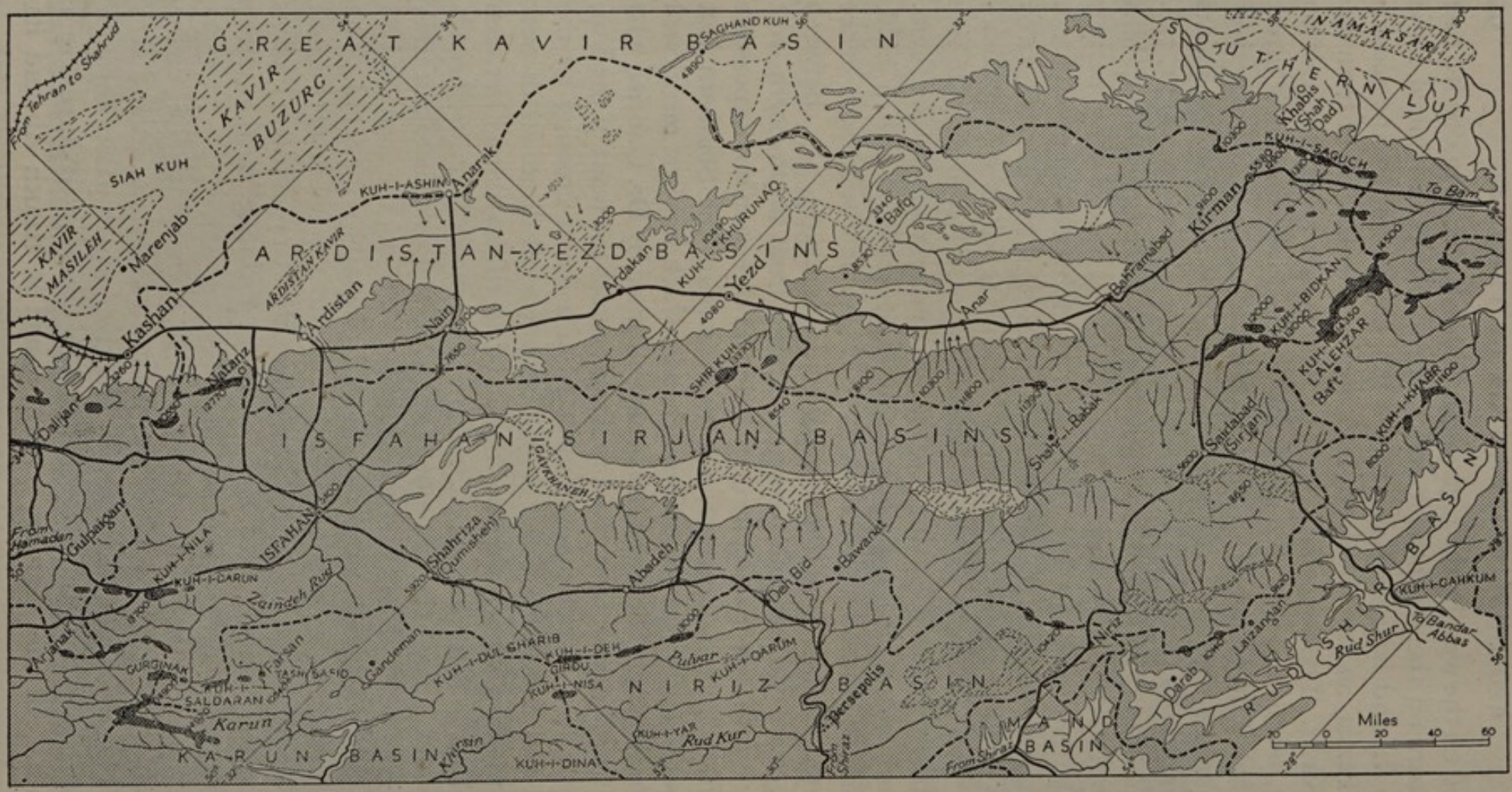
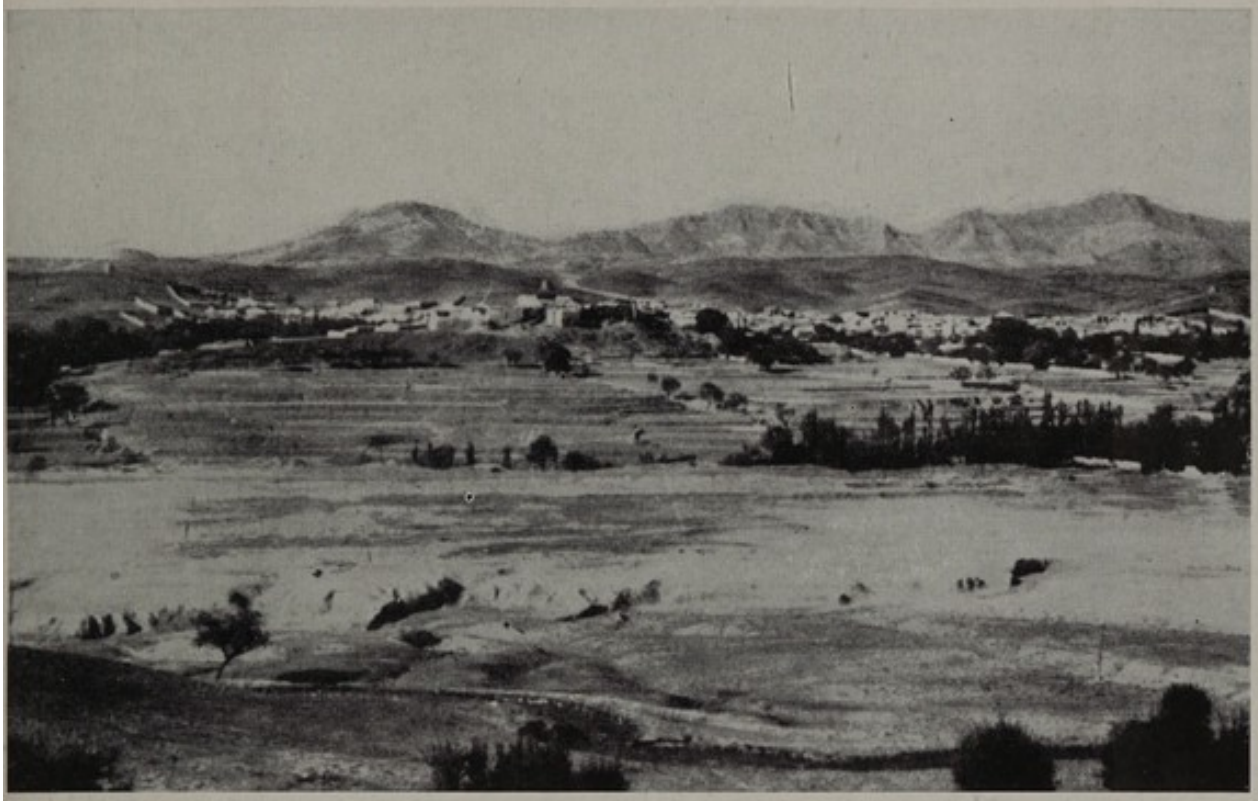


FIG. 19. *The South-western inland basins. Layers stippled at 5,000 and 10,000 feet; heights in feet*



77. *Varpusht village, Isfahan basin, about 35 miles west of Isfahan, on the Gulpaigan road*



78. *Samirun (Usburjan), Isfahan basin, between Shahriza (Qumisheh) and Abadeh*



79. *Bahman village, 10 miles west of Abadeh, from the north-west*



80. *Kuh-i-Taghun, near Bahman*

surplus reaches a kavir which is independent of Namaksar, so that the drainage from the southern edge of the Lut does not mingle with that from the northern (photo. 151).

The lowest part of the Lut, about 800 feet above sea-level, is over 2,000 feet below that of the Great Kavir, and it is more than 11,000 feet below the summit of Kuh-i-Jamal Bariz. The northern rim of the basin is lower than the southern, but reaches over 6,000 feet in places. Outlying isolated hills project through the alluvium of the old lake bed on the north, one standing two days' march inside the Lut. Wind and dust-storms are the curse of the region, and, though the wind does not seem to persist in one direction, it does appear to have been the cause of sweeping the sand from dried-up delta fans into the great mass of confused dunes on the east, which extends for about 100 miles and is about 40 miles wide (photos. 141, 142). Little vegetation is encountered inside the Lut, and the main mass of the sand-dunes are also barren; but the outer fringe of the sand-mass is dotted with scrub, which becomes less sparse eastwards and forms a belt of scanty vegetation in winter. This forms a marked contrast to the vegetation in the better watered valleys on the west side of the basin, where there are date-gardens, e.g., at Shah Dad.

The South-western Inland Basins (fig. 19)

The depressions bordering the south-western side of the Great Kavir and Southern Lut are comparatively narrow. The basins are shaped by the roughly parallel lines of mountains standing between 30 and 40 miles apart, and are strung in chains from north-west to south-east; the kavirs within them show roughly the same alinement. There is, however, considerable encroachment of the debris from the hills over the edges of the kavirs, though the landscape presents a desolate appearance (photos. 77–82).

The first chain of basins begins east-south-east of Kashan, with a small kavir north of Ardistan, another about 50 miles east of Nain, and a third about the same distance east of Yezd. The great motor-road from Kirman to Tehran passes through all these towns, and therefore crosses the valleys which feed the basins. All three kavirs lie at about 3,000 feet above sea-level, approximately at the same altitude as the Great Kavir; their normal areas are about 90, 250, and 150 square miles respectively, but they are at present inadequately surveyed. They are shown on fig. 19 as the Ardistan-Yezd basins.

The second chain of salt basins is strung along the next depression

to the south-west. There is a detached outlier near the town of Iraq[1] (Sultanabad) which contains a salt-lake well known to travellers from Khurramshahr to Tehran by the Qum road. The main depression begins east of Gulpaigan where the drainage runs south-east to feed the salt-swamp east of Isfahan, in which the Zaindeh Rud is also dissipated. This swamp is the north-western end of a succession of kavirs totalling 150 miles in length which are separated by a low divide in the same valley floor from the basin of Sirjan. The Sirjan kavir dries up fairly well in the summer and is not traversed by treacherous mud channels. A road used much by animals and occasionally by motors crosses it from Niriz in the west to Sirjan (Saidabad),[2] where it meets the main motor-road between Bandar Abbas and Kirman. The Sirjan kavir is about 160 feet higher than the rest of the chain of kavirs to the north-west which are just under 5,000 feet above sea-level.

The country south-east of Sirjan rises to a dreary upland plain which then gives way to the remarkable basin of Jaz Murian. Here the lowest point is only about 1,000 feet above sea-level, but the water in the *Hamun*, which is fed by the Halil Rud on the west and the Bampur river on the east, is generally drinkable when there is any. It is thus rather different in type from the kavirs, and is described as part of south-eastern Persia (pp. 104–107).

V. South-eastern Persia

South-eastern Persia (fig. 20) comprises a coastal plain on the west and south, seldom 20 miles wide; the unprepossessing hill wilderness of Persian Makran, a plateau of crumbling red-brown and grey-green rocks, about 70 miles wide, rising northwards to a dominating range, the high edge of a plateau occasionally more than 6,000 feet above sea-level; the inland basin of Jaz Murian, little more than 1,000 feet above sea-level in the middle, and filled with a thick deposit of silt, partly covered by sand-dunes; and the northern range of Kuh-i-Jamal Bariz, rising to 14,000 feet in the north-west but falling to lower hills in the east. Altogether this region covers an area of 50,400 square miles, and is about 300 miles long from west to east and nearly 180 miles broad. The Southern Lut lies beyond it on the

[1] The name of this town has been recently changed from Sultanabad to Iraq, which is often confusing. It is sometimes spelt Arak, which seems to have been adopted for the railway station. For a map of this basin, see fig. 53.

[2] Saidabad is the new name for the much better-known Sirjan.

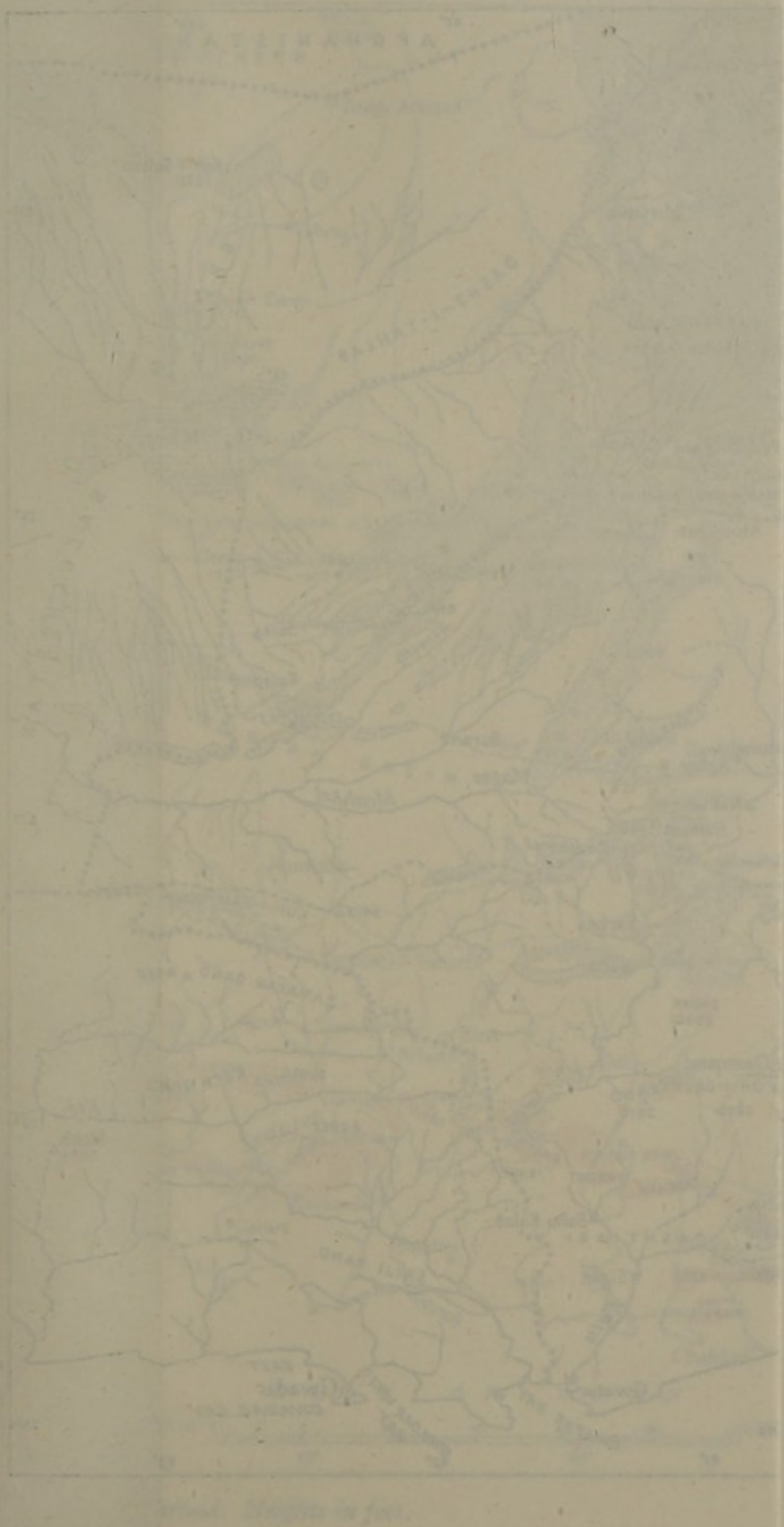




FIG. 20. *Persian Makran, Jaz Murian basin, and Sarhad. Heights in feet.*

north (pp. 93–96); the gulf of Oman, from the Rudian river in the strait of Hormuz to Gwatar, bounds it on the south; south-west Persia abuts it on the west, the limit being Minab, the Kuh-i-Zindian, the bare gabbro peak of Kuh-i-Shah (8,500 ft.), and the summit of Kuh-i-Bidkhan (13,000 ft.). The eastern boundary follows the undemarcated frontier from Gwatar as far as the Kuh-i-Bampusht range, and then turns back westwards along this range to the Guinak pass south-west of Magas, thus separating the drainage of the gulf of Oman from that of the Mashkel. From the Guinak pass it crosses to the Kuh-i-Birg and follows the northern watershed of the Bampur river and Jaz Murian drainage.

The population throughout is scanty; the central part of the Jaz Murian plain is uninhabited for most of the year, but in the spring of some years there is a little cultivation and usually good grazing according to east Persian standards. Dates are the staple food of the people, eked out by a little corn, dried fish brought in from the coast, and a very small amount of meat raised locally; camels are the normal means of transport.

The narrow coastal plain is described in Chapter IV, so that here the only two main divisions to be dealt with are the Persian Makran hills and the Jaz Murian basin.

Persian Makran

The ranges of Persian Makran exhibit two trend-alinements at right angles to each other: from north to south on the west and along the Biaban coastland west of Jask, and from west to east inland from Jask to Gwatar. The change from one to the other is sharp, as seen near Gaigan, 12 miles north of Jask. The structure, topography, and landscape show marked contrasts with those features of south-west Persia. The mountains are no longer composed of domes (p. 74), but tend to be basin-shaped or 'synclinal' on the south, and rise from a platform of silt or clay which gains height gradually from south to north. Each range has along its crest-zone a depression, the rim of which falls in steep cliffs to the platform of harsh plain between the ranges. An occasional stream breaks from the central depression through the rim, but usually only its bed lower down carries water supplied by a spring issuing from the junction of the sandstone and clay. The yield of such springs is small, but serves to water the date-palms which support a few families. The drainage pattern is also different from that of the Zagros. In the Makran the rivers do not carve gorges through the mountains, but tend to insinuate themselves

between and around them in fairly wide valleys, with the result that almost all provide practicable routes inland from the coast, because the gradient is more gradual. The river beds do not maintain an even width but widen to as much as a mile when away from the hills; they are amply filled with gravel, and even when they narrow to 100 yards they are without rapids or boulders. Only near their head is the gradient so steep as to be difficult for camels, and then only for a short distance. Another interesting feature of the landscape is the abundance of 'benches' and 'terraces', found along all the valleys. They are correlated with raised beaches near the coast and preserve approximately the same interval between themselves and the present river bed from source to mouth.

From these outer hills of Makran five prongs of rock come down to the sea and divide the coastal plain into sections. They reach the sea near Bunji (37 miles west-north-west of Jask), Bahal (just east of Jask), Gohart (about 60 miles farther east), Bandini (50 miles farther on), and between Chahbar and Gwatar. In most of these prongs the friable beds of sandstone and silt are nearly flat. The rocks near Gohart have been partly worn away, leaving remains which recall Stonehenge. The landscape east of Bandini is one of fantastic columns overlooking 'bad-lands' of confused hillocks and gullies, resembling the séracs of a glacier ice-fall and better viewed from the air than on the ground. Nil-i-Sunt, north-east of Chahbar, is a bold mass surrounded by fine cliffs, with a summit like the regular waves of a petrified sea (photos. 130, 131).

This southern part of the hill zone of Makran extends to within about 50 miles of the eastern frontier, where a deep embayment of plain extends northwards from the coast on both banks of the Kaur Kalu.

About 50 miles inland of the coast the character of the mountains changes. The ranges no longer have the synclinal depression or the warm brown colour of those nearer the coast, but are formed by the irregular rucking up of the clay basement into long, rough, sage-green ranges, and some of the intermontane plains are dotted with hillocks of various coloured rock, queerly shaped like haystacks. In the north of Makran the ridges are sufficiently packed and numerous to form a kind of roughened plateau, generally about 5,000 feet above sea-level, but reaching 6,800 feet, and with a kind of embayment of plain as low as 2,500 feet in the centre. This plain has been eroded out of the northern flank, and its drainage escapes through the mountains and reaches the gulf of Oman by the Kaur Rapch.



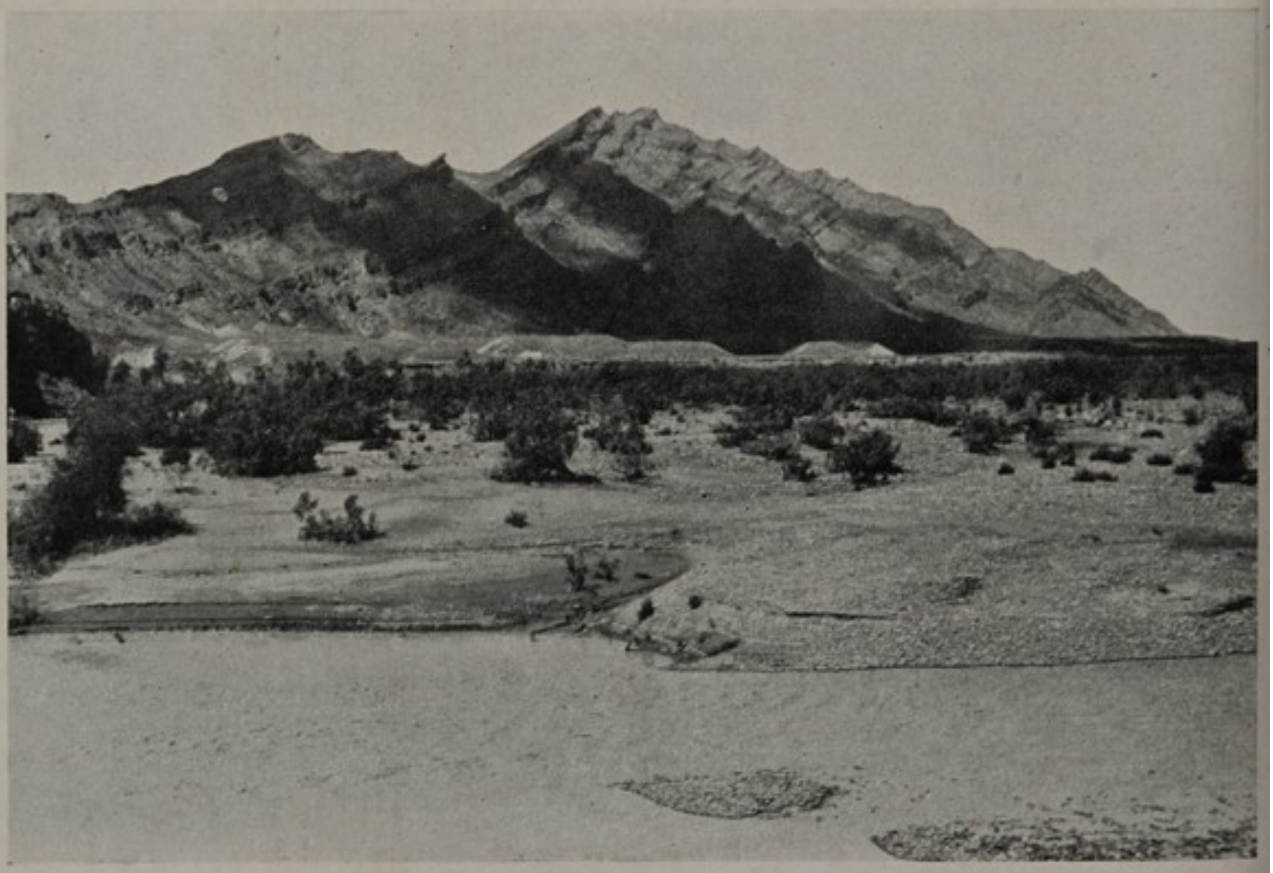
81. *Kuh-i-Mahidan, near Tarsan*



82. *Hamiyun, north-west of Yezd-i-Khast*



83. *The Spidmach hills, inland between Jask and Karkindar, built of sandstone overlying grey silts and clays. Eroded 'badlands' in the foreground*



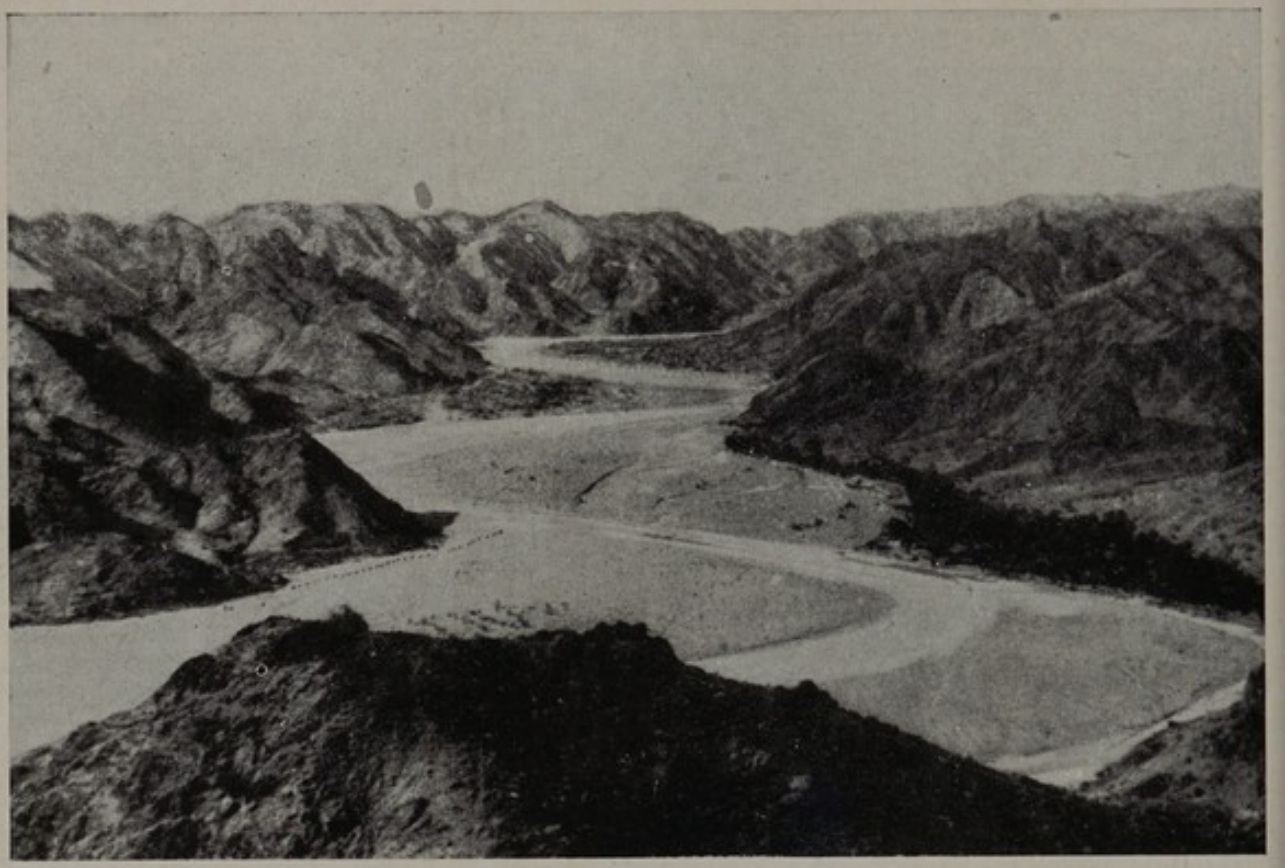
84. *The Kaur Kar near Geh, Persian Makran*



85. *Floods in the Dashtiari plain, seen from Giti*



86. *The Dashtiari plain at Lifiri, stretching seawards beyond Gunji*



87. *View up the valley of the Kaur Kaju a few miles above Qasrqand, north-eastern Persian Makran*



88. *The rasp-like maze of hills near Sarbaz and the Jaz Murian divide, north-eastern Persian Makran*

For more detailed description Makran is divided into four parts: western Makran, coastal Makran, northern Makran, and the Rudian basin, the last being in some ways more akin to the Jaz Murian basin than to Makran, though its drainage reaches the sea.

Western Makran is the comparatively narrow strip inland of the strait of Hormuz, where the range-trends are nearly north and south. The brown outer range is tilted steeply seawards so that its crest is jagged and narrow, and the foothills face it like the teeth of a rip-saw, each ridge sloping at about 30 degrees westwards and falling abruptly to the east. East of the first range, which is known as Jabal Suharon and Jabal Karai, there is a broad dull grey plain across which three separate sandstone masses stretch in line from north to south, with ridges reaching over 3,000 feet. They are known as Kuh-i-Shaikhan, Kuh-i-Kurak, and Kuh-i-Parkau (3,043 ft.). These two outer ranges of hills are collectively called Kuh-i-Biaban. In the north a third sandstone mass occurs, in plan shaped like a boomerang, with one limb running north-north-west and the other almost eastwards, marking the change in trend mentioned above (p. 99).

Coastal Makran. East of the longitude of Jask the sandstone massifs exhibit the depressions already described. Between Jask and Karkindar these reddish-brown massifs fall roughly into three ranges, each massif often having two or more different names;[1] thus the large massif immediately inland of Jask is Kuh-i-Gaigan (1,630 ft.) on the west, Mangura in the north-east, Kuh-i-Hangah on the east, and Kuh-i-Hushdan on the south-east; the whole feature is about 30 miles long and 15 miles wide.

The first range between Jask and Karkindar is made up of six such massifs, which may be named Gaigan-Hangah, Spidmach-Langri, Hun-Nilag, Chug-Kuruchu, and Saharan. Kuh-i-Spidmach (photo. 83) reaches 1,590 feet, and Darhaman Kuh in the Chug-Kuruchu massif, 1,950 feet. A few unsurveyed points seem to rise above 2,000 feet, but most are about 1,000 feet. The second range, about 80 miles long like the first, has only three component massifs, but they are much bolder and higher: Kuh-i-Chashu, a small massif on the west, Ramand-Guhkuh in the centre, and Tatami-Basidi on the east. Guhkuh reaches 6,220 feet. A third range stands north of this and also comprises three massifs, but they are more detached

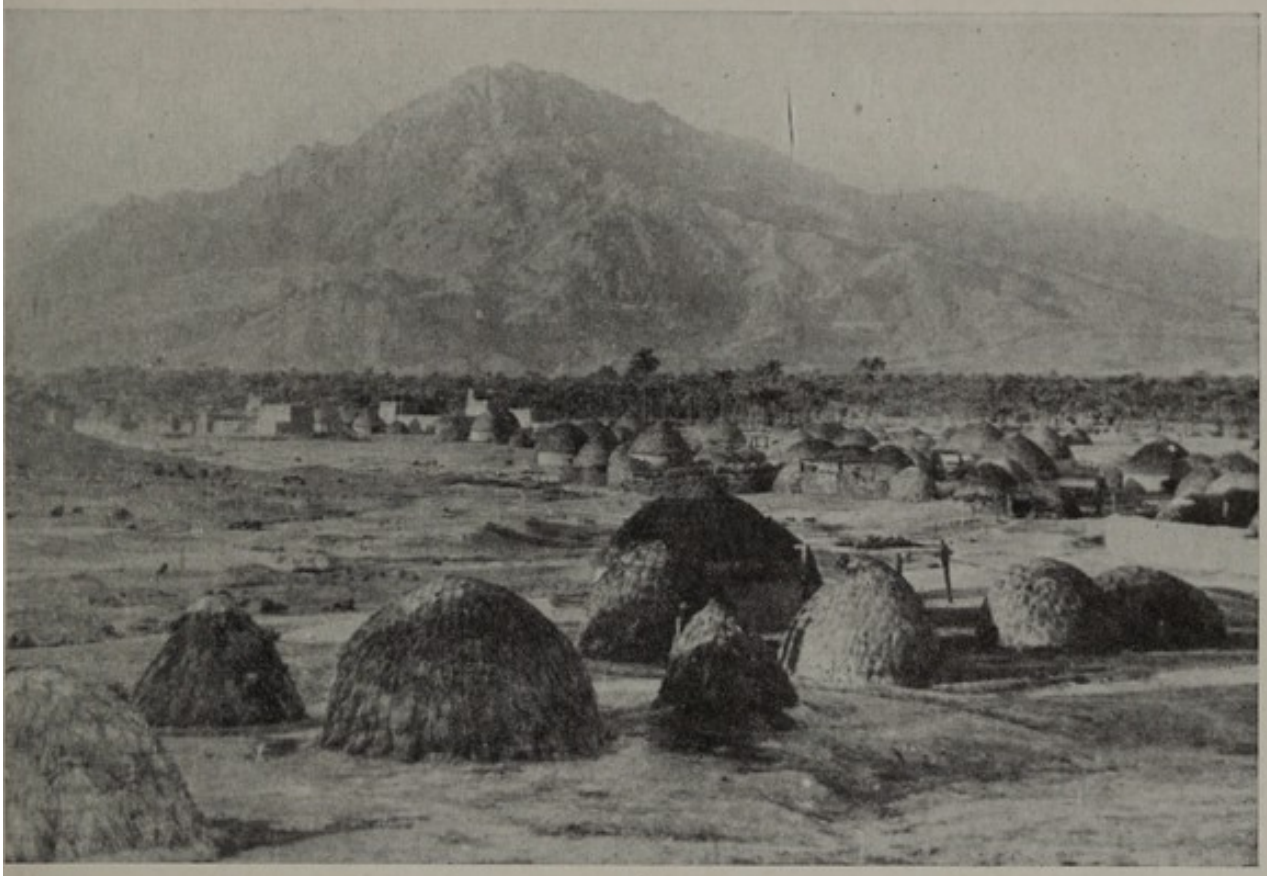
[1] Names in coastal Makran appear to vary a good deal, and different travellers are given different names for the same feature. Those given here are the most recent, and are shown on fig. 20, but they disagree with those on earlier published maps.

from one another: Afin Band on the west, Kuh-i-Hazar Shah and Bonkuli in the centre, and Kuh-i-Meha on the east, all cliff-bound massifs with summits between 4,000 and 6,000 feet.

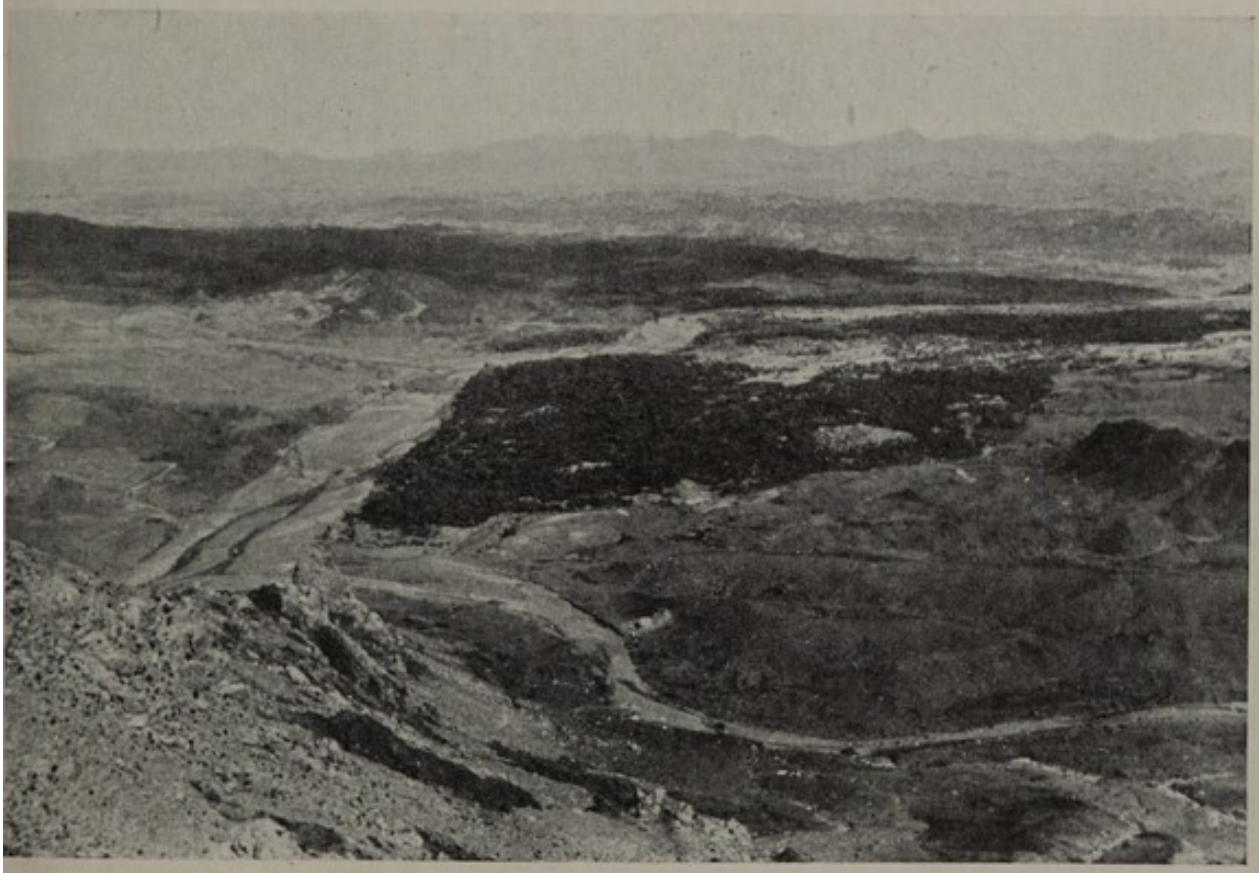
East of the longitude of Karkindar there is only a single range of these sandstone massifs in coastal Makran, but it extends for 110 miles from Band-i-Shariki to Band-i-Lilah. There are six units all rising over 2,000 feet at some point, and one just under 4,000 feet. They are Band-i-Shariki, Band-i-Kalam, Kuh-i-Sugu, Kuh-i-Barishk, Kuh-i-Kargahi (with Kuh-i-Pusak), and a long massif at the eastern end called Band-i-Koroch on the west (with Panzdag, 3,940 feet) and Band-i-Lilah on the east. A different type of range not in line with the others lies towards the coast in front of Band-i-Lilah. Known as Kuh-i-Barudak, it is anticlinal and not synclinal; dome-shaped in structure, not saucer-shaped. It encloses the plain of Dashtiari on the south-west. The silt brought down by three branches of the Kaur Kalu (or Dashtiari Chil) which join near Sigan has built up this plain, the most fertile in the Makran. Low mud walls have been erected on it in a roughly rectangular pattern, and these serve as small dams to hold up and store rainfall for watering date-palms. These palms are planted in lines close to the walls in order to profit from the occasional ponds and are a feature of the district (photos. 85, 86).

North of this long range in coastal Makran there are a few isolated sandstone masses. Kuh-i-Naran lies about 10 miles north of Kuh-i-Kargahi; Kuh-i-Shalmar is 10 miles to the east, near Geh; north of the Dashtiari plain three closer together stand in line: Kuh-i-Kasheh, Kuh-i-Yakunt, and Kuh-i-Dalig, the last ending a few miles short of the frontier.

Northern Makran is a drab region lying beyond the reddish ranges of coastal Makran and forms a strip of country from 20 to 40 miles wide. In it many ranges, surprisingly rough considering their moderate height, rise above terraced plains. The prevailing colour is dull olive-grey, but confused masses of coloured rocks emerge through this sombre mantle, and these are again present in the northern watershed, where they have a marked west-north-westerly trend and appear to be strongly folded. The 'benches' and 'terraces' following the river-courses increase in height in the western part of the strip from about 1,200 feet in the south to 4,500 feet north of Anguran. Here, in the north-west, the watershed follows a kind of roughened plateau rising above 6,800 feet at one place, but becoming gradually lower a few miles south-west of Anguran. Eastwards, about longitude 58° E., the plateau narrows to a broad-topped range, Kuh-i-Bashagird



89. *The village and mountain of Fanuch, Persian Makran. Matting huts in foreground*



90. *Basin of the Fanuch river above Fanuch, showing extensive date-gardens and the gap cut in the dividing range between the Makran and the Jaz Murian basin. View northwards*



91. *Camel caravan near Kardi passing into the Birinti valley of the Rudian basin at the Jaz Murian divide*



92. *View downstream towards the Birinti gorge*

(Bashakard), with a higher summit, Kuh-i-Kuran (7,090 ft.). This watershed range extends eastwards for about 90 miles before being cut through by the Kaur Fanuch (known lower down as Kaur Rapch) to enclose the headstreams, and the actual watershed traverses lower country to the north where coloured rocks have been cut into by erosion (photo. 90). North of Fanuch and close to Nask the divide is only 2,900 feet above sea-level; but the watershed soon regains the range and is over 6,000 feet at Kuh-i-Azbagh, only 20 miles east of Fanuch. East of this point the range again widens to an olive-grey plateau between 4,000 and 5,000 feet, roughened by small excrescences like a file (photo. 88). This is its general character as far as the Baluchistan frontier, but it is pierced by watercourses draining southwards at a few places, and blocks of coloured rocks, such as Hamant (7,400 ft.), emerge from it (photo. 5). The effect in the east is to leave rough ranges of hills separating wide strips of terraced plain north of Dashtiari; the transverse rivers link up each strip, and the terraces along these rivers afford easy means of communication.

A few villages are found on the wider terraces where conditions are best for date-palms. Anguran is the largest in the west, Garafin, 20 miles south-east of it, being second. Both have probably less than 100 matting huts, but Anguran has a ruined mosque and fort. Farther east, Husti and Gari Darap are about the same size, but have more palms; Bint and Geh are larger, each with a fort and extensive date-gardens. Fanuch (photo. 89) occupies a site of importance guarding the route through the mountains to the Jaz Murian basin; it has a number of fairly substantial mud-brick houses and large date-gardens. Qasrqand is the largest village towards the east.

Most rivers in the Makran are known as *kaurs*, and are often dry, though vegetation marks their courses. Acacias with pugnacious thorns, fan-palms with leaves yielding useful fibres, and the shady tamarisk persist in the river beds. The banks are usually steep and low cliffs are common; in the rare spates these tend to crumble. The Jagin, Gabrig, Sadaich, and Rapch drain the western half of Makran. The Rapch is the longest, as it collects drainage north of the Fanuch gap. Kaur Kar is the only watercourse of any size in the east excepting the Kaur Kalu, which has the largest catchment of all and collects all the streams draining Dashtiari, though water only flows at the surface in a few places, except occasionally (photo. 84).

The *Rudian basin* lies north of western Makran and covers about 4,840 square miles. The river breaks through several obstacles to reach the strait of Hormuz and provides part of one of the classical

routes into central Asia. It rises east of Daulatabad village at about 5,000 feet (*c.* lat. 28° 20′ N., long. 57° 10′ E.) in a rocky platform which is cut by several parallel watercourses with well-graded slope and gravelly bottoms; these unite to form the extensive gravel-covered waste of Qulashgird at about 2,000 feet above sea-level, across which the ill-defined shifting watercourses are almost always dry.

The Qulashgird plain is tilted south-eastwards, so that water gradually collects in that direction in a single gully cut in the rock and shows fitfully at the surface. Then as the channel becomes again covered by gravel the water seeps into it and only reappears below Birinti. Here the channel is rocky and steep-sided and the stream occurs as an almost continuous chain of large pools. At Birinti the Khaneh-i-Jagin tributary—not to be confused with the Kaur Jagin east of Jask—joins from the east, having drained the rocky upland south of Khanu and the western end of the Bashagird plateau. The Rudian leaves its last defile at Minab, where it has spread out a sheet of coarse gravel along the coastal plain. Minab is the only village of any size in the whole area, though a few huts cluster at Birinti and there are little groups of huts on river terraces farther upstream. Date-palms are grown wherever there is enough water, and occasional patches of corn. The old fort at Manujan, now little more than a ruin, commands the route along the Khaneh-i-Jagin (photos. 91–94, 126).

The Jaz Murian Basin (fig. 20)

The Jaz Murian basin has an area of about 26,560 square miles and is about 200 miles long from west to east, excluding the Jiruft drainage in the north-west. It is separated by low passes from the upper Rudian basin: one at about 2,000 feet on the gravel waste of Buduk, where the watershed between the two crosses an almost imperceptible rise, and another as low as 1,650 feet, a little south of Khan-i-Mirza, where a rocky col has gentle approaches on either side. The Jaz Murian is best described in three long strips: the southern border, the central sump with its western and eastern drainage, and the northern watershed range which separates it from the Lut.

The southern border is made up of hills north of the Makran watershed from Bam Barek (6,800 ft.) to Hamant (7,400 ft.). Streams flowing north have carved short deep open gullies, occasionally, as at Ramishk, with a small upper stream-bed draining a minor trough parallel to the trend. Many of the hills end northwards with rocky spurs falling steeply to embayments of plain on either side. Water is always scanty in the streams except after an occasional storm, and all

that is available is used to water date-gardens, such as those at Isfakeh and Mask Hutan (photos. 96, 248).

The central strip has a low-lying plain in the middle, buried under silt, and it is in this 'sump' that water from the whole basin gradually accumulates, and from which the basin is named. The sump is dry in summer, but its floor is so gently inclined that a very little water floods the margins of silt in winter. Thus the centre is barren, and the margins, which are only occasionally flooded, have tufts of coarse grass. Beyond these margins small plots of land are cultivated in favourable years, their sites being marked by ridges of clay a few inches high. The channels entering the sump at both ends—Rud Halil on the west, Rud Bampur on the east—are dug into the silt a few feet deep and are defined by a fringe of scrub, which thins out on either side into the landscape of silt-plain and sand-dune. Near the east end a ridge of low hills, Kuh-i-Gishuk, runs for a few miles south of Bampur and stands about 300 feet above the plain, but no other range of rock occurs elsewhere so near the line of central drainage. Sand is piled up in this quarter more than elsewhere, and the dunes may rise to 100 feet or more (photos. 97–101).

At the western end of the basin the silt plain is pierced by numerous harsh bare rocks which rise like an archipelago of islets. Beyond them the edge is marked by an almost straight line running for 40 miles almost due north from Khan-i-Mirza to Khanu. The dark grey rock spurs rise steeply from the basin floor to a rectangular block of plateau which is mostly drained westwards to the Rudian. Kuh-i-Kalmurd, west of Khanu, is a large diamond-shaped mass which falls northwards to a lower grey plateau enclosing the western side of the plains of Jiruft and the Halil Rud. A few miles to the east, across the Halil Rud, stands the bold mountain of Absagu (*c.* 4,000 ft.), with its fine crags towering 2,500 feet above the plain. It commands a fine view of the western basin and of the cultivated Jiruft plains. The Halil Rud runs at the foot of it from a gradually narrowing funnel from the north-west, and rises in the Jiruft country, which is very similar to that at the head of the Rudian (photos. 102–105).

The eastern end of the central strip is formed by a waste of sage-green hills rising unevenly to their maximum height near the bold peak of Hamant. This type of country is confined to the angle between Kaur-i-Nashahman in the south and the Aptar river on the north, for beyond the latter the hills are more regularly alined in parallel ranks from north-west to south-east. Kaur-i-Nashahman provides a barren but easy route to the Kalkarian pass (4,800 ft.) and

thence to the Kaur Sarbaz, Dashtiari, and the coast; the Aptar river leads to the Guinak pass, Magas, and the Mashkel basin on the east (p. 113). This route passes through several date-plantations, each with its attendant village. But in the eastern part of this strip most of the fertile ground is not in the hill-zone but on the northern bank of the main Bampur river; cultivation is centred round Iranshahr and Bampur, but it extends only a dozen miles west of the latter. Bampur was the most prosperous district until about 25 years ago; its ruined fort stands on a mound, and there is still enough water for irrigating small fields of cereals, but it is now eclipsed by Iranshahr, which has some new dwellings and a fort in a fair state of repair.

The northern strip is the high ground which shuts the Jaz Murian basin off from the Southern Lut. The watershed runs south-east from Kuh-i-Bidkhan to Mil-i-Farhad, a distance of 160 miles along a well-defined but sometimes broad-topped range, mostly built of granite masses. The first hundred miles is nearly all above 10,000 feet with summits as high as 14,300 feet in Kuh-i-Lalehzar. The north-eastern slopes water the district of Bam (p. 95). Near the little village and pass of Deh Bakri the range falls to pleasant country between 6,000 and 8,000 feet, dotted with trees and enjoying an agreeable climate. Scrub grows on the neighbouring hill-sides up to 12,000 feet. South-east of Deh Bakri the range, now known as Kuh-i-Jamal Bariz (Jabal Bariz), is of steep-sided granite, often overlain with lava, which accounts for the broad flat crest in some places. After 50 miles the range narrows and the crest falls to 6,300 feet at the pass of Gudar Zurneh. Here the countryside is well wooded, but the route is rougher and less used than that by Deh Bakri.

South-east of Gudar Zurneh the range begins to lose height and lava-capped tablelands between 5,000 and 6,000 feet carry it on eastwards. From Mil-i-Farhad it continues east for 150 miles to a point south of Kwash, composed partly of lava, partly of dull grey limestone.

The flanks facing the Jaz Murian basin on the west are steep at first, but there are rough foothills mostly of coarse red or purple conglomerates, and beyond them a region that appears like a gigantic crazy pavement, flat-topped hills capped with slabs. Dusari, one of the principal forts of Jiruft, lies at the foot of one of these. Other oasis settlements occur where a channel has been dug deep enough to reach water. These settlements come upon the traveller unexpectedly after a long march across the barren terrace; the ground dips suddenly, and in a hidden valley is a date-garden with a few huts and wells (photos. 106, 107).



93. *Khanu Bala, central Rudian basin*



94. *Old fort at Manujān, Rudian basin*



95. *Rugged gabbro hills and blown sand on the southern edge of the Jaz Murian basin near Ab-i-Razi*



96. *Isfakeh village and date-gardens on a broad gravel estuary, south-eastern Jaz Murian basin*

The plain makes a deep wedge in the hills near Panj Angusht, and a watercourse near the great rock of Mil-i-Farhad (photo. 6) cuts through the lava cap, thus forming a route to the Southern Lut by the pass of Gudar Gishu. The lava-capped plateau is the main feature for the next 40 miles eastwards, and in its tangle of foothills is the district of Hudian, remote and isolated, whose villages welcome no strangers, and whose eastern side is formed by the curving limestone wall of Bur Kuh, a high plateau which continues for another 40 miles (photos. 108, 109). The terrace along its southern side, about 150 feet above the plain and slightly tilted, is cut by dry ravine-beds, so that laden animals should avoid it. Beyond the Bur Kuh massif the terrace is replaced by a long carpet of gravel which approaches Bampur and provides an easy route from there to the village of Bazman, thence to the base of the Kuh-i-Bazman volcano (or Kuh-i-Zindeh, 11,478 ft.), whence the Southern Lut is reached by the pass of Gudar-i-Ahu, less than 4,000 feet above sea-level. Kuh-i-Bazman has been climbed. On clear days, which are infrequent, it commands a superb view northwards over the ruined lava-fields, south-westwards over the grey massif of Bur Kuh, and south-eastwards over the parallel ridges between Jaz Murian and Magas. The sister cone of Chihiltan in the Taftan group is visible to the north-east, smoking above the haze which often hides its base (photos. 113, 114).

VI. The Upland Rim of Eastern Persia

Eastern Persia is broadly divisible into the mountain rim, comprising the Qain and Birjand highlands in the north and the Nasratabad–Taftan region in the south, and the frontier lowlands which merge into the deserts of Afghanistan and Baluchistan, where the Helmand (the classical Etymander) and lesser rivers drain into the Hamun of Seistan.

Qain and Birjand Highlands (fig. 21)

These highlands cover about 31,500 square miles and are about 360 miles long from north-west to south-east. The main core of high country passing near Birjand is more than 100 miles long and about 60 miles across. The ground falls gradually on the western side to the Kavir of Bahabad, south-east of the Great Kavir (p. 93), and more abruptly eastward to the frontier plain between Namaksar-i-Khaf and Seistan. On the south the region narrows and ends along a curved

line from Faizabad on the edge of the Southern Lut, over a col at Simak, and along the Neh valley towards Seistan.

The trend of the mountain ranges is fairly constant from north-north-west to south-south-east, though in the south-west it changes more towards a west–east alinement. From north-east to south-west

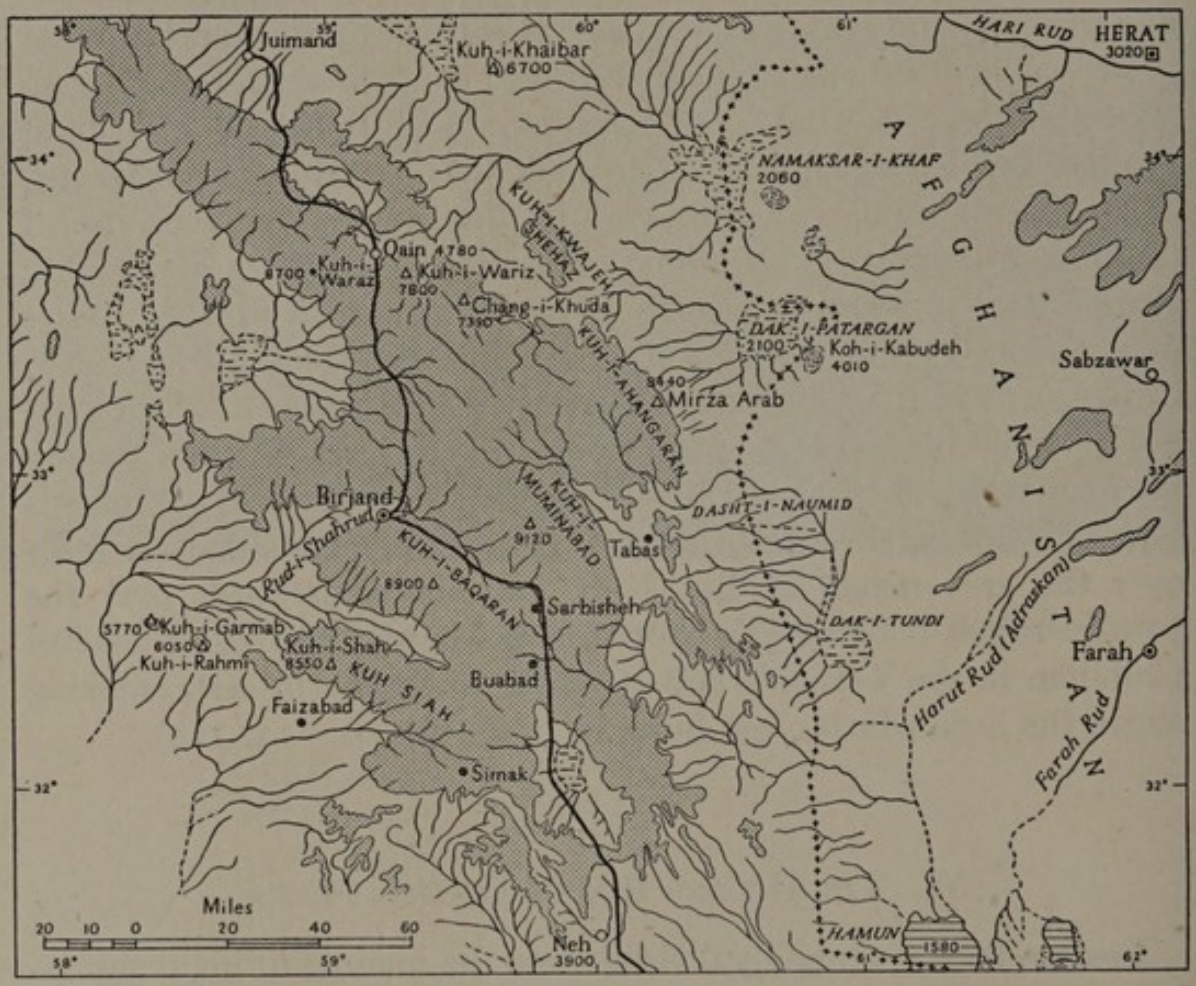


FIG. 21. *The Eastern Upland Rim and the Frontier Lowlands. Ground over 5,000 feet stippled; heights in feet*

the ranges are as follows: Kuh-i-Kwajeh Shehaz, known south-eastwards as Kuh-i-Ahangaran; a broad unnamed hump, with summits known as Kuh-i-Wariz and Chang-i-Khuda, stretching from near Qain to Tabas in Sunnikhaneh on the edge of Dasht-i-Naumid; Kuh-i-Muminabad, north-east of Birjand; Kuh-i-Baqaran; and lastly a group of three small ranges, Kuh-i-Garmab, Kuh-i-Rahmi, and Kuh Siah (Kuh-i-Shah), which together form a range from west-north-west to east-south-east.

Kuh-i-Kwajeh Shehaz is the boldest of these ranges, one of its segments, that of Kuh-i-Mirza Arab, overlooking the frontier lowland from an altitude of 9,440 feet above sea-level. On its eastern side



97. *Sand-dunes near the Bampur river at Vakilabad*



98. *Fixed sand-dunes near Bijnabad, Jaz Murian basin*



99. *Terrace and stony desert east of Khan-i-Daraz*



100. *Sand fringe of the Bampur river near Vakilabad*



101. *Sand and grazing scrub near Bijnabad, Jaz Murian basin*



102. *The silt plain of north-western Jaz Murian, looking north from Khanu*



103. *View southwards of Absagu in north-western Jaz Murian basin*



104. *A satellite depression near Khanu with sterile centre, bordered by strip of vegetation and rock waste*



105. *Hajiabad village and date-gardens, with scrub-dotted plain beyond, western Jaz Murian*

the lower slopes merge into desolate plain, kavir, and sand-dunes 7,000 feet below. On this side good grazing-grounds occur at from 4,000 feet upwards, and there are villages with terraced gardens, vineyards, and orchards of fig, nut, pear, and mulberry, as well as cultivation of corn and opium here and higher. Some of the present settlements are on old sites, and stones from the ruins are quarried for new buildings. Higher up, bushes and trees, including willow near water, replace the camel-thorn and scrub of the lower slopes. On the summit a much frequented shrine affords a fine view eastwards across the plain, where two salt-lakes, Namaksar-i-Khaf and Dak-i-Patargan, with their fringes of kavir, appear as sheets of ice (p. 115). Looking northwards from Kuh-i-Kwajeh Shehaz towards the Meshed district Kuh-i-Khaibar alone is conspicuous. Farther west the hills become more rounded and less rugged.

The country north-west of Qain is rolling upland, nearly 6,500 feet at one place but falling below 5,000 feet near Qain. Towards this little town are several squalid villages whose inhabitants suffer much from dysentery and malaria and are addicted to excessive opium smoking. Opium is indeed a favoured crop, but wheat and barley are grown in the open valleys, and melons and beetroots gathered in the autumn. Camels are bred in these parts, and there is good grazing for them.

Kuh-i-Muminabad rises at a few places above 9,000 feet; but it is more rounded than Kuh-i-Kwajeh Shehaz, and it degenerates south-eastwards into the rolling plain of Sarbisheh which connects north-westwards with the broad valley of the Rud-i-Shahrud. Birjand stands in this treeless valley, the only place of any size or note (photos. 110, 111). Its inhabitants are very dirty and idle; their water is brought by *qanat*, but is salt, and berberis is the principal cultivated shrub, though there are some mulberry-trees.

The north-eastern slopes of the neighbouring range on the south, Kuh-i-Baqaran, are more attractive, since the gullies have small settlements, each with its pond fringed with willows, which contrast strangely with the rest of these parts (photo. 112). Fruit does well in spite of the long hard winters, and as soon as the snow has melted tulips and crocuses appear. The nights are cold even in summer. The Kuh-i-Baqaran is shorter than either of the two northerly ranges and only once reaches over 8,000 feet; a small extension of it lies about 6 miles north-east of Buabad, a village whose unpleasing name means 'the abode of smells'.

Kuh-i-Shah (8,550 ft.) is the highest of the group of rather rugged

ridges which make up the southern range. There is little of interest to record about them. In the desert to the west the mountains are seldom more than pyramids of rock, small in size though often as

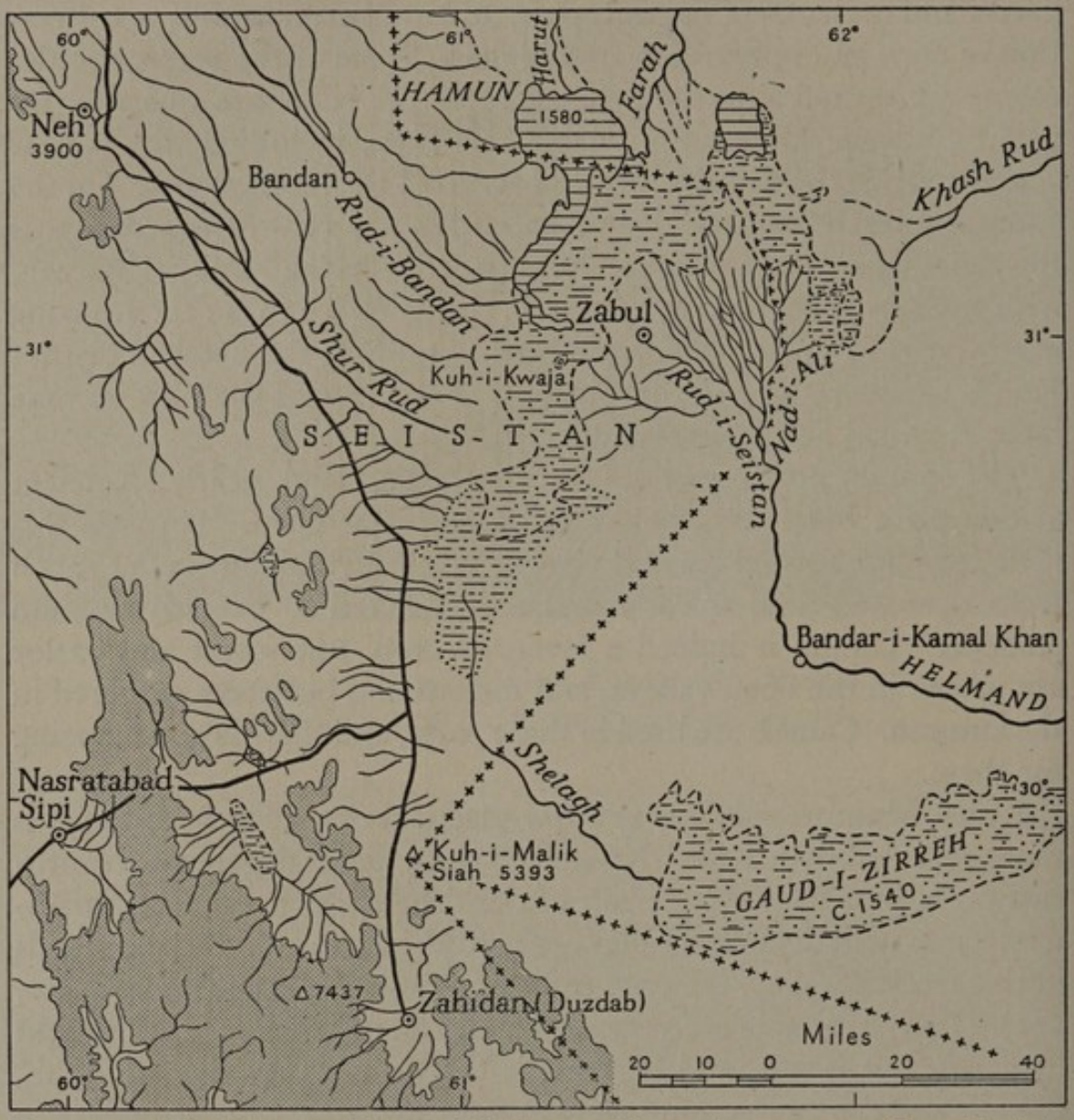


FIG. 22. *The Eastern Rim and Seistan. Ground over 5,000 feet stippled; heights in feet*

rugged in outline as an alpine peak. The scenery is austere, with broad belts of bare plain interspersed between barren rocky ridges. Faizabad, about 18 miles south of Kuh-i-Shah, is the largest of a small group of poor villages. Neh and its fort, a short distance from the east Persian highway, lie in a wind-swept district where barren ridges project from desert; in this desolate country opening south-eastwards into Seistan there are only rare oases, one of them being Bandan (fig. 22), about 40 miles east-south-east of Neh, where a rocky gorge gives some protection for its date-groves.

In spite of all this bleakness throughout the region, a number of small villages with gardens are tucked away in gullies, especially in the north, and there also the unprepossessing mountain flanks are sufficiently tufted with shrubs for camels to graze. Flocks of sheep and goats also struggle to provide material for the carpet-weavers around Durushk in the Birjand district, the shrubs yielding the vegetable dyes. A strong north-west wind, which like the *shamal* of Iraq blows for long periods in summer, drives windmills for grinding grain, formerly so essential for the caravans which passed along this route. Now that motors have replaced most of the camel traffic, much of this trade has disappeared.

Nasratabad–Taftan Region (figs. 18, 20, 22)

The southern division of the highland rim covers about 37,000 square miles, and is about 400 miles long from north to south and 120 miles wide at most. It may be subdivided into three parts: the north, a district very similar to, but lower than that just described, and narrowed between the Southern Lut and the Helmand swamps; the centre, where the volcanic mountains forming the Taftan massif rise from an apron of plateau; and the south, where well-marked ridges branch off south-eastwards from the outskirts of the volcanic land. The first of these districts is barely inhabited; the other two, which are spared the blast of northerly winds in summer and are sufficiently high to enjoy a cooler climate, comprise the Sarhad of Persian Baluchistan, a comparatively well-populated health resort in this otherwise unattractive eastern Persia.

The northern district is bounded on the west by a line southwards through Simak along the eastern side of the Lut to the rocky headland near Nasratabad-Sipi (lat. 30°, long. 60°); on the south by a line from the latter almost due eastwards along the northern lower slopes of the Taftan group of cones to Kuh-i-Malik Siah (5,393 ft.), the junction peak of the Persian, Afghan, and British Baluchistan borders; and on the east from Kuh-i-Malik Siah by the plateau edge overlooking Seistan to a little west of Neh in the north (fig. 20).

On either flank of this long strip are rugged chains of rocky ridges, with a central corridor of desolate tableland comprising wind-swept plains with low ridges between them, all trending a little east of south. The eastern chain is the more conspicuous, though pierced by a few watercourses draining intermittently to the Seistan basin; except for these gaps its sombre outline is fairly regular, its summits standing

up to 6,000 or 7,000 feet above sea-level and 4,000 or 5,000 feet above the Seistan lowland.

The western chain is less imposing because its base is at a greater altitude, but a few peaks are higher than those to the east, notably Kuh-i-Lunka (7,535 ft.) and Kuh-i-Malusan (8,415 ft.). Within this district are two small enclosed basins; one near Gachi Chah about half-way between Kuh-i-Malik Siah and Neh; the other near Garaghah, south of the motor-track from Seistan to Nasratabad-Sipi and Bam. Especially in the north, the population is scanty and comprises very small communities of Reki Baluchis living in black tents. It is slightly denser in the south where Ismailzai Baluchis are found. There are no settlements of more than a few huts except Nasratabad-Sipi in the south-west; the customs and frontier station of Zahidan (Duzdab), which serves as a depot for trade, is near the undemarcated border with British Baluchistan, about 25 miles south of Kuh-i-Malik Siah. It is the terminus of the North-western Railway of India, built during the War of 1914–1918, and the starting-point of the east Persian highway.

Northern Sarhad adjoins the district just described (fig. 20). Its western limit follows the glacis of the Lut to Pansureh, its southern may be taken as a line eastward to Ab-i-Khan on the Bampur–Kwash motor-road, and its south-eastern and eastern along this road to Mirjawa and thence to Kuh-i-Malik Siah. By far the most imposing feature of this district is the volcano of Kuh-i-Chihiltan, which dominates the ruined cones of the Taftan group (photo. 114). The summit reaches 13,034 feet, and from its crater issue intermittent fumes of sulphurous gases. Most of the older cones, about 3,000 feet lower, are grouped to the north-west, and drained by wooded gullies, shut in by lofty precipices surmounted by jagged peaks of many colours. The Taftan group has now been fairly well explored and the extensive view from the summit described: to the south-west, the long ridge and cone of Bazman (11,475 ft.), rising 70 miles away from the sandy wastes of the Lut (photo. 113); to the north, the grim black precipices of Kuh-i-Malik Siah, about the same distance; to the north-east, grey-capped Koh-i-Sultan (7,650 ft.) on the horizon of British Baluchistan; on the south-east, Panj Angusht guarding Kwash. Minor peaks and ridges of all shapes and sizes rise between and beyond these landmarks in every direction, not 'like the waves of a sea as in the Alps, but spread out upon vast pale brown and purple plains, each clearly distinguishable'.

The valleys within this small isolated mountain district are relatively



106. *Terraces on the northern side of Jaz Murian near Khan-i-Daraz*



107. *Sar-i-Khan oasis lying in a gully cut in the stony terraces on the northern side of Jaz Murian*



108. *Bur Kuh massif from Deh Hur*



109. *Remnants of old settlements at Surk in Hudian*

well watered and decked with planes, willows, and poplars. There are gardens with mulberry, quince, and apricot, and little fields of wheat. Remnants of diverse peoples maintain their own dialects and scraps of ancient cultures in a climate cold in winter but vastly preferable in summer to the sun-baked plains around. The skirts of the mountains tail off to the plain so gradually that motors have been driven to points close to the great cone, and in 1916 a car crossed the eastern slopes with no previous preparation (photos. 115, 116).

Away to the west the plain along the edge of the Chah-i-Gabi *hamun* (kavir) extends for about 50 miles, before ravines, sapping into the plateau, break it up into stony country with rock ridges and defiles between Jauri and the date-groves of Pansureh. Twenty miles to the north the broad channel of the Gajjari river takes the rest of the drainage of the northern Sarhad plateau through the Pir Shoran ridge to the Lut. Along its channel are occasional marshes, the haunt in autumn of many geese, duck, and snipe, whilst elsewhere there are thickets of tamarisk and willow. The stony plain through which this river runs is by no means bare, and sharp-pointed ridges project from it. In the open, near the north-eastern foot of a conspicuous hill called Gwah Kuh, is an oval pit, 95 feet long, 70 feet wide, and 35 feet deep in 1929. This pit was punched by a meteorite which fell about 1870, and was originally deeper and narrower, but is now being gradually filled in by rain-wash and silt. Another meteorite fell west of Kwash in 1929. Kwash, or Vasht, is little more than a village with fort and telegraph office, but has been the administrative centre of Sarhad since 1928. It is connected to Iranshahr and Bampur by motor-tracks. The road between Kwash and Zahidan has been allowed to fall into decay.

The southern subdivision of eastern Persia, southern Sarhad, has as its western boundary the Kuh-i-Darznan and as its southern the Mashkel Rud from about Magas to the border of British Baluchistan. Along these limits it adjoins the Jaz Murian basin and Persian Makran. Southern Sarhad displays a fairly regular pattern of parallel ranges from north-west to south-east with broad valleys between them. Besides the Kuh-i-Darznan, there are three such ranges, each being more rounded and the valleys between them more open towards the south-east. From west to east the first is Kuh-i-Birg, rising just above 9,000 feet, capped with white limestone underlain by layers of red and grey shale. The second is a bundle of ridges distinguished by steep peaks formed by ribs of limestone between less resistant sandstone and shale. It leaves the plateau south-east of Kwash at about

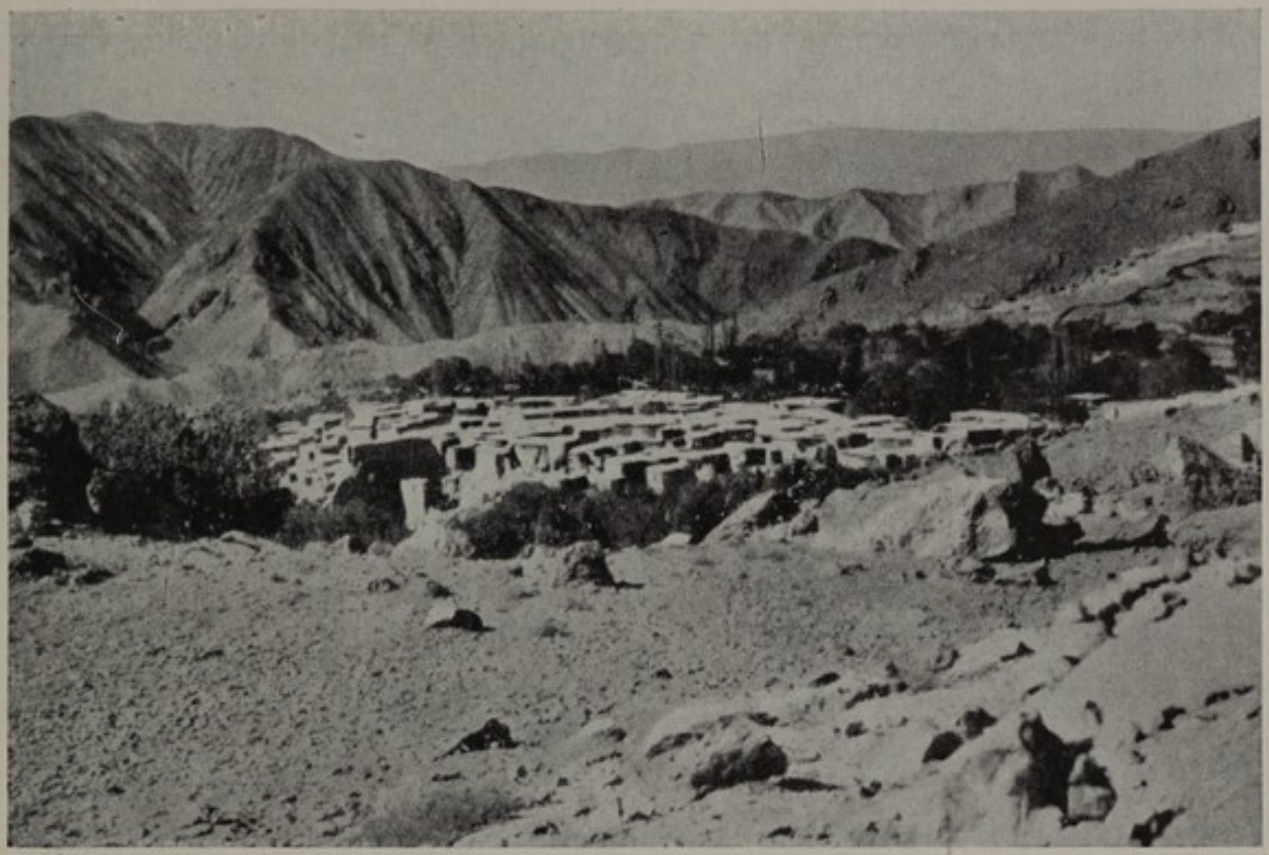
9,000 feet, is known as Kuh-i-Morpish and Kuh-i-Badamo (8,596 ft.) farther south-east, and just east of Dizak bends eastwards to mark the frontier for over 30 miles. Between it and the first range is a lower parallel ridge separating the Pashut and Simish valleys. The most easterly range is also built of parallel ridges and troughs with a long gravel glacis sloping gently north-eastwards to the Mashkel Hamun. The range is narrow in the north, where it is known as Kuh-i-Dastkird, but it widens and loses height south-eastwards towards Jalk, where it begins to swing to the east.

The lower ground between these ranges grows sufficient crops for local needs, but by no means forms level ground, being frequently interrupted by gullies. Often the track must follow the stream bed and the gullies afford good ground for ambush. The people are mostly Baluchi nomads with fair-sized flocks, but there are also some settled tribes who irrigate their lands either direct from streams, or more commonly from qanats. A few larger villages, such as Dizak, Suran, Kaladin, and Magas, grow dates as well as wheat. But wealth is assessed chiefly in flocks, which move up the mountains in spring and down in autumn. Compared with some parts of Persia the climate is not one of extremes; there is occasional frost in winter and snow may fall even in the lower Mashkel, though rarely; but only the lower valleys are immoderately hot in summer.

The Frontier Lowlands (figs. 12, 21, 22)

The eastern boundary of Persia is not yet fully demarcated, but along most of its course it keeps to lowland, part of the great depression that covers so much of south-western Afghanistan. Only a narrow strip of this lowland lies within Persia. The boundary in the north is formed by the Hari Rud for 120 miles south of Sarakhs, but the valley of this river then turns eastwards to Herat and the boundary continues southwards, traversing four inland basins before climbing the black precipices of Kuh-i-Malik Siah, 500 miles south of Sarakhs and 320 miles from the gulf of Oman. The lowland then falls within Baluchistan, but a small portion of it along the lower slopes of north-eastern Sarhad borders the Hamun-i-Mashkel.

This frontier strip is described below in three parts: the valley of the Hari Rud (fig. 12); the three desert basins of Namaksar-i-Khaf, Dak-i-Patargan, and Dasht-i-Naumid (fig. 21); and Persian Seistan (fig. 22). The Mashkel Hamun is in British Baluchistan and only its western glacis falls in Persia (fig. 20). It is impossible to avoid men-



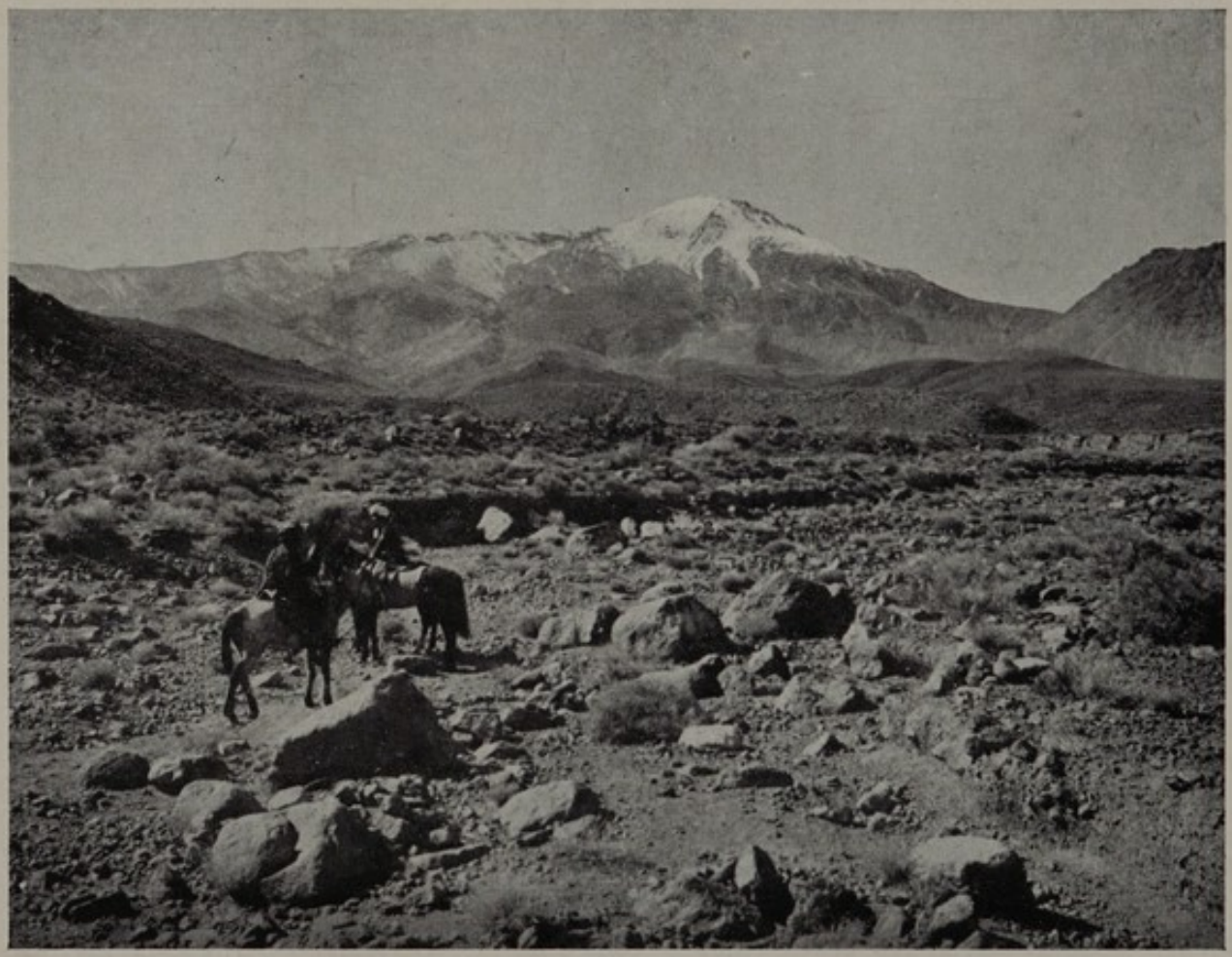
110. *Chinisht, a village at 7,000 feet, on the Birjand highlands*



111. *Birjand. The dry bed of the Shahrud forms its high street in summer*



112. *Shaukatabad village and pond, district Birjand*



113. *Kuh-i-Bazman,* 11,475 *feet, from the south-east near Pansureh*

tioning some details beyond the border, since these are relevant to the physical features of Persia.

The *Hari Rud* rises in the Afghan mountains not far from Bamian, 100 miles west of Kabul, and occupies an immense trench for 250 miles almost to Herat. There its valley opens westwards to a plain in which the river has notched its bed below riverain terraces, and flows west-north-west for about 60 miles. Near the frontier post of Islam Kala (formerly Kafir Kala) the river turns north and forms the boundary, first between Persia and Afghanistan, then between Persia and Russia (Turkoman S.S.R.). Finally, as the Tejend, the river is distributed into numerous channels north-west of the town of Tejend and its waters are dissipated in salt-marshes among the sands of Transcaspia.

Along the Persian boundary from Sarakhs southward the Hari Rud occupies a bed sunk from 20 to 50 feet below the terraced glacis along the left bank. The valley is open and the eastern slopes of Kuh-i-Jangir rise gradually from the plain. Near Pul-i-Khatun the Kashaf Rud (p. 42) comes in from Meshed, its valley forming a broad lobe of lowland silt. From Pul-i-Khatun to Zulfikar the Hari Rud occupies gorges cut through low hills, deposits of clay at Zurabad marking a lake-bed formed when the course to the north was obstructed. Twenty miles upstream of Zulfikar is another gorge, the gateway between the Kuh-i-Shah Nishin (6,900 ft.) on the north-west and the Siah Bubak (4,900 ft.) in Afghanistan, the western end of ancient Paropamisus. Southwards the country opens out to an extensive plain, stretching westwards to Turbat-i-Shaikh Jam and south-eastwards almost to Herat. Most of it is given over to grazing.

The basin of *Namaksar-i-Khaf* is separated from this plain by low sandstone hills girt with aprons of rock waste inclined gently towards the central sump of salt-lake, marsh, or kavir, according to the season. In Namaksar-i-Khaf rocky pyramids project like islands, as though a mountain region had sunk and the peaks had been half buried by detritus. Many of the peaks retain their rugged and sharp outlines. The smaller sump of Dak-i-Patargan, south of Namaksar-i-Khaf, from which it is separated by a low divide, has very similar features with rocky stacks projecting from its mantle of waste. One, larger than the others, is the limestone hill of Koh-i-Kabudeh (4,010 ft.), which overlooks the sump from the east, just beyond the border. The boundary passes through the centre of Namaksar-i-Khaf, but the greater part of Dak-i-Patargan is within Persia. From here southwards the eastern side of the Persian rim is steeper, in places

precipitous, and the western apron of the next depression has therefore a greater slope, while the sump itself, Dak-i-Tundi and its plain Dasht-i-Naumid, almost all of which is in Afghanistan, is buried by rock waste. On the Persian side the apron is made up of fans of debris emerging from each gully in the rock wall to the west, so that travel is tiring and monotonous over a succession of fans with ascents and descents of some hundreds of feet. These sumps are all extremely desolate, but on the fans there are occasional bushes on which camels from the villages higher up are turned out to browse and breed; formerly, many of the transport camels of Persia were bred on these forbidding wastes. The rainfall is low, seldom as much as 5 inches a year, the wind is violent, and the extremes of temperature are great. The changes of temperature are rapid, all of which helps to account for the break-up of the rocks, and yet a few families remain to tend their animals.

Seistan. There is no conspicuous divide between Dak-i-Tundi and Seistan, where, though the climate is equally bad, the abundance of water permits a considerable amount of agriculture and a larger population. Seistan holds a high place in Persian legend as the home of Rustam and Kai, founder-heroes in Persian mythology. It was rich and prosperous until the Mongols ravaged and depopulated the country-side (p. 261). Because of its proximity to India, Seistan is better known than any other district of eastern Persia (fig. 22).

Seistan properly falls into both Persia and Afghanistan, though the name is no longer used in the latter country. It covers an area of 2,850 square miles in Persia. The basin receives the drainage from over 125,000 square miles in Afghanistan, brought by four rivers, Helmand, Khash, Farah, and Harut (Adraskan). It also receives some ephemeral torrent drainage from the west. These four rivers are also used for irrigation along their lower courses, so that some do not always bring water to the Hamun, but the Helmand is never dry and all carry large volumes in spring and early summer when snow is melting in the Afghan mountains.

The Helmand is the principal river and the only one which directly concerns Persia, its discharge in a normal year varying from 2,000 cusecs at low water to 60,000 in flood. It is said that in abnormal floods it has been known to discharge ten times that amount. Its lower course in Afghanistan is at the bottom of a deep narrow valley sometimes 2 miles wide cut in the gravel-covered plateau with cliffs of silt up to 250 feet high. Near Bandar-i-Kamal Khan, where the cliffs open out north and south, the river enters its delta and divides



114. *Kuh-i-Chihiltan, 13,034 feet, Taftan group, from Khan Shambeh*



115. *Bidistir valley, in the north-west part of the volcanic group of Taftan*



116. *Anjirtalj valley, northern Sarhad*

into three main branches, Rud-i-Seistan, Rud-i-Purian, and Nad-i-Ali. The first is a channel taking off at Band-i-Seistan, where the water is held up by a dam 1,700 feet long, from 70 to 100 feet wide, and up to 20 feet high. This dam is destroyed every year when the river rises about Christmas and is not renewed till the late autumn. The canal irrigates Persian Seistan. The other two channels are natural. The Seistan lake, or *Hamun*, which takes the drainage is never more than 15 feet deep and more often from 4 to 8 feet deep. The area under water shrinks rapidly after each flood, and by the end of autumn large tracts have dried up. Very little water is lost by seepage, since the bed is almost impermeable, but it has been calculated that as much as 10 feet of water may be evaporated each year. In wet years with heavy discharge from the rivers the lake becomes a sheet of water 100 miles long and from 5 to 15 miles broad in spring. After abnormal floods the Hamun discharges its surplus through the Shelagh channel southwards into Gaud-i-Zirreh, a low-lying depression about 80 miles to the south containing saturated salt water.

The eastern part of the basin is fringed with gravel-covered cliffs. The basin itself is nearly level at about 1,580 feet above sea-level, Gaud-i-Zirreh being 40 feet lower. Much of it is barren and desolate, except where crossed by the many channels, the courses of which are marked by cultivation or tamarisk thickets concealing jackal and wild pig. The fringe of reeds in parts of the Hamun is thick and imposing. Primitive hunters and fishermen live in nearby huts, navigating rafts of reeds through the curving water-lanes. It is very difficult to get a clear idea of the different channels, but a view can be obtained from Kuh-i-Kwaja, an isolated lava rock rising 500 feet above the lake. There are the ruins of a Sassanid palace and fire-temple on it, and many empty tombs where corpses are temporarily stored before transport to the sacred precincts of Meshed (photo. 118).

The Helmand carries much silt which is deposited in the delta channels and builds the beds higher than the surrounding flats. Thus a big flood breaches their banks, the channels become deserted, and new ones are established. The delta mouths have constantly changed in the past, and there are many ruined sites and relics of deserted canals. The villages, modern and ancient alike, in all stages of ruin and decay, are built of sun-dried brick; the domed houses of Persian Seistan are not, however, found on the Afghan side, where dwellings are mostly of wattle and daub. Two of the most pretentious ruins are of burnt brick, which is also used in the lower courses of other ruins (photo. 117).

The great volume of silt brought to Seistan ought to be filling it up, but the level reached by the alluvium was once 400 feet higher than to-day. It may be that the basin floor is sinking, or that wind in the dry climate carries away much of the surplus silt.

The wind is tempestuous and persistent from about the end of May until late September. It blows from the north-north-west often with a velocity of 70 miles an hour. It is more violent at the north end of the lake than in the frontier basins farther north, but its force declines south of the Hamun. Blizzards may occur from December to March from the same direction and are severe enough to cause death to camels; in one of these an average wind velocity of 88 miles an hour was recorded over 16 hours, with gusts up to 120 miles an hour. All houses are built with their backs to the wind, a practice which has come down from early times, as shown by ruins. These have had their bases undercut by wind erosion, and as a result some ruins have lost their walls facing the wind. Some villages have been buried by sand; the process continues to-day, Kala-i-Nau having been buried between 1903 and 1905. The pond of Kala-i-Kohna was filled by blown sand in three months in 1904 and a hillock 10 feet high took its place. But the wind also removes the sand and restores villages for use and fields for cultivation. In rare periods of calm during summer there are plagues of midges and mosquitoes, horse-flies, and other insects; there are also poisonous snakes.



117. *Ruined mansion near Bulai, Seistan, from the south*



118. *View eastwards of the reedy marshes of the Helmand, from the ruined site of Ghagha Shahr, Kuh-i-Kwaja, Seistan*



119. *The sea-front at Bushire*



120. *Hormuz. View from the old fort*

CHAPTER IV

THE COASTS

THE coasts of Persia are approximately 1,450 miles long, more than one-quarter of which faces the Caspian. Backed by mountains or desert they have been of relatively little use as economic outlets to Persia, and particularly in the south have been isolated from the main currents of Persian history. Nevertheless, the southern coasts flank the maritime highway between Iraq and India and therefore are important in world affairs, while the northern has often been the scene of Russian intervention. The small external trade of Persia has also preferred the Caspian routes to those by the southern gulfs.

SOUTHERN COASTS

Introduction

The southern coasts of Persia are approximately 1,050 miles long and will be described from north-west to south-east in three sections: (1) the Persian Gulf, from Abadan to Lingeh; (2) the strait of Hormuz, from Lingeh to Minab; (3) the gulf of Oman, from Minab to Gwatar. The strait of Hormuz is the link between the Persian Gulf and the gulf of Oman.

The whole coast is backed by barren limestone or sandstone mountains, except in the extreme north-west, where it is composed of the mud-flats and marshes at the head of the Persian Gulf. Elsewhere the coastal plain is mostly narrow and sandy, with patches of cultivation and date-groves near the villages. The trend of the mountains and hills runs parallel to the coast; the limestone ranges have scattered shrubs and fruit-trees, with some herbs and flowers in spring, but the sandstone hills are almost completely barren.

The only large perennial river that enters the sea from south Persia is the Karun, which has a joint estuary with the Euphrates and Tigris at the head of the Persian Gulf: this estuary (the Shatt al Arab) forms the frontier with Iraq for some miles inland. Most other rivers of south Persia are intermittent, salt in their lower courses, undrinkable, and useless for irrigation. The water-supply is scanty, from scattered wells, and from domed reservoirs (*birkeh*) in which the winter rain is stored.

The climate is very hot and enervating in summer, though pleasant in winter. The coastal plain is known as *garmsir* or winter

pasture. The prevailing wind is the north-west *shamal*, which blows regularly for five or six months of summer, bringing dense clouds of dust and affecting visibility at sea. The northerly winds of winter are often interrupted by the south-east *kaus* or *sharqi*, by the north-east *nashi*, and occasionally by the south-west *suahili*. Land- and sea-breezes are well marked in spring and autumn, and squalls are frequent at all seasons.

The main ports (Ch. XIII) are the river ports of Abadan, Khurramshahr (Mohammerah), and Bandar Shahpur at the head of the Persian Gulf: these are many miles inland, behind the mud-flats. Other ports, inadequate, shallow, and exposed, are Bushire on the Persian Gulf, Lingeh and Bandar Abbas in the strait of Hormuz, and Jask and Chahbar on the gulf of Oman. There are few anchorages along the coast, except for small craft.

Several islands lie off the coast and will be described at the ends of the appropriate sections: Kharg, Shaikh Shuaib, Hindarabi, and Qais in the Persian Gulf, and Qishm, Henjam, Larak, and Hormuz in the strait of Hormuz.

The peoples of the coast are mixed. On the Persian Gulf coast generally the cultivators are Persians and the fishermen and sailors are Arabs. On the Makran coast the people are Baluchis. Dates are the staple food, except along the gulf of Oman, where the people live on fish.

The chief products of the region are pearls, oil, gypsum, salt, and fish. Boats from the Persian coast take part in pearl-fishing from the Great Pearl Bank in the south of the Persian Gulf, but the pearl market is on the Arabian side and the industry is declining. Oil from south-west Persia is refined on Abadan island by the Anglo-Iranian Oil Company, and active prospecting is taking place elsewhere; it is this commodity which marks the future importance of this region. Gypsum is widespread and used as a cement. Salt is mined in the islands of Hormuz, Qishm, and Henjam. The coastal waters are very clear and swarm with fish; some is caught and eaten, or traded for dates from the interior.

A dry-weather motor-road follows the north-east shore of the Persian Gulf, but it is liable to be destroyed by torrents in winter; in places it is flooded at high tide. There are only tracks round the head of the Persian Gulf and along the strait of Hormuz and gulf of Oman coasts. Communication with the interior is difficult owing to the many parallel ranges of barren mountains and to the mud and marsh in the north-west. The only main motor-roads inland are from

Khurramshahr to Ahwaz, from Bushire to Shiraz, and from Bandar Abbas to Kirman; also the Anglo-Iranian Oil Company's road from Ganaweh to Gach Saran. The Trans-Iranian railway runs from Bandar Shahpur to Tehran and the Caspian Sea. Khurramshahr has a new terminus joined to the Trans-Iranian railway at Ahwaz since 1941. Sea, air, and cable communications are briefly described in Chapter XIV.

1. Persian Gulf from Abadan to Lingeh

The Persian Gulf coast of Persia will be described from north-west to south-east in four sections: Abadan island to Ras al Bahrgan; Ras al Bahrgan to Bushire; Bushire to Naband; and Naband to Lingeh. The islands that lie off this coast (Kharg, Shaikh Shuaib, Hindarabi, and Qais) are described in a separate section at the end.

Abadan Island to Ras al Bahrgan (fig. 23)

General Description. The Persian coast at the head of the Gulf extends 65 miles east from the Iraqi frontier, at the mouth of the Shatt al Arab. It is composed mainly of the mud-flats and marshes stretching 60 miles inland round Khor Musa inlet. Abadan island lies between the Shatt al Arab and the Bahmishir, the natural mouth of the Karun. The soft alluvial mud, deposited in historical times (p. 27), prevents the construction of a commercial port near the river mouths, and the main routes and large ports are many miles inland. The only cultivated belts of this coast are the date-groves on the banks of the Shatt al Arab and Bahmishir. The tracks across the marshes keep more than 40 miles inland and are motorable only in dry weather.

Detailed Description. Abadan island is 40 miles long. At its north-west end is the artificial Haffar channel, about 2½ miles long, cut in Abbasid times to link the Karun with Basra. The island is bordered by date-groves and cultivation, except on the seaward side, which is swampy. The large oil refinery and port of the Anglo-Iranian Oil Company are at Abadan and Bawarda in the north-west part of the island (p. 496). There are several tracks across the island and inland of the date-groves. Abadan and Bawarda are served by motor-roads, with ferries across the Haffar channel to Khurramshahr and across the Shatt al Arab to the Fao–Basra road in Iraq.

The Bahmishir is a natural mouth of the Karun, but most of the Karun water is now diverted to the Shatt al Arab, and the upper Bahmishir is very shallow.

Khurramshahr (Mohammerah) is on the north bank of the Haffar channel. It is the chief port of Persia (p. 504). It was taken over by the British in 1941 and has been developed as an Allied naval and minesweeping base. There are motor-roads to Basra and to Tehran,

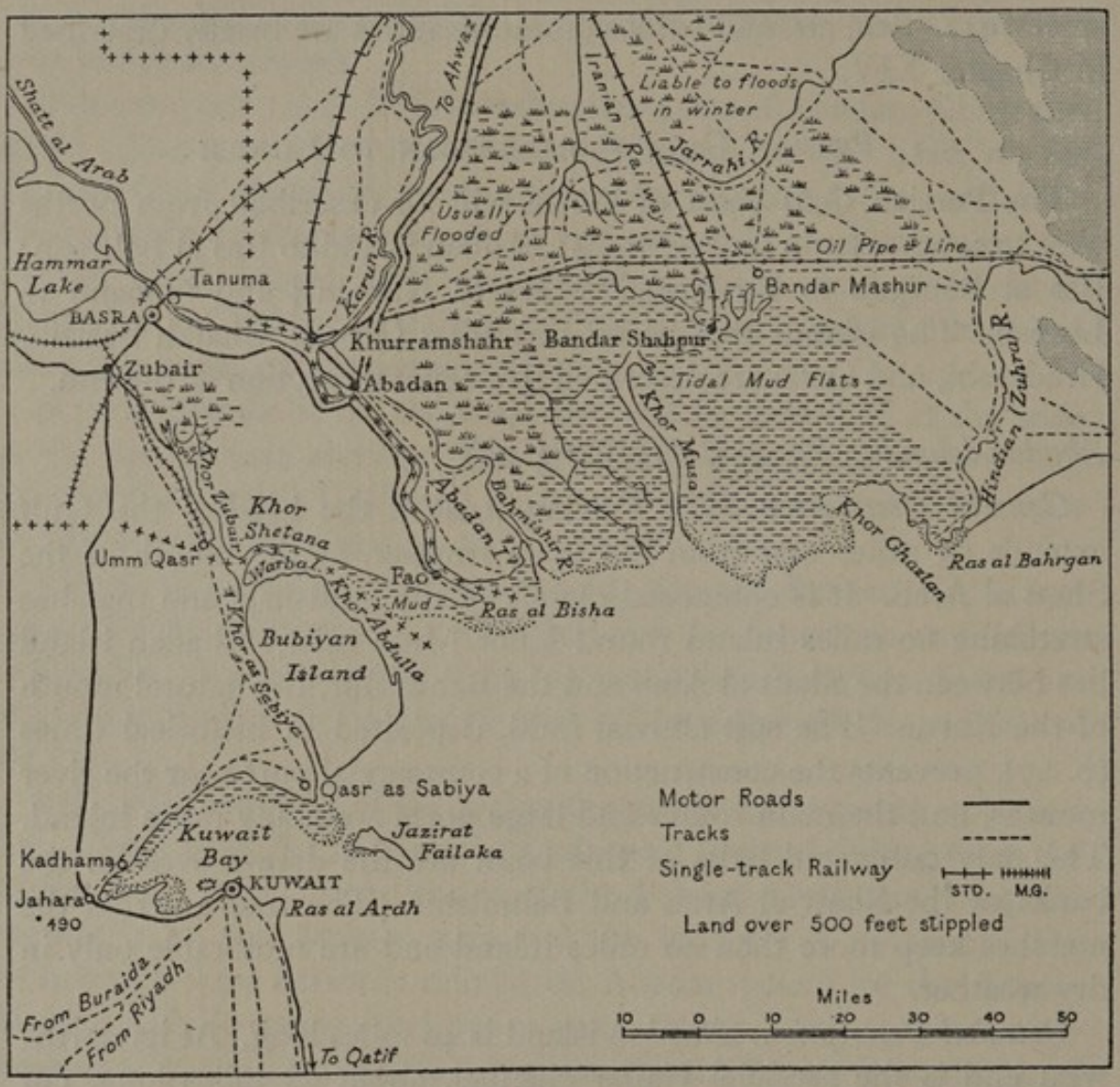


FIG. 23. *The Coast at the head of the Persian Gulf*

and a single-track railway to the Trans-Iranian railway at Ahwaz. Steamers navigate the Karun to the rapids at Ahwaz in the wet season.

The coast between the Bahmishir and Khor Musa, 20 miles east, is composed of wide tidal mud-flats intersected by shallow channels. Inland are extensive marshes usually flooded and the haunt of wild-fowl. This district was formerly drained and cultivated, but in 1765 the dikes were cut as a protection against Persian invaders and the plains were swamped. Still farther inland are plains liable

to flood in winter but dry in summer, cultivated by irrigation or used for grazing, and inhabited by the Chaab Arabs (p. 378).

Khor Musa is a deep channel about 1½ miles wide in the tidal flats. It winds inland for 50 miles, and has several unsurveyed branches; the head is split up into many intersecting channels. There is an anchorage 20 miles from the entrance. The port of Bandar Shahpur (p. 501) is 45 miles up the channel at the edge of a reclaimed mud island. Bandar Mashur is a small settlement on a mound in the marshes at the head of Khor Musa; it has brackish wells and a dry-weather aircraft landing-ground.

Tidal mud-flats continue east of Khor Musa for 35 miles, with an extensive bay, Khor Gazlan, in the east. Ras al Bahrgan is at the east end of the mud-flats and is formed by the delta of the Hindian (Zuhra) river. Inland of the flats is a wide grassy plain, marshy in places after wet weather and stretching north-east for more than 30 miles to the foothills of the Khuzistan mountains.

Ras al Bahrgan to Bushire (fig. 24)

General Description. The coast between Ras al Bahrgan and the Bushire peninsula is low and sandy, except for a swampy bay north of Bushire. The coastal plain, between 15 and 35 miles wide, is sparsely cultivated, with date-groves near many of the villages. It is backed by two ranges of hills, Bibi Hakim approaching the coast in the north, and the short range of Kuh-i-Bang rising from the plain north of Ganaweh. Several small rivers meander across the coastal plain, the most important being the Hindian or Zuhra in the north and the Hilleh Rud, the outlet of the Shahpur, in the south: both are navigable for short distances by small craft and are crossed by ferries. A track, motorable in dry weather, runs along the coast, and there are others farther inland. Tracks lead to the interior from the small ports of Bandar Dilam, Bandar Rig, and Shif, and metalled motor-roads run inland from Ganaweh to the Gach Saran oilfield and from Bushire to Shiraz. The only anchorages are off Bandar Dilam, Ganaweh, Bandar Rig, and Bushire, and east of Kharg island.

Detailed Description. From Ras al Bahrgan the coast runs straight north-east for 30 miles, forming the low north-west shore of the wide Dilam bay. Near the head of the bay is a sharp peak 900 feet high, part of the Bibi Hakim hills. The coastal plain is barren and impregnated with salt for 11 miles to Bandar Dilam, which has a

boat creek and sheltered anchorage; it was a Dutch trading-port in the eighteenth century, but is now an unimportant fishing-village.

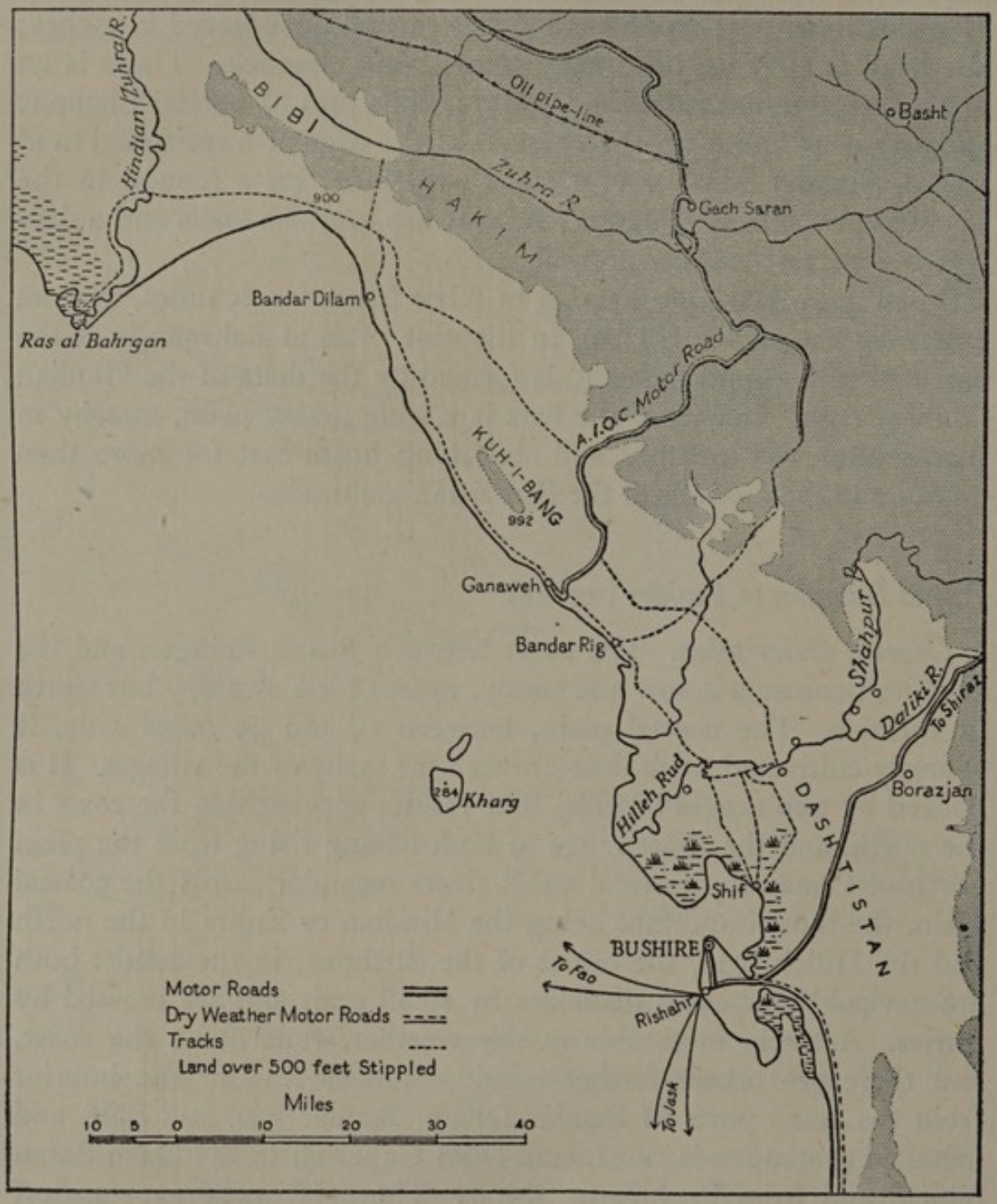


FIG. 24. *Ras al Bahrgan to Bushire*

South-east of Bandar Dilam the coast continues low and sandy, with salt creeks and isolated hillocks. The rugged Kuh-i-Bang range, which contains veins of gypsum, is 15 miles long; the highest point (992 ft.) is 3 miles inland.

Ganaweh is a small port with an Anglo-Iranian Oil Company



121. *The shore of the Strait of Hormuz near Bandar Abbas*



122. *The coastal plain near Bandar Abbas*



123. *View south over the Bandar Abbas coastal plain towards Qishm island*



124. *Caravan passing northwards out of the coastal plain two miles north of Bandar Abbas*

depot, 40 miles south-east of Bandar Dilam; it has a jetty in a tidal creek, an aircraft landing-ground, and a wireless station. The Company has built a motor-road to the Gach Saran oilfield in the hills nearly 50 miles north-north-west, and connected it through to Behbehan in the Marun basin. The Ganaweh district was formerly prosperous, and the ruins of a city cover the ground for more than a mile inland, but the river which irrigated the plain has been diverted by an earthquake.

Bandar Rig is a small local port with a boat creek, 10 miles south-east of Ganaweh; the stronghold of a famous eighteenth-century pirate, its fort was razed by British troops. Ten miles south of Bandar Rig is the mouth of a small salt river, and 13 miles farther south is the navigable mouth of the Hilleh Rud (Shahpur), which winds through a cultivated district with several villages and wells.

Between the Hilleh Rud and Bushire, 15 miles south-east, is an extensive swamp intersected by creeks, bordering a bay containing sandbanks and islets. The small port of Shif, at the head of the bay, is a sea outlet for produce of the Hilleh district. The coastal track keeps inland between Bandar Rig and Shif.

Bushire (photos. 119, 270, 271; p. 502), the chief open-sea port of Persia, has a good mountain route to the interior. But it has only an open roadstead and is less important to-day than the river-port of Khurramshahr (p. 504) which has far better facilities. Bushire has been the headquarters of the British Political Resident in the Persian Gulf since 1778. The town is at the north-west end of a ridged peninsula connected to the mainland by a strip of salt-marsh. The peninsula, the classical *Mesambria*, is a raised coral reef 16 miles long and about 5 miles wide; the seaward edge has low cliffs. The road to Shiraz crosses the strip of salt-marsh, which is liable to floods in winter, but an all-weather motor-road was planned for 1937. Rishahr, which contains the cable-station and European villas, is 6 miles south of Bushire and is connected to it by motor-road; it is on the site of a medieval port, and has a ruined fort. The south-east end of the peninsula is low.

Bushire to Naband (fig. 25)

General Description. South-east of the Bushire peninsula the coast is known as the Tangistan coast. The coastal plain is only 1 or 2 miles wide and is intersected by ravines; it contains many small villages surrounded by date-groves. The only article of export is brushwood brought down by herdsmen from the hills.

Detailed Description. The coast is backed for the first 50 miles by a narrow sandstone range (Kuh-i-Mand) whose most conspicuous peak, Buriyal (Asses' Ears), is 2,680 feet high. The coastal road crosses a succession of ravines and rocky ridges and is liable to be washed away by streams in winter. Between the Kuh-i-Mand coastal

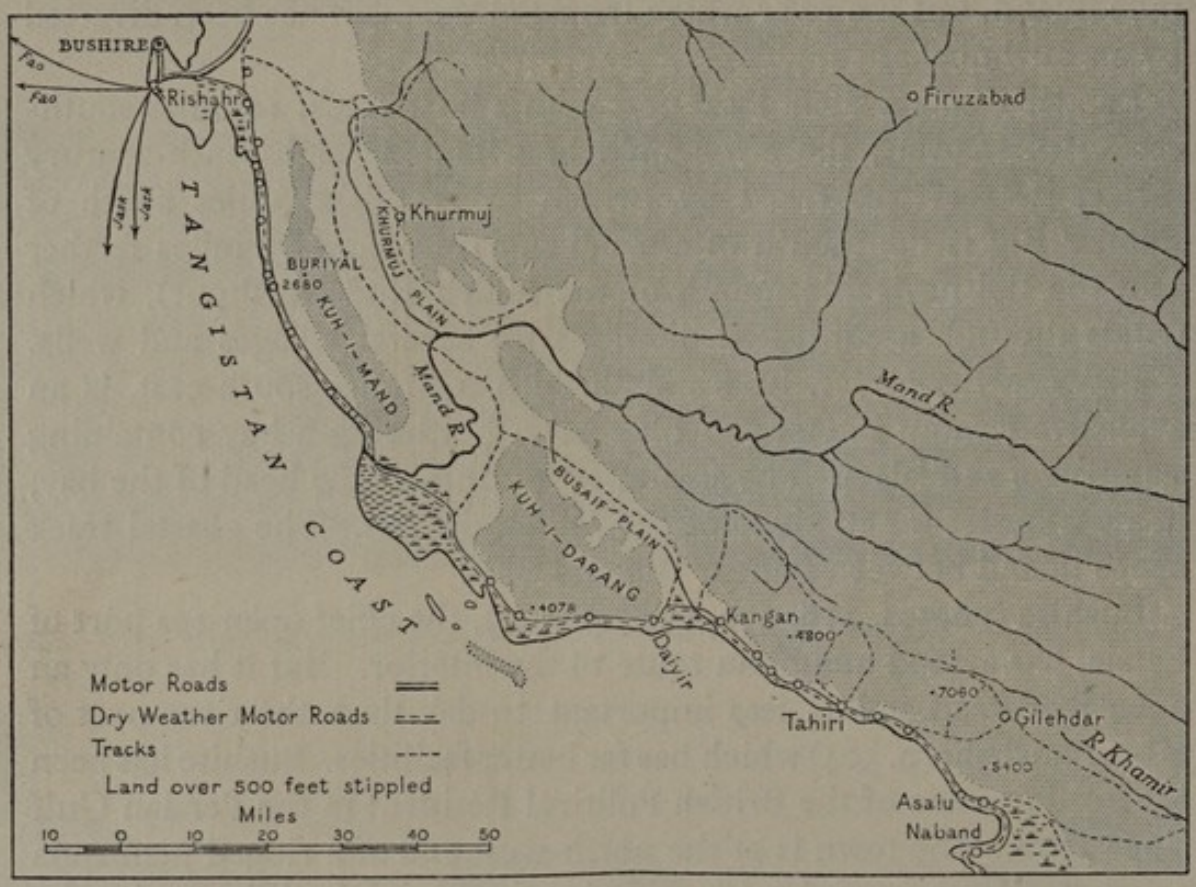


FIG. 25. *The Tangistan Coast: Bushire to Naband*

range and the next range more than 20 miles inland is the cultivated Khurmuj plain which is drained south-east into the Mand river. The wide valley of this river opens to the sea south of the Kuh-i-Mand range, and the mud-flats and marshes of its delta form the coast for the next 20 miles. The Mand is navigable for some distance by small craft and is unfordable when in flood; the dry-weather coastal road crosses its mouth by a pontoon bridge. There is anchorage off the delta. South-east of this gap the coastal plain is constricted by the Kuh-i-Darang range, whose seaward edge is very steep. The coast trends south-east for 12 miles to the highest point (4,078 ft.) and is fringed by marsh; it then turns east for 17 miles to Daiyir, a small port with anchorage close off shore and an emergency landing-ground. Kuh-i-Darang falls north-east to the Busaif plain,



125. *Kuh-i-Shamil from the north-west. View towards the lower Rudian*



126. *Minab from the west*



127. *The coastal plain 60 miles east of Jask. Sand-dunes south-west of Gohart*



128. *The coastal plain near Karkindar from the summit of Kuh-i-Tulidar*

drained by a small stream whose marshy valley opens to the sea near Kangan 9 miles east of Daiyir.

By this turn to the east round Kuh-i-Darang the coastline cuts inland across the trend of the coastal hills. From Kangan it runs south-east along the foot of the inland ranges for nearly 50 miles until it cuts back at Naband bay. The mountains tower more than 4,800 feet above the sea, their highest peak reaching 7,060 feet. The coastal plain is in places less than a mile wide, and contains small fishing-villages and date-groves. Kangan was formerly a Portuguese trading-port; it has a good roadstead with partly sheltered anchorage. Tahiri, a village 21 miles south-east of Kangan, is on the site of the medieval city of Siraf, which was the chief emporium of eastern trade in the ninth and tenth centuries. The ruins and pottery debris extend nearly 2 miles along the shore west of Tahiri and up a terraced limestone ridge between the mountains and the sea. The ruined graveyards of Siraf fill the Shilau valley behind this ridge. A conduit supplied Siraf with spring water from the mountains. Tracks by precipitous ravines cross the mountains to fertile plains inland.

The coastline cuts back across the trend of the coastal mountains at Naband bay, which opens west from the marshy Gabandi plain extending east-south-east between the mountains and the coastal hills. Naband village is on the south shore of the bay, near the north-west end of the coastal hills. There is anchorage in the bay, and a track leads up the Gabandi plain from the north shore, but there are only mule-tracks to the interior. Asalu, a small pearl-fishing village and police-post on the sandy north shore of the bay, has anchorage inside a reef and an emergency landing-ground.

Shibkuh Coast: Naband to Lingeh (fig. 26)

General Description. Between Naband point and Lingeh, 150 miles east-south-east, the coastline trends along and across successive coastal ranges. Where the coast crosses the mouths of the valleys between these ranges there are wide bays opening south-west, as at Muqam, Charak, and Mughu. These and other smaller bays provide anchorage. The coastal plain is narrow, with small fishing-villages. The dry-weather motor-road follows the coast closely the whole way, mostly at the foot of steep sandstone cliffs. The only road to the interior runs north-west from Lingeh to Lar, where it links with an all-weather road to Jahrum and Shiraz. The islands of Shaikh Shuaib, Hindarabi, and Qais lie off the Shibkuh coast.

Detailed Description. From Naband point, at the south entrance to Naband bay, the coast trends east-south-east for 63 miles to Muqam, along the foot of the coastal hills. It is steep-to and has low cliffs, and sandy bays in which small craft can shelter. There are anchorages off the villages of Bustanu and Shivuh, but the best protection for moderate-sized vessels is 3 miles west of Shivuh. The cultivated Gabandi valley, which lies behind the coastal range

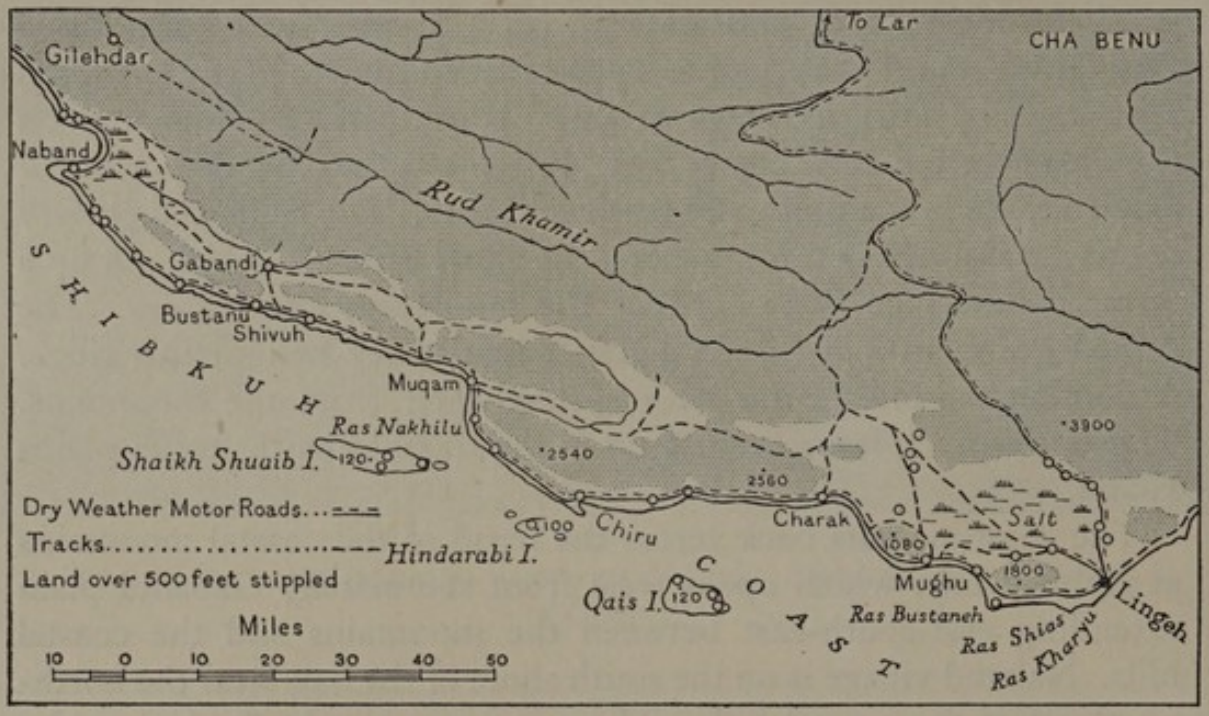


FIG. 26. *The Shibkuh Coast: Naband to Lingeh*

for the first 30 miles from Naband bay, is marshy in its lower half and produces flax for fishing-nets; its trade is served by Shivuh, which has a shallow harbour inside a reef.

From Muqam, a small port, the coast trends south to Ras Nakhilu, crossing the ends of two coastal ranges enclosing a narrow valley, off which there is anchorage. The coast runs east-south-east for 17 miles from Ras Nakhilu to Chiru point, the hills rising steeply from it. The northern of the two coastal ranges rises to 2,540 feet. Chiru village is in a small bay east of Chiru point; it has a sandy beach and good anchorage sheltered from the north-west.

From Chiru the coast trends east for 33 miles to Charak. The only anchorages are off two small fishing-villages 10 and 15 miles east of Chiru. Charak is a walled fishing-town with a date-grove; it has a creek usable by small craft a mile to the east, and good sheltered anchorage; a track leads north.

East of Charak the coast curves south-east, forming Charak bay; it crosses the mouth of the wide Mihrakan salt-marsh which stretches east for about 35 miles behind the coastal hills, and is fringed inland by hamlets and date-palms: the centre is passable by animals in summer but only by boats in winter. Charak bay is separated from Mughu bay, farther south-east, by a low broad point north of which is a volcanic hill 1,080 feet high. There is anchorage off Mughu village, on the north shore of its wide sandy bay, and a track leads north across the salt-marsh. South-east of Mughu bay is Ras Bustaneh, which rises north-east to Jabal Bustaneh, a group of irregular volcanic hills with two peaks 1,800 and 1,750 feet high. Between Ras Bustaneh and Ras Shias, 11 miles east, is a wide sandy bay; it is fronted by a rocky beach and rises to the foothills of Jabal Bustaneh; there is anchorage in the west off Bustaneh village and off Ras Bustaneh. Shias bay, entered between Ras Shias and Ras Kharyu 3 miles north-east, affords sheltered anchorage and has a sandy beach. Lingeh is 3 miles north-east of Ras Kharyu.

Kharg, Shaikh Shuaib, Hindarabi, and Qais Islands

Kharg island (fig. 24) is 23 miles south-west of Bandar Rig and 34 miles north-west of Bushire. It is about 4½ miles long and 2 miles wide, and contains barren table-topped hills rising to 284 feet. The east coast is low and cultivated and has a sandy beach; it is surrounded by a reef. There is anchorage off the east coast, sheltered from the north-west, and landing is possible at a small pier by the ruined fort. There is a village and a ruined trading-fort on the north-east extremity, dating from the Dutch occupation from 1748 to 1765. The Anglo-Iranian Oil Company has reopened some road-metal quarries in the hills. The island contains catacombs which have been identified as early Christian tombs, probably of the Nestorian church.

Shaikh Shuaib island (fig. 26) is about 7 miles south-west of Ras Nakhilu. It is 15 miles long and 3 miles wide, and has an east–west ridge of hummocks about 120 feet high. The coast has low cliffs and a few sandy bights, and is fringed by reefs. There is anchorage to north and to south of the east end, off which is a small islet. Shaikh Shuaib has several villages and many goats are kept, but there is no cultivation.

Hindarabi island lies 4 miles south-west of Chiru point. It is 4½ miles long and about 2 miles wide. The east and west ends are cliffed, and the island is surrounded by a reef. The highest point is about 100

feet above sea-level. A village on the north coast has good anchorage off it.

Qais island is separated from the mainland between Chiru and Charak by a navigable strait 10 miles wide. The island is 9½ miles long and 4½ miles wide. Its coasts are sandy, with low cliffs at the east and west ends, and are fringed by reefs. The anchorage, off the north-east point, is exposed to easterly winter gales. The rocky central plateau, 120 feet high, is grazed by sheep and goats. There are several villages and some cultivation. Water is obtainable along the shore by digging, and rain is stored in cisterns. Qais was the successor of Siraf and the predecessor of Hormuz as the chief emporium of eastern trade, from about the eleventh century to the thirteenth: ruins of the medieval walled city extend half a mile along the north coast.

2. Strait of Hormuz from Lingeh to Minab

The strait of Hormuz forms the entrance to the Persian Gulf and links it with the gulf of Oman. Its Persian coast trends east-north-east from Lingeh for 96 miles to Bandar Abbas, crossing the ends of several unsurveyed mountain-ranges and of the valleys between them. It then curves east and south-east for 40 miles to the Minab river, and is backed by a wide plain. The large island of Qishm, 67 miles long, is separated from the mainland between Lingeh and Bandar Abbas by Clarence strait. The smaller islands of Henjam and Larak lie off Qishm island, and Hormuz lies off the mainland coast east of Bandar Abbas.

Lingeh to Minab (fig. 27)

Lingeh (p. 506) extends 1¼ miles along the shore and is surrounded by large date-groves. Inland, an eroded sandstone plateau rises to 400 feet, and beyond it is the large Mihrakan salt-marsh which extends west for about 35 miles to Charak bay. North of the salt-marsh are the Lingeh mountains, in which Lingeh peak rises to 3,900 feet 22 miles north-north-west of the town. Lingeh has a road to Lar and Shiraz, just possible for cars, a dry-weather coastal road to Bushire, a coastal track to Bandar Abbas, and a track north-west across the salt-marsh.

North-east of Lingeh the sandy coast slopes up to an irregular group of hills whose highest point (1,020 ft.) is 3 miles inland, 10 miles north-east of the town. There is a table-topped outlier 620 feet high between it and the sea. Kung, a small town in a date-

grove 4 miles north-east of Lingeh, was the gulf headquarters of the Portuguese during the seventeenth century, after their expulsion from Hormuz. Kung has good anchorage, and about fifty ocean-going dhows which trade with Khurramshahr and sail once a year to Aden and east Africa. North-east of the table-topped hill is the mouth of a valley 5 miles wide. For 17 miles beyond this the coast crosses the ends of two sandstone ridges (1,330 ft. and 2,940 ft.) of

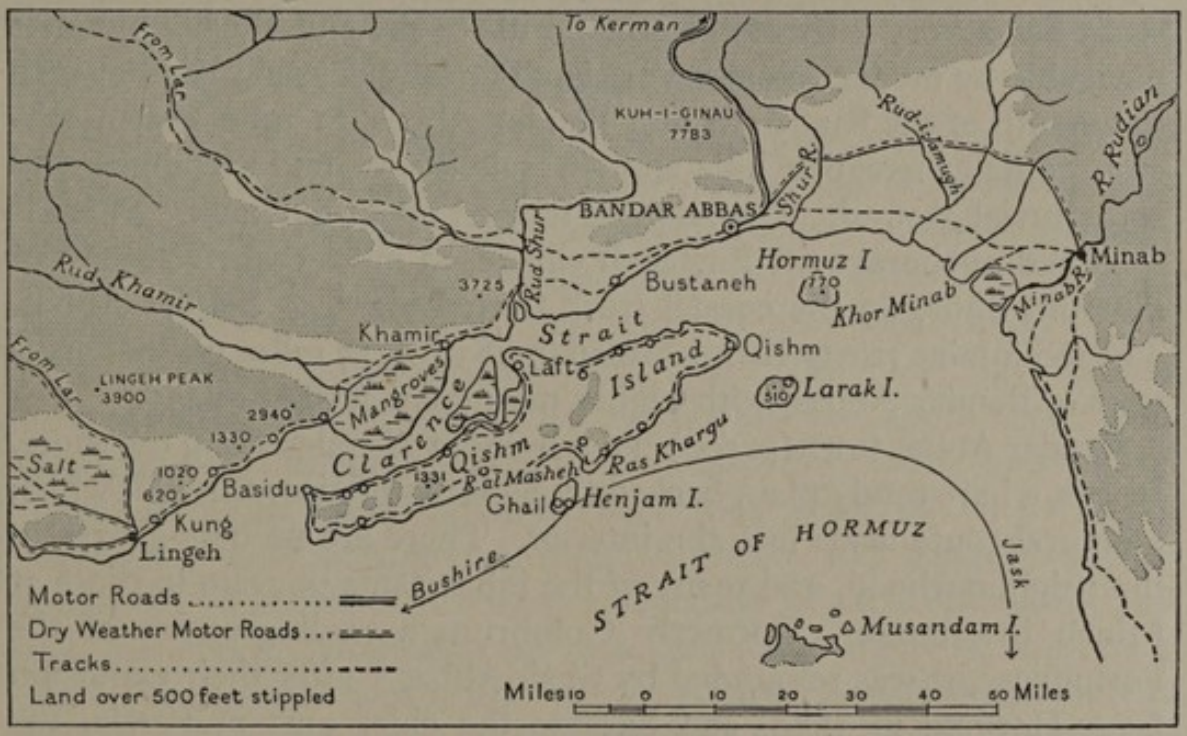


FIG. 27. *The Strait of Hormuz: Lingeh to Minab*

the Lingeh mountains; at certain points the foot of the cliffs can only be passed at low tide. North-east of these mountains the coast forms the north-west shore of Clarence strait, which lies between Qishm island and the mainland.

Clarence strait is about 65 miles long and in the middle is constricted to a width of 1½ miles by Laft point, which projects from the north-west coast of Qishm island. South-west of Laft point the strait contains many mud islets covered with dense mangrove thickets. A large islet divides the navigable channel into two: the north-western is the wider, but almost silted up; the south-eastern is deeper, but narrow and intricate. Between the Lingeh mountains and the Khamir range, about 15 miles north-east, is the valley of the salty Rud Khamir (Mehran) which reaches west-north-westwards parallel to the coast for 200 miles (p. 71). A large mangrove swamp extends from its mouth for 10 miles out into Clarence strait. Khamir

village is near a creek at the north-east end of the mangrove swamp, and exports sulphur and millstones to Bandar Abbas. The range in which Kuh-i-Khamir (3,725 ft.) is an important peak extends west for nearly 50 miles. Its seaward end falls in precipitous rocky spurs, leaving only a narrow passage along the shore. To the east is the mouth of another salt river, the Rud Shur, whose tributaries drain a large basin among high mountains inland (p. 72), and which enters Clarence strait near its narrowest part. The east part of Clarence strait has a very intricate channel, with banks and shoals, but it is navigable by moderate-sized vessels. The bare coastal plain between the mouth of the Rud Shur and Bandar Abbas, 31 miles east-north-east, contains irregular hills and several villages, and is composed of soft alluvial ground. The shore is fringed by a tidal bank. There is sheltered anchorage off Bustaneh village, 13 miles east-north-east of the Rud Shur, on the coastal track from Lingeh to Bandar Abbas. The mountains rise to Kuh-i-Ginau (7,783 ft.), 17 miles north-north-west of Bandar Abbas, with higher mountains farther inland.

Bandar Abbas town (p. 500) extends about 1½ miles along the shore. It is in a bare sandy plain backed by high mountains, through which a natural route leads into the interior. There are no date-groves in the neighbourhood, and many of the inhabitants migrate to those at Minab in summer. Formerly Gombrun, a trading-centre of the Portuguese, it was refounded by Shah Abbas I after their expulsion from Hormuz in 1622, and became the chief port of Persia, the headquarters of English and Dutch commerce in the Gulf, until the middle of the eighteenth century (photo. 180). Its trade has declined in favour of Bushire and Khurramshahr, which have better facilities for modern ships and better routes to the interior, and it is now the distributing centre only for south-east Persia. The lorry and caravan route north to Kirman is liable to landslides; other routes lead west to Lar and east to Minab, and there is a coastal track to Lingeh.

The coast between Bandar Abbas and the Minab or Rudian river, nearly 40 miles east-south-east, is low and mostly swampy, with mangroves in the east (photos. 121–126). It is fringed by tidal mud-flats. There are high mountains about 25 miles inland. Another Rud Shur (salt river) and the Rud-i-Jamugh enter the sea along this coast. The caravan route from Bandar Abbas to Minab keeps about 15 miles inland, but there is a track, passable only in dry weather, about 5 miles from the sea. The Minab river near the coast flows through a district cultivated with date-groves and orchards, to which many people from Bandar Abbas and Hormuz migrate in summer; most

of its water is used for irrigation, and little reaches the sea. Khor Minab, a salt creek 7 miles north-west of the river, is used by native craft trading in grain and fruit, and has tracks to Minab from its head. The village of Minab is 15 miles inland. Near by are the ruins of Old Hormuz (the classical *Harmozia*), chief port of south-east Persia until the thirteenth century: at the beginning of the fourteenth century the inhabitants abandoned the city and founded a new one on Hormuz island, taking the name with them. South-east of the Minab river the coast forms the shore of the gulf of Oman.

Qishm, Henjam, Larak, and Hormuz Islands (fig. 27)

Qishm island is the largest in the Persian Gulf. It lies parallel to the coast between Lingeh and Bandar Abbas, and is separated from it by Clarence strait (p. 131). The island is 67 miles long from north-east to south-west and contains irregular flat-topped hills, with several peaks over 900 feet high; the highest peak (1,331 ft.) is 18 miles from the south-west end. Laft point and Ras Khargu project from the middle of the north-west and south-east coasts respectively. The south-east and west coasts have sandy bays backed by the irregular coastal hills; the north-west coast, which forms the south-east shore of Clarence strait, is flatter and fringed by tidal mud-flats. The island is mostly barren and in parts encrusted with salt, but cereals, vegetables, melons, and dates are grown on fertile black loam in the north, and the 33 villages have a population of 13,500. There are many goats, antelopes, and wild-fowl, and cattle and poultry are reared. Salt is mined on the south-east coast and provides the bulk of the revenue. Severe earthquakes occurred at the end of the nineteenth century. The chief villages are the small ports of Qishm at the east and Basidu at the south-west entrances to Clarence strait: each in turn was a British naval station during part of the nineteenth century, but was abandoned because of the intense summer heat and malaria. There are numerous small villages in the fertile northern part and round the coasts. Qishm changed hands several times from the seventeenth to nineteenth centuries, between the Portuguese, English, Arabs, and Persians.

Henjam island lies off Qishm island: it is separated from Ras Khargu by Henjam sound, 1 mile wide. The island, 5½ miles long and 3 miles wide, has barren hills rising to 344 feet. The north point, Ras al Masheh, has good anchorage to the north-west, a boat jetty, and a landing-beach (p. 507). Formerly a British naval station, it has been handed over to the Persian Government. The island's position

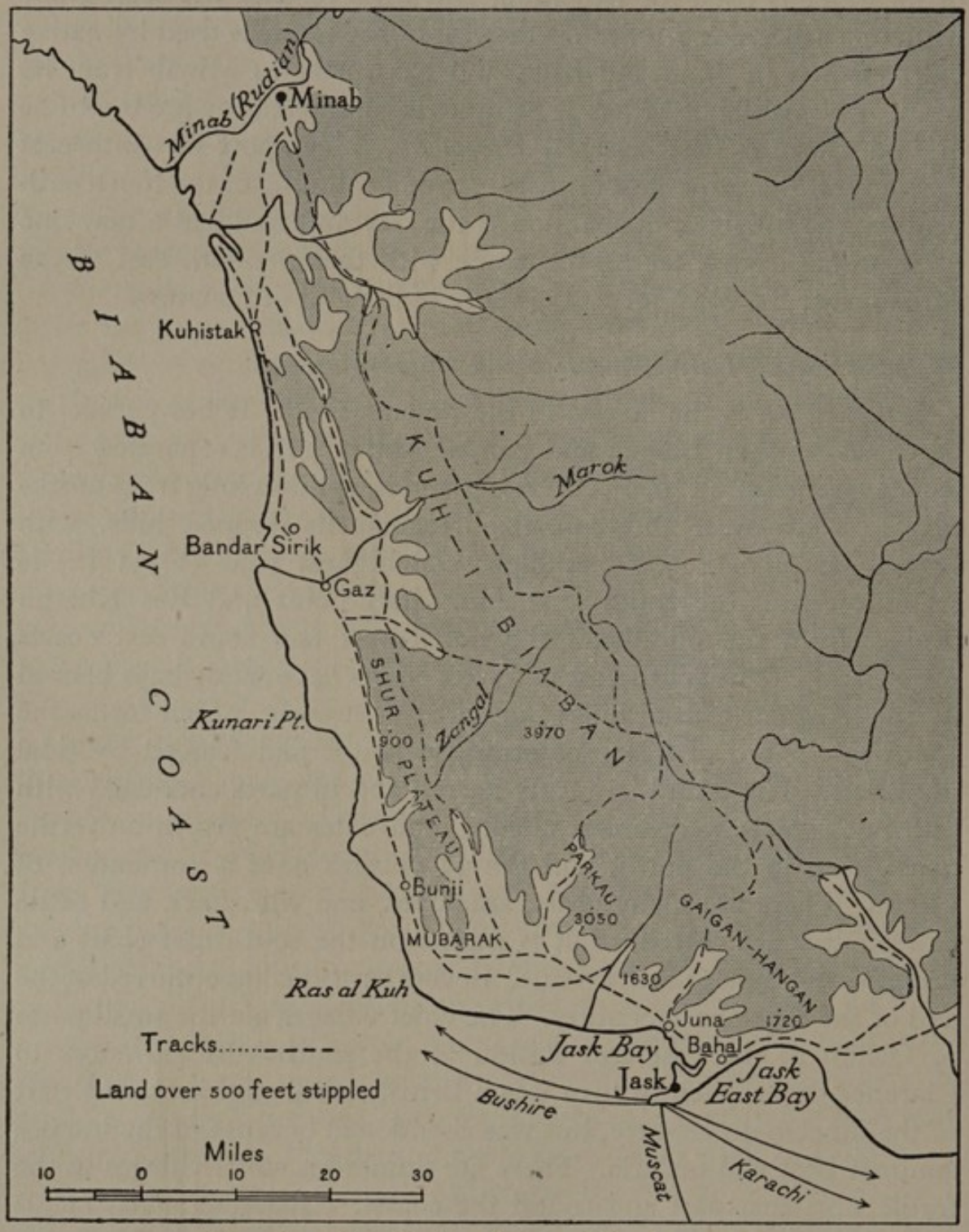


FIG 28. *The Biaban Coast: Minab to Jask*

has strategic value as the strait is here only 32 miles wide so that the Arabian coast can usually be seen. Henjam sound could be used by seaplanes in good weather, but it is not suitable as a seaplane base. Henjam had cables to Bushire and Jask; the cable to Bandar Abbas is now broken. There are rain-water tanks at Ras al Masheh and good wells at Ghail village, 4 miles south-west. The island contains

valuable salt-mines, and two small pearl-fishing villages, Ghail and Henjam. A former town on the north coast was destroyed by pirates.

Larak is a barren island 6 miles south-east of Qishm town. It is $6\frac{1}{2}$ miles long and $4\frac{1}{2}$ miles wide, and has rugged hills rising to 510 feet. It is surrounded by a reef. A fishing-village on the north coast has exposed anchorage off it, and the ruins of a Dutch fort near by. Rain is stored in cisterns, but water is scarce.

Hormuz island lies 11 miles south-east of Bandar Abbas and 23 miles west of the mouth of the Minab river (photo. 120). The island is $5\frac{1}{2}$ miles long and $4\frac{1}{2}$ miles wide. It contains barren salt-plug hills about 300 feet high, which are encrusted with many different-coloured minerals, and a few white peaks rising above 700 feet in the centre (p. 72). The hills fall steeply to the sea except in the north, where there is a low point and a shelly plain about 1 mile wide. An anchorage off the north coast is sheltered. Red iron oxide associated with the salt-plugs is mined by the Persian Government: more than 7,000 tons were shipped to Britain in 1936 out of 13,000 tons exported. The city of Hormuz was founded at the beginning of the fourteenth century when the entire population of Old Hormuz emigrated from the mainland. For two centuries it was the chief emporium of Eastern trade and the centre of an empire, though all its water and supplies had to be imported. It was occupied by the Portuguese in 1507 and remained their headquarters in the Persian Gulf from 1514 to 1622 (p. 269), when they were expelled by the combined attack of English ships and Persian land forces. The city then declined; its ruins cover the north coastal plain, and those of the strong Portuguese fort are on the point, protected by the sea on three sides (photo. 179). A fishing-village of about 200 houses is now the only settlement; the wells and cisterns dry up in summer, and the inhabitants seek relief at Minab.

3. Gulf of Oman from Minab to Gwatar

The Persian coast of the gulf of Oman will be described from north-west to south-east in two sections: the Biaban coast, from Minab to Jask; and the Makran coast, from Jask to Gwatar.

The Biaban Coast: Minab to Jask (fig. 28)

General Description. The Biaban coast forms the north-east shore of the head of the gulf of Oman. It trends south-south-east from the mouth of the Minab river for 88 miles to Ras al Kuh, whence it trends east for 30 miles to the Jask promontory. From Minab to

Ras al Kuh the coast is backed by the Kuh-i-Biaban and, in the southern part, by the Shur plateau.

Very little is known about this coastline. It is fringed by flats of sand and mud, and anchorage is bad. It affords no shelter from the *shamal*, which blows from the north-west or west, and is only visited by small craft that can be hauled up or enter the creeks. The coast is very low, and a plain varying from 1 to nearly 10 miles wide extends inland to the foot of the hills. There are firm damp sands with tufts of grass near the sea, and soft dry sands a few miles inland: between them are mangrove swamps and the characteristic *mins* or dangerous quicksands formed by the sun drying the surface while the soil below remains semi-fluid.

The coastal plain is thinly populated, and the inhabitants are very poor. Small villages and hamlets are the only settlements, and they are several miles inland. Date-groves surround the villages, and wheat is grown, but there is usually one rainless year in three. The wells are mostly shallow, and a number are brackish. The coastal track keeps several miles inland behind the swamps and quicksands, and the only tracks to the interior are up the watercourses which are usually almost dry but are impassable after heavy rain. The inland hills are briefly summarized on pp. 99–102.

Detailed Description. Between the Minab river and Kuhistak, 18 miles south-east, the coast is still that of the comparatively fertile Minab district (p. 132). At Kuhistak, a village with a fort on an isolated hill, a spur of the Kuh-i-Biaban reaches almost to the sea. From this point the hills trend south-south-east and the coastal plain widens to the Marok (Gaz) river, which reaches the sea 25 miles south of Kuhistak. There is anchorage for small craft at Bandar Sirik, a small backwater among sand-dunes $3\frac{1}{2}$ miles north of the Marok mouth; Sirik village is one of a group in the date-groves about 3 miles inland.

The Marok river drains the north-west part of the Kuh-i-Biaban and is perennial but not drinkable; its mouth can be entered by small craft; the track from Kuhistak crosses it at Gaz village 7 miles inland. The coast between the Marok river and Kunari point, 17 miles south-south-east, is almost unknown; it has a wide belt of mangrove swamps, partly covered at high-water springs, and the foothills are nearly 9 miles inland; a possible landing-place has been reported about 9 miles south of the Marok mouth. South-east of Kunari point the coast recedes and the Shur plateau projects in front of the Kuh-i-Biaban, so that the coastal plain narrows to about 3 miles. The highest point in the low Shur plateau, which is com-

posed of very broken ground, is a 900-foot hill 9 miles east of Kunari point; the Kuh-i-Biaban rises to a conspicuous peak 3,970 feet high, 16 miles farther inland. Several small watercourses drain the Shur plateau, but the only perennial stream is the Zangal river, whose mouth is 13 miles south-south-east of Kunari point.

The coast continues south-south-east from the Zangal river for 17 miles to Ras al Kuh; from the plain rise irregular hills, one being 720 feet high. The coastal track keeps inland of these hills. Proserpine rock, close off shore about 6 miles north of Ras al Kuh, is a wedge-shaped rock 70 feet high. Ras al Kuh is a very low point, but Kuh-i-Mubarak (330 ft.) north of the point is conspicuous for many miles.

Between Ras al Kuh and the Jask promontory, 30 miles east, the shore is low and sandy with tufts of grass. Behind it a belt of mangrove swamp extends about 3 miles inland. The coastal track runs along a sandy scrub-covered plain with occasional date-groves and villages, nearly 5 miles inland. The coastal plain is backed in the west by spurs of the Shur plateau, and in the east by Kuh-i-Parkau (3,050 ft.) and the yellow cliffs of Gaigan (1,630 ft.), at the southern end of the Kuh-i-Biaban where the trend of the hills turns abruptly east. Several small watercourses lead down from these hills, but none are perennial.

Jask is a small fishing-village and telegraph station on the tip of a sandy promontory curving south-west to form Jask bay. There is a lighthouse on the point. Vessels anchor either in Jask bay or in Jask East bay (p. 507) according to the wind. Jask creek, north of the village, winds through mangrove swamps and is used by native craft. Juna (Old Jask) is 7 miles north of Jask, among the sand-dunes at the head of the bay; it was once an important village, and was the site of the first English trading factory and fort in Persia, but it is now in ruins.

The Makran Coast: Jask to Gwatar (figs. 20, 29, 30)

General Description. The coast of Persian Makran extends for 240 miles east-south-east from Jask to the Baluchistan boundary in Gwatar bay. It forms the north shore of the gulf of Oman as it widens towards the Arabian Sea. The coastal plain varies from about 1 to 25 miles wide; in the west it is mostly low and swampy or sandy, but farther east there are hills near the coast and several low cliffed headlands.

The outer disconnected range of sandstone massifs of coastal

Makran is alined from west to east (p. 99). The bare sandstones have weathered into fantastic shapes, and at their seaward base the grey silts of the coastal plain have deteriorated into 'badlands' composed of serrated edges, ridges, and gullies that are extremely difficult to traverse. The main rivers or *kaurs*, which only flow after heavy rain, pass between the sandstone massifs, so that their valleys

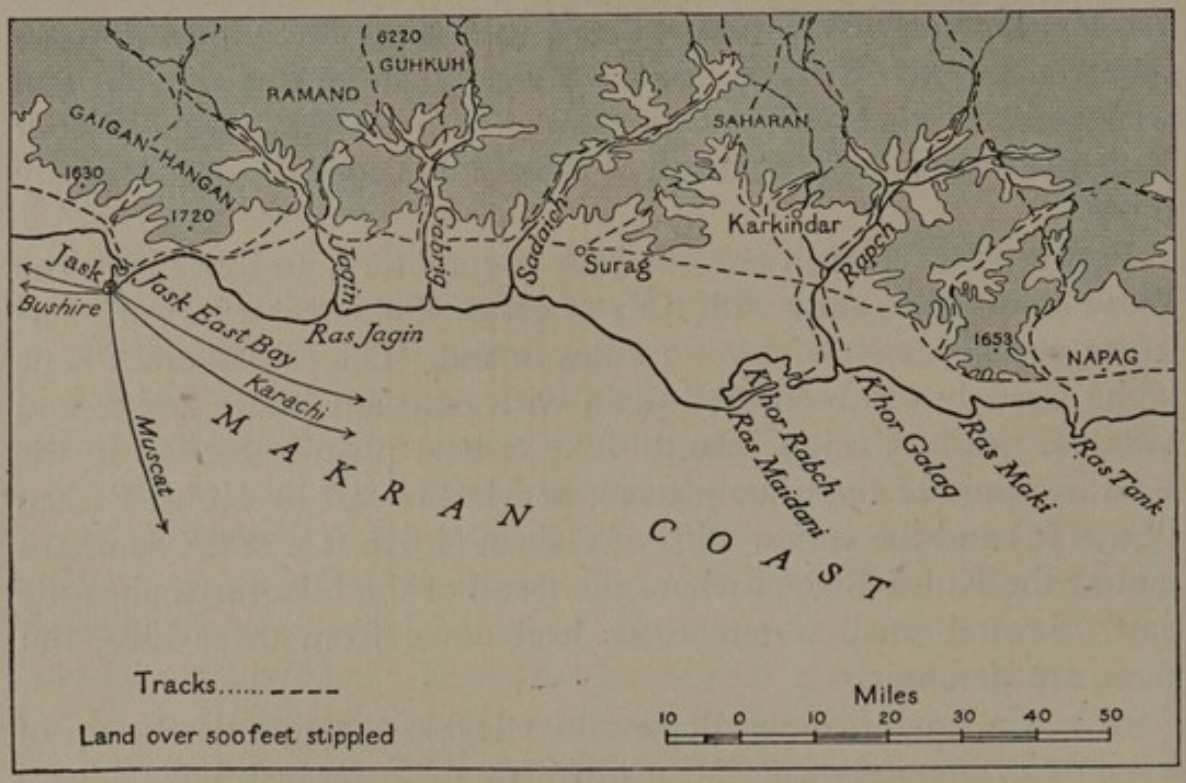


FIG. 29. *The Makran Coast: Jask to Ras Tank*

form fairly easy passages inland. As they cross the coastal plain they lose most of their water in the sands, some never reaching the sea. A series of terraces along the river valleys is correlated with remains of raised beaches near the coast, indicating spasmodic uplift of the land. A line of mud volcanoes, of which Napag is the largest, extends along the Makran coast (photo. 129).

The coastal plain is mostly covered with barren sand and clay, which turns to slippery mud after rain. The population is scanty, but a number of villages and hamlets stand in date-groves where the streams emerge from the hills, and there are occasional fishing-villages near the sea.

Fish forms the main food of the people and their livestock; some is sun-dried and exchanged for dates from the interior, and the small fish that are washed up at some seasons are exported to Ceylon as manure for plantations. The Dashtiari plain in the east is the most

fertile part of the Persian Makran coast, and grows dates and cotton.

A coastal track follows the Indo-European telegraph line from Jask through Chahbar to Gwatar, at varying distances from the shore. The natural routes to the interior are up the watercourses, which are dry or in pools except after rain, when they may become impassable. Camels and donkeys provide the only means of transport.

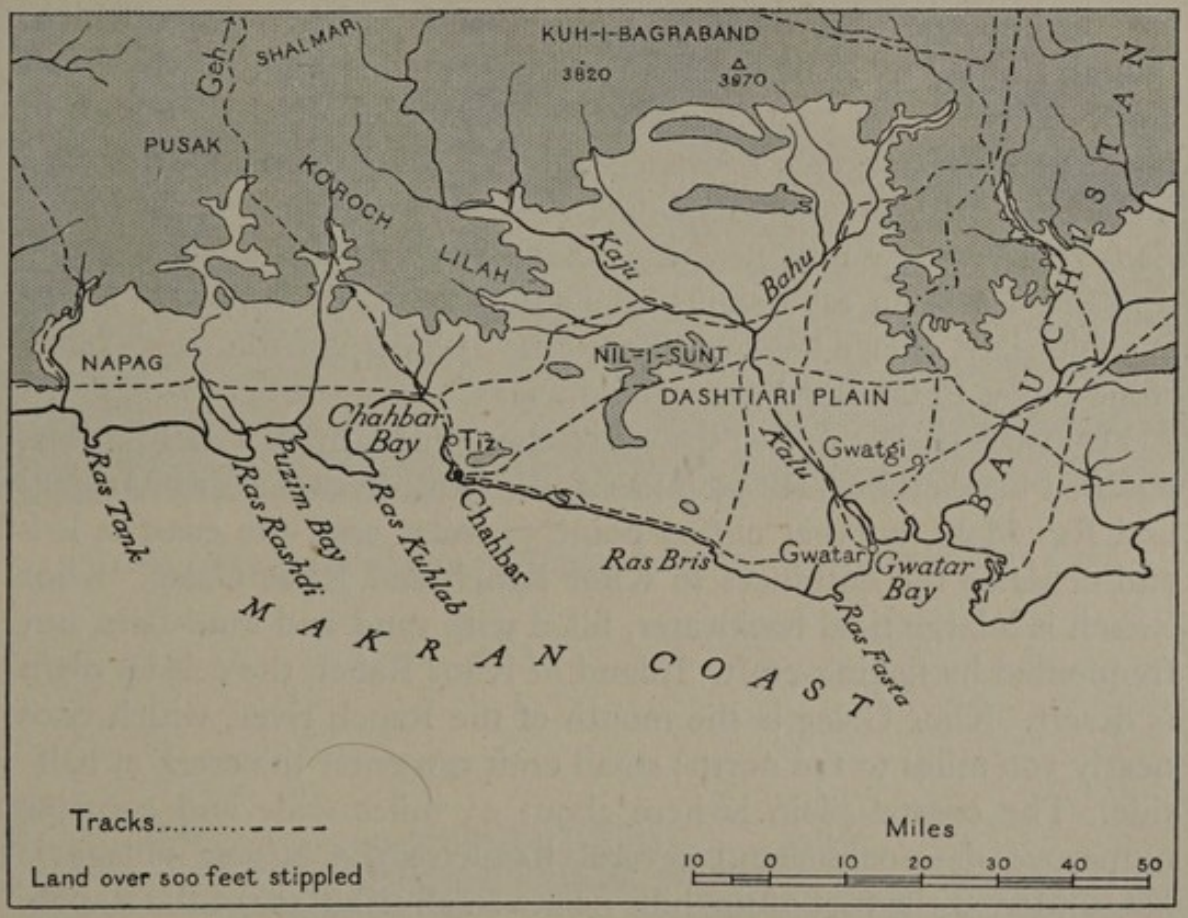


FIG. 30. *The Makran Coast: Ras Tank to Gwatar*

The coast is frequently obscured by dust-haze, especially from April to July. Though affected by surf and swell, it is sheltered by Oman from the full force of the summer south-west monsoon: for this reason, Tiz, in Chahbar bay, was important in early medieval times as the last safe port for ships sailing to India from the Persian Gulf during the monsoon; it also afforded shelter in winter to ships on the opposite course when held up by north winds at the approach to the gulf.

Detailed Description. Jask East bay extends 15 miles east of Jask promontory (fig. 29). Its north-west shore is rocky with a sandy beach and low cliffs, and the north-east shore is low and fringed by a sandbank. At the head of the bay the coastal plain is only a mile

wide and is backed by white cliffs 1,720 feet high. The anchorage close off the north-west shore is sheltered from both monsoon and northerly winds, but it suffers from surf and swell.

Beyond Jask East bay the coast is low for 40 miles to the Sadaich river. The coastal plain is more than 10 miles wide, and contains extensive mangrove swamps intersected by creeks. Camels are sent to this region to graze for several months. The three largest creeks are the mouths of the Jagin, Gabrig, and Sadaich rivers which, though fronted by shallow bars, can be entered at high tide by small craft. These rivers contain quicksands, and their banks are high in places; the coastal track and telegraph line cross them about 9 miles inland and pass several small date-groves and villages. East of the Sadaich river, low hills near the coast have caused the wind to pile up sand-dunes on each side of the river mouth (photo. 127). Surag is a fair-sized village between these coastal hills and the steep sandstone range to the north.

From the Sadaich river the coast rises gradually to Ras Maidani, a cliffed headland nearly 35 miles south-east. Between Ras Maidani and Ras Maki, another cliffed point 33 miles east, the coast is low and contains the entrances to Khor Rabch and Khor Galag. Khor Rabch is a large tidal backwater, filled with sand and mud-flats, but frequented by fishing-craft. Inland of Khor Rabch the coastal plain is desert. Khor Galag is the mouth of the Rapch river, which rises nearly 100 miles to the north; small craft can enter the creek at half-tide. The coastal plain is here about 23 miles wide and contains numerous date-palms and several hamlets: the largest village is Karkindar, at the foot of the hills near a small tributary of the Rapch. Beyond Khor Galag are the barren 'badlands' of Bandini, and the coast rises to broken cliffs behind Ras Maki (photos. 128, 130).

Between Ras Maki and Ras Tank, 15 miles east-south-east, the coastal plain is constricted by the Kalat hills, which rise steeply 4 miles inland, 1,653 feet high at one point; they are of white clay and are scored by many ravines. Ras Tank is a rocky promontory joined to the coast by a narrow sandy isthmus; ruins of an ancient city lie close inland. The coastal track and telegraph line, that cross the Rapch river 12 miles inland, approach within 4 miles of the coast in order to pass round the Kalat hills, and then continue east about 6 miles inland.

The hills recede nearly 20 miles from the shore for the next 50 miles to the east (fig. 30), and the plain is composed of barren sands and silts cut up by numerous ravines. Napag, the largest mud volcano in



129. *The mud volcano of Napag, 10 miles north-east of Ras Tank*



130. *The 'badlands' of Bandini, coastal Makran*



131. *View towards Mil-i-Sunt. The coastal plain of Makran between Paraz and Chahbar*



132. *The Makran coast near Gwatar from the air*

Makran, is 10 miles north-east of Ras Tank (photo. 129); eruptions have built its cone nearly 200 feet above the surrounding plain, and bubbles of greenish mud keep forming and bursting. Ras Rashdi, 20 miles east of Ras Tank, is the eastern end of a rocky flat-topped promontory about 150 feet high; it is inaccessible from the sea, but is joined to the mainland by low sandy ground. Puzim bay is entered between Ras Rashdi and Ras Puzim, a headland with cliffs 300 feet high, 5 miles east; two watercourses drain into creeks in the north-west and north-east corners of the bay; there is anchorage for small craft off the west side, or off a fishing-village on the east side. From Ras Puzim the cliffs gradually become lower as far as Ras Kuhlab, 12 miles east-south-east.

Chahbar bay, the best harbour on the Persian Makran coast, is entered between Ras Kuhlab and Chahbar point, nearly 10 miles east; the bay is almost semicircular, extending about 10 miles inland; the head is low and swampy, but the east and west sides are rocky. The bay affords good protection from the summer monsoon and from northerly winds, though during the monsoon heavy swell sweeps into it. Chahbar village (p. 508) is just inside the east entrance and is sheltered. The track from Jask bends south round the head of the bay, and continues along the coast from Chahbar to Gwatar; another track leads north-east across the plain and through the mountain valleys to Geh and Bampur (photo. 131).

Tiz (*class.* Tesa) was a trading-centre in early medieval times, affording convenient shelter for small ships sailing between India and the Persian Gulf. Its ruins are in a narrow valley which opens into Chahbar bay between cliffs about 5 miles north of Chahbar. It is guarded from sea attack by a nineteenth-century fort, and from land attack by a massive medieval wall on the south and by broken hills on the north and east. The valley is fronted by a shallow lagoon that fishing-craft can enter at high tide.

The sandstone hills that form the inland edge of the coastal plain between Jask and Chahbar die down to the east, and for the remaining 60 miles of the Persian Makran coast the plain extends more than 50 miles inland; in the west it is broken by the bare ridges of Nil-i-Sunt and by other low hills, but in the east it forms the fertile Dashtiari plain. From Chahbar point the coast trends east-south-east for 36 miles to Ras Bris; it has rocky hills and cliffs broken by small watercourses. Ras Bris is at the west end of a low table-land whose white cliffs extend 17 miles east-south-east to Ras Fasta, with a gap half-way. Ras Fasta is the west entrance-point of Gwatar bay, at the

head of which the Baluchistan boundary reaches the sea. The cliffs of the table-land form the west side of Pasa Bandar, a bay just inside the entrance that affords shelter to small craft. Gwatar village and fort are at the north-east foot of the cliffs, near the mouth of the Kaur Kalu, which waters the Dashtiari plain. This river forms the estuary of the Kaju and the Bahu, which rise about 120 miles north-west and north respectively. The Dashtiari plain becomes flooded after rain, and the water and slimy silt deposits are held up by dams built for irrigating numerous date-palms and cotton bushes. The mouth of the river is tidal for some distance inland and has deep water inside the bar, which can be crossed by small craft. Mud-flats and swamps extend east of the Kalu mouth for 5 miles to the creek that marks the Baluchistan boundary; the coastal track and telegraph line cross the border at Gwatgi, 10 miles inland (photos. 85, 86, 132).

CASPIAN COAST

Introduction (fig. 11)

The Persian shore of the Caspian Sea extends for 400 miles between the Russian frontiers at Astara in the west and at Hasan Quli bay in the east. The coastal plain is narrow and is backed by the high Elburz mountains. For more detailed description it will be divided into three sections: from Astara to Rud-i-Sar; from Rud-i-Sar to the Nika river; and from the Nika river to Hasan Quli bay: these three sections correspond approximately with the traditional provinces of Gilan, Mazanderan, and Asterabad (now Gurgan).

The surface of the Caspian Sea, which once extended to the foothills of the Elburz, is 85 feet below mean sea-level, and its level is now falling at an average rate of about 8 inches a year.[1] The Russians have for many years projected a canal to connect the Caspian with the Black Sea and thus to raise its level. The sea is tideless, but temporary rises at the shores occur during strong winds. The prevailing winds and currents are anti-clockwise, so that along the Persian shore they are from west to east. The salinity of the Caspian is only three-eighths of the average ocean salinity, and the water is drinkable in most places.

The coast has no sheltered harbours, and most of the rivers are closed by bars and useless for navigation. The sea is very shallow for several hundred yards off shore so that goods have to be tran-

[1] The level of the Caspian oscillates periodically and seasonally; the principal cause seems to be the variation in the Volga.

shipped in shallow craft. Landings can be made almost anywhere, and small craft of 2ft. 6in. draught can come within 100 yards of the shore except in the south-east corner. The beach is sandy and varies in width: off Gilan and east Mazanderan it is from 40 to 60 yards wide and almost level, and is beaten by stormy breakers into a hard surface fit for motor transport; in west Mazanderan, where the mountains come close to the sea, it is narrower, steeper, and very soft. The beach is interrupted by numerous rivers, which swell in winter and spring: the smaller streams can be forded across the bars at their mouths, but the larger ones have to be crossed by ferry.

The coast is remarkably uniform, with long straight beaches and no cliffs or prominent headlands. The varying widths of the coastal plain correspond to the size of the rivers bringing the sediment of which it is composed, the widest part being formed by the delta of the Safid Rud in the west. The action of the prevailing west-to-east wave movement has built spits and bars, gradually closing the bays to form lagoons and diverting the river mouths to the east. The prevailing winds have piled up lines of sand-dunes from 20 to 60 feet high along the coast, except where the mountains come close to the sea and coarse material replaces the sand. The lagoons (*murdab*, or dead water) have mostly been filled up by river sediments, reeds, and thickets, and form marshes behind the dunes: only the large Murdab of Pahlevi in the west and Asterabad (Gurgan) bay in the east still contain open water. Behind the marshes, impenetrable jungle and dense forests extend across the plain and into the foothills, and have been partly cleared and irrigated for cultivation. These four zones—dune, marsh, plain, and foothill—extend all along the coast, and each has its characteristic type of vegetation, fauna, agriculture, and settlement. Traces of the Caspian's original shore-line remain as ancient dunes, river terraces, and former sea cliffs. Wind-borne loess covers part of the foothills behind Asterabad (Gurgan) bay. East of the Caspian the narrow strip of the Turanian plain included in Persian territory forms a contrast to the rest of the coastal plain: it is a level steppe inhabited by Turkoman tribes (pp. 342, 363).

The warm wet climate of the south Caspian shore (p. 156) is most intense in the west, in Gilan, which has a heavy rainfall, particularly in autumn and winter, and hot steamy summers. In the east it becomes gradually drier and more extreme, the Turanian steppe having hot summers and cold winters. The climate makes the coastal plain very unhealthy with malaria and other fevers, particularly in summer (p. 172); it is very relaxing, and Loti likened it to the languor

of a hothouse. The climate also contributes to the luxuriant vegetation and rich harvests of the region, as it provides an uninterrupted growing period: Firdausi, the Persian poet, called it a land of perpetual spring. The natural vegetation (p. 191) varies according to the zones of the coastal plain: the light soils of the dunes are covered by patchy scrub; the marsh belt contains tall reeds, thickets, and meadows; and the forests (p. 192) are composed of deciduous trees, climbing plants, and dense undergrowth. The coastal plain abounds in game: the marshes are inhabited during the winter by innumerable wild-fowl, and the forest undergrowth harbours wild boars, deer, tigers, jackals, hyenas, and wolves; fish teem in the marshes and rivers.

The population of the coastal plain is dense compared with the rest of the country, and it is estimated that at least one-sixth of the total population of Persia lives in the Caspian provinces. There are two groups of people, the plains people and the hill people. The plains people, except the richer ones, remain in the low districts the whole year to harvest the fertile fields and swamps, and are pale and lacking in energy. The people of the foothills spend the summer in the mountains with their flocks and herds, and in the winter they descend to pasture their cattle in the foothills and earn money by doing heavy agricultural work in the plains. The dwellings are mostly steep-roofed and thatched or tiled to shed the water, and are raised on wooden platforms (p. 351). High platforms in the fields (for watchers against wild pigs), rice storehouses, and silk-worm sheds, are also typical of the Caspian coastland. Compact villages occur only on the dry ground of the foothills and the dunes; those of the foothills are irregular clusters of houses, but on the dunes they are built in parallel rows. In the swamps and clearings of the plain, solitary houses, or small groups, are built on natural or artificial rises. The Turkoman nomads of the steppe were recently settled in houses and their tents removed as a precaution against raiding (p. 342); those nearest the coast are boat-builders and fishermen.

Rice is the principal crop in the plain, so that the region is widely flooded except in summer, and irrigation canals intersect the ground. Cotton, sugar-cane, tobacco, and vegetables are grown in the drier parts of the plain, and in the foothills. Mulberry plantations for feeding silk-worms, orchards, and gardens are other features of the landscape. Buffaloes wallow in the marshes and rice-fields, and humped cattle graze in the marsh belt in winter. The horses of the steppe are said to be the best in Persia. Fishery stations were built

by the Russians during the nineteenth century at all the principal river mouths and are now run by a joint Soviet-Persian company: salt fish (mainly sturgeon), caviare, and isinglass are prepared and exported to Russia. There are a few local factories but no large-scale industries, and the exports, both to the interior and to Russia, are foods and raw materials such as rice, cotton, silk, cigarette-tobacco, sugar, tea, citrus fruits, and timber. Commerce was developed earlier in Gilan than in Mazanderan, as the trade between Russia and Tehran passed through the former province.

The chief towns—Resht, Babul (Barferush), Sari, and Gurgan (Asterabad)—are all more than 10 miles inland, near the base of the foothills. Resht (p. 532) is the capital of Gilan and an important transit town; Babul is the commercial centre of Mazanderan, and Sari (p. 362) is its capital; Gurgan also is the capital of its own province. Fumen and Lahijan are small towns in the fertile Gilan plain, and Khurramabad and Chalus are centres of agriculture in west Mazanderan. Amul is a very ancient town in east Mazanderan; Behshahr (Ashraf) and Farahabad have ruins of palaces built by Shah Abbas, but are now only small villages. Riza Shah modernized the principal towns and built model villages, hotels, and bungalows to improve the amenities of the coast as a holiday resort. Pahlevi (formerly Enzeli), the outport of Resht, has for long been the only important port. The new ports of Nau Shahr and Bandar Shah (terminus of the Trans-Iranian railway) had already become almost useless by 1941 owing to silting and to the fall of the Caspian's level, but the Russians have since then improved them by dredging. The other ports—Astara, Shahsawar, Mahmudabad, Babulsar (formerly Meshed-i-Sar, outport of Babul), and Bandar-i-Gaz—are only open roadsteads and have very little trade.

Bad communications were for long a hindrance to the development of the region: the roads were muddy ditches, completely impassable in winter, and the horse and pack-mule formed the only means of transport even in summer. The stone causeway built along the coast by Shah Abbas in the sixteenth century soon decayed through neglect. Under Riza Shah, motor-roads were constructed into and along the coast, and the Trans-Iranian railway was built to serve east Mazanderan and Gurgan. To-day a well-bridged motor-road runs along the coast from Resht to Babulsar and continues through Babul to Sari and Gurgan. The coastal track from Astara to Pahlevi has recently been made motorable in dry weather. The main roads to Tehran are from Resht up the Safid Rud, from Nau Shahr

up the Chalus valley, and from Babulsar up the Talar. The Trans-Iranian railway skirts Asterabad bay and the foot-hills between Bandar Shah and Shahi, and uses the Talar valley to cross the Elburz mountains. From Astara a motor-road runs inland to Tabriz. A bi-weekly steamer service for mails, passengers, and freight was operated in peace-time between Pahlevi and Baku, and a weekly service between Baku, Astara, Pahlevi, and Bandar-i-Gaz.

The Coast of Gilan: Astara to Rud-i-Sar

This section of the coast falls into two natural divisions: Persian Talish, and the Murdab and Safid Rud delta region.

Persian Talish

For about 70 miles south-south-east of Astara the coastal plain is narrow and is backed by the Talish hills. The beach is of hard sand, and behind it a uniform line of dunes extends all along the coast. Numerous short rivers descend from the Talish hills; the bars across their mouths can be forded, except in spring, but they are mostly deep just inside. The plain between the dunes and the hills is only about 1 mile wide for the first 35 miles, beyond which it widens gradually. Thick forests stretch to the beach, but are cleared for rice cultivation round the numerous small settlements. The Russians have recently made a road along the coast; it is motorable, except in winter when the heavy rains form sticky mud in several sections.

Astara is a small fishing-town on the stream which forms the frontier between Russia and Persia. It is connected by a bridge with Soviet Astara on the north bank. The population of Persian Astara is about 6,000. There are depths of 13 to 18 feet three-quarters of a mile off shore, but steamers anchor $2\frac{1}{2}$ miles out. The jetty is now high and dry, and trade ceased several years ago. A difficult mountain motor-road runs inland to Ardebil and Tabriz.

South of Astara the plain is about 1 mile wide, and numerous houses are scattered in the forest. From Chilivand, a village 10 miles south of Astara, a track crosses a 5,419-foot pass to Ardebil. A spur narrows the plain near Chilivand to less than half a mile. Hevik, 20 miles south of Astara, is a large group of scattered houses, on the banks of a stream that admits small craft. Five miles south of Hevik, a spur of the hills approaches the sea, leaving only a narrow space for the road. Ships anchor 2 or 3 miles off this stretch of the coast. Off the mouth of the Lissar stream, 13 miles south of Hevik, there is a depth of 18 feet at 600 yards from the shore: Lissar village at the

mouth is overlooked by a medieval castle which crowns a low hill 1½ miles inland. Beyond Lissar the plain widens gradually, and at Karganrud, 11 miles south, the hills are nearly 4 miles from the sea.

Karganrud is a scattered village at the mouth of the largest river that enters the sea along the Talish coast. Vessels can anchor in 22 feet of water at 400 yards off shore, or in 6 fathoms at 1 or 2 miles. Small craft enter the river and trade with Baku. A track ascends the Kargan Rud valley to Ardebil. From Siahchal, 6 miles south of Karganrud, a foot-path crosses the Rovra pass (about 6,560 feet) to Herau. Beyond Siahrud, where the plain is 5 miles wide, the coast trends south-east away from the hills, and the plain opens towards the Murdab and Safid Rud delta. Between Siahrud and Kapurchal, a small village behind the dunes at the west end of the Murdab, the swampy belt becomes more marked, and in winter contains many decoys for wild duck. Timber from the hills is taken to the west end of the Murdab, whence flat-bottomed craft take it to Pahlevi.

The Murdab and Safid Rud delta

The plain of Gilan proper, composed of the Murdab region in the west and the delta of the Safid Rud in the east, is about 65 miles long and more than 20 miles wide. The region is the wettest, most luxuriant, and most unhealthy in the Caspian provinces. Rice-fields and mulberry plantations predominate in the forest clearings, and the Gilan plain also produces most of the tobacco used in Persia. The name Gilan is said to be derived from *gil* (mud), and the muddy state of the roads was formerly notorious: good motor-roads now radiate from Resht, the capital.

The Murdab (lagoon) is more than 20 miles from west to east, and about 5 miles wide. Shallow and swarming with fish, its water is fresh and supplied by numerous streams. The edges and islets are covered with reeds and thickets, the haunt of innumerable frogs, tortoises, and water-birds. A narrow sand-spit, covered with pomegranate scrub, separates the Murdab from the sea; it has a gap near the centre, with Bandar Pahlevi (p. 508) on the west and its suburb, Ghazian, on the east. Ships anchor just inside the entrance, between the spit and a low island, but cannot enter the harbour in rough weather. Small craft, drawing not more than 4 feet, formerly carried goods and passengers across the Murdab to Pir-i-Bazar, a landing-place up a stream 10 miles south-east, whence a narrow-gauge railway ran to Resht; this is now disused and superseded by a good lorry-road running east from the quay at Ghazian, curving

round the east end of the lagoon to Resht, and continuing up the Safid Rud valley to Kazvin and Tehran. Inland of the Murdab, the rice plain stretches more than 15 miles south-west to the unsurveyed foothills; Fumen, a small town about 20 miles from the sea, is the focus of the district.

The Safid Rud breaks through the Elburz mountains south of Resht and divides into numerous small channels. The central and southern parts of the delta are thickly forested and contain few settlements, but the forests to the west, round Resht, were cleared during the Russian occupation from A.D. 1723 to 1734 (photo. 133). The main channel, which is constantly changing, flows north-east for 40 miles and enters the sea 25 miles east of the Murdab; a flat with 6 feet of water on it extends nearly half a mile off its mouth. Four miles farther east, at Hasan Kiade fishing-station, is the mouth of an old channel of the Safid Rud. Hasan Kiade is at the tip of the delta, and the coast then trends south-east for 18 miles to Rud-i-Sar, and approaches the Elburz foothills. Dunes, with marshes inland, form the seaward edge of the delta, and are followed by a track the whole way from Ghazian to Rud-i-Sar; the marshes are particularly extensive south-east of Hasan Kiade. The main settlements here are all between 10 and 15 miles inland, and the motor-road east from Resht passes through them on its way into Mazanderan. Kuch-i-Isfahan is a market in the cultivated plain between Resht and the Safid Rud. Lahijan (pop. 20,000), the centre of the local cotton and silk industries, is on the lower slopes of the hills east of the river, and has tea plantations and orange-groves. Langarud (pop. 10,000) is the trading-centre of a cultivated area south-east of the Safid Rud delta, but is almost deserted in summer. Rud-i-Sar (pop. 7,500) is another small market-town, at the point where the motor-road from Resht reaches the coast.

The Coast of Mazanderan: Rud-i-Sar to the Nika River

This section of the coast will be described in two divisions: West Mazanderan, where the mountains are close to the sea, and East Mazanderan, where the coastal plain is 20 miles wide.

West Mazanderan

For more than 100 miles south-east of Rud-i-Sar the coastal plain is only about 5 miles wide. The beach is steep and composed of soft sand and shingle, and the dunes are not well developed. Depths of 20 feet are found half a mile off shore between Rud-i-Sar and Shah-



133. *In the low cultivated plain near Resht*



134. *Spring in a valley through the Mazanderan forest*



135. *Flood water at Bagh-i-Shah near Babul*



136. *The fertile, unhealthy coastal plain near Amul, about* 15 *miles inland of the Caspian*

sawar, 40 miles south-east; for 35 miles beyond Shahsawar the depths a quarter of a mile off shore are sufficient for anchoring in calm weather. Forest covers the foothills, and reaches the beach in places (photo. 134), but the wider parts of the coastal plain are cleared for intensive rice cultivation. A motor-road follows the coast the whole way.

About 6 miles south-east of Rud-i-Sar a track ascends the broad valley of the Pul-i-Rud and crosses the mountains to Kazvin. Beyond the Pul-i-Rud, thick forests form a frontier zone between Gilan and Mazanderan, the traditional boundary being the Miandeh stream, 17 miles south-east from Rud-i-Sar. Steep spurs of the Sakhtsar hills run down almost to the sea east of the Miandeh, and beyond them the motor-road makes a short loop to pass through Ramsar, 2 miles inland. Ramsar has hot sulphur-springs, and a model town, with hospital, hotel, and casino, was built there for Riza Shah.

South-east of Ramsar is the Tunakabun plain, which is entirely cleared of forest and is the most intensively cultivated and thickly populated part of the Persian Caspian coast. Its centre, Khurramabad, has large orange-groves. The port is Shahsawar, at the mouth of the Mazar river; it has only an open roadstead, and ships lie nearly a mile off shore: the flat-bottomed craft used for loading rice can shelter behind the bar of the Mazar. Shahsawar is the usual stopping-place for motorists between Resht and Babul, and was modernized by Riza Shah. A track ascends the main tributary of the Mazar and crosses the Elburz mountains to the upper Shah Rud valley.

A few miles beyond Shahsawar the forest again descends almost to the beach, as far as the Chalus valley, about 35 miles east-south-east. Much timber and firewood is exported from this part of the coast. A track leads up the Sardab valley, 3 miles west of the Chalus, to the fertile and picturesque Kalar Dasht district in the foothills.

The lower end of the Chalus valley is cleared and cultivated, with rice-fields and orange-groves. The Chalus river is powerful, and its sediments tinge the waves for some distance out to sea. Chalus is another of the model towns built for Riza Shah, and has a modern hotel and a silk industry. The new port of Nau Shahr (p. 511) is 4 miles east of Chalus. The Chalus road to Tehran is the shortest route between the coast and the plateau, and was built in 1933 for summer holiday traffic; it is often blocked by snow in winter, but a tunnel has been constructed to eliminate the highest stretches.

East of Nau Shahr the foothills again constrict the coastal plain,

and virgin forests and brushwood descend to the beach. Tracks lead up the Pul tributary of the Chalus, and up the Kujur stream 20 miles east, to fertile cereal-growing districts in the foothills. Beyond the Kujur the coast trends east-north-east, and the plain gradually widens: high dunes reappear, with marshes and rice-fields behind them; from the foot of a former sea-cliff near the mouth of the Kujur an ancient dune extends east for many miles, parallel with the modern dunes but nearly 2 miles inland. At Iz-i-deh, a small village 18 miles east-north-east of the Kujur, the foothills are 9 miles inland; between Iz-i-deh and Mahmudabad, 6 miles farther along the coast, the plain widens suddenly towards east Mazanderan.

East Mazanderan

The plain of east Mazanderan stretches east-north-east for nearly 60 miles, from Mahmudabad to the Nika river near the west end of Asterabad bay, and averages 20 miles in width. The beach is hard and level, and is backed by dunes more than 30 feet high. Four medium-sized rivers—the Haraz, Babul, Talar, and Tajan—and numerous smaller streams enter the sea along the east Mazanderan coast; the ground is also intersected by innumerable irrigation canals. About half the plain is cleared, and cultivated with rice, cotton, sugar-cane, and fruit. East Mazanderan was very prosperous during the Safawid dynasty and a favourite resort of Shah Abbas. Sticky mud is a great obstacle to travel in this region, except along the modern motor-roads: the main road from Resht continues along the coast as far as Babulsar (Meshed-i-Sar), where it turns inland to Babul, Shahi, and Tehran, with a branch from Shahi to Sari and Gurgan; another motor-road runs inland from Mahmudabad to Amul and thence to Babul (photos. 135, 136).

Mahmudabad is a small modern town with a rice factory and a wooden jetty; ships occasionally lie in the roadstead to be loaded with rice. A narrow-gauge railway built about 1888 from Mahmudabad to Amul, 16 miles inland, is derelict and overgrown by jungle. Amul is in the south-west corner of the east Mazanderan plain, on the west bank of the Haraz river; it is a very ancient town, three times destroyed by floods and rebuilt; it has large bazaars and contains much of archaeological interest, including the ruins of a mausoleum built by Shah Abbas; the town is surrounded by dense orange-groves. It has motor-roads north to Mahmudabad and east to Babul, and south up the Haraz river to Tehran. The Haraz, which enters the sea 7 miles east of Mahmudabad, is powerful in spring; a branch

running along the base of the foothills nearly 20 miles inland joins the Babul river, and has many cuts for irrigation. There are depths of 10 fathoms a mile off shore at Faridun Kinar (Ferikenar), a dune village 5 miles east of the Haraz mouth. Beyond Faridun Kinar the forest cover becomes gradually thinner, with the decrease in rainfall.

Babulsar (Meshed-i-Sar) (p. 512) is a small port at the mouth of the Babul river, 17 miles east-north-east of the Haraz. A submerged sandy ridge extends off the Babul, whose mouth is deflected to the north-east by a bar; the river is navigable by small craft as far as Babul, 12 miles inland. The banks of the Babul are precipitous in places, and the river is 30 or 40 feet below the level of the plain so that it is useless for flow irrigation: cotton and flax accordingly take the place of rice and sugar-cane on either side. The motor-road from Resht turns inland at Babulsar and follows the east bank of the Babul; a track continues along the coast towards Asterabad bay.

Babul (formerly Barferush) is the chief commercial town of Mazanderan. It has paved streets, and the houses are scattered among trees and orange-groves; outside the town is a royal garden built by Shah Abbas. Roads run north-west to Babulsar, south-east to Shahi, and south-west to Amul. Shahi (formerly Aliabad) is 20 miles inland, at the point where the Talar river emerges from the foothills; the town has grown since the northern section of the Trans-Iranian railway was built, and has several factories. The road from Babulsar, and the road and railway from Bandar Shah and Sari, converge at Shahi and pass up the Talar valley to Tehran. The Talar is very rapid in spring, and dangerous to ford, but at other seasons it may be almost dry; it enters the sea 9 miles east-north-east of Babulsar.

Sari, the capital of Mazanderan, is on the west bank of the Tajan river, 16 miles inland at the base of the foothills. It is surrounded by fruit-trees, and its streets are paved and drained; traces remain of the former wall and ditch; to the north is another royal garden built by Shah Abbas; the town was modernized under Riza Shah and has several hotels. The Tajan is a broad river with a hard gravel bed; a track passing through numerous villages on its banks connects Sari with the coastal track. The present village of Farahabad is 3 miles inland on the east bank of the Tajan; lower down are the ruins of a favourite palace of Shah Abbas, sacked by Cossacks in 1668; and at the mouth of the Tajan are a fishing-station and custom-house, with anchorage in 8 fathoms 2 miles off shore. Dense forests cover the plain for 7 miles east-north-east, to the Nika river which curves round from the foothills south of Asterabad bay.

The Coast of Gurgan: Nika River to Hasan Quli Bay

This section of the coast comprises two contrasting regions: Asterabad bay to the west, and the Turanian plain to the north-east.

Asterabad Bay

The dunes of Mazanderan continue into the Mian Qaleh peninsula, a spit which almost encloses Asterabad bay. The bay is nearly 50 miles long and between 5 and 10 miles wide. The strip of plain between the bay and the foothills is narrow, and the numerous streams that enter the bay are all less than 10 miles long and dry up in autumn and winter. A blue mist usually hangs over the bay, but the region is much drier than Gilan and Mazanderan, and the vegetation is more open. Rice is again the staple crop. Loess deposits cover parts of the foothills and are marked by a specialized flora. Both road and railway follow the base of the foothills for the first 30 miles from Nika station, after which the railway crosses the plain and curves round the bay to Bandar Shah, and the road goes straight on to Gurgan.

The Mian Qaleh peninsula is 35 miles long and less than a mile wide. Its dunes are covered by thick scrub, containing much game, and the peninsula was formerly preserved as a royal 'chase' and guarded by three forts. It is uninhabited and uncultivated. Fringes of marsh project from the southern edge into the bay. The coastal track from Babulsar continues to the tip of the peninsula. Three low islands—Great, Middle, and Little Ashuradeh—formerly stretched in a line to the east. The Russians had a naval station on Great Ashuradeh to control Turkoman raids (p. 290), but it was unsuitable as a permanent station owing to the unhealthy climate and bad water. Great Ashuradeh is now joined to the end of the Mian Qaleh peninsula, and Middle and Little Ashuradeh have merged into one island which is covered with reeds and uninhabited. Between Ashuradeh island and Bandar Shah, on the mainland about 4 miles east, is the entrance channel to Asterabad bay.

The shores of Asterabad bay are low, and the bordering marshes increase every year. The rivers deposit their muds very evenly in the calm waters, and the bottom is so soft that ships have to re-anchor every two days. Depths in the north part of the bay allow vessels drawing 9 feet to approach to within 400 yards of the Mian Qaleh spit, but along the south and west shores flat-bottomed craft drawing 2 or 3 feet cannot approach within 100 yards, and steamers lie more than half a mile out.

Numerous small settlements lie along the base of the foothills. The only large village is Behshahr (formerly Ashraf), which has dwindled since it was built at the beginning of the seventeenth century by Shah Abbas, who had magnificent palaces and gardens overlooking the bay. A track from the mouth of the Nika river skirts the west side of Asterabad bay and joins the motor-road at Behshahr. The former port for Ashraf was at Qaratepe, built on a mound 8 miles north-west, which is now 2 miles inland. Gurgi Mahalleh, 5 miles west of Behshahr, has a colony of Georgians deported by Shah Abbas. The remains of the rampart and ditch which formerly marked the boundary between Mazanderan and Asterabad provinces are nearly 20 miles east of Behshahr. Bandar-i-Gaz is a small port connected to the Trans-Iranian railway by a short narrow-gauge line; owing to the silting of the bay, the port now has a very small capacity.

Beyond the south-east corner of the Caspian the motor-road continues along the fertile foothill zone into the Gurgan and Findarisk districts. Gurgan Asterabad, capital of the province, is more than 20 miles inland and has roads north and north-west across the Turanian plain.

The Qara Su divides the cultivated zone at the foot of the hills from the steppe. The river has a marshy delta, and a ruined port and fishery station at its mouth: its water is not fit to drink.

Turanian Plain

The coast of the Turanian plain extends 40 miles north from the Qara Su to the Russian frontier at the mouth of Hasan Quli bay. There is a line of dunes 1 or 2 miles inland of the present shore-line. The sea is too shallow for even flat-bottomed craft to reach the shore, and the shallow belt is gradually becoming broader. The plain, part of the classical *Hyrcania*, stretches many miles inland, and is covered by scorched grass in summer and sometimes by snow in the late winter months. It is completely flat, and the only heights are artificial mounds or *tepes*. The steppe was once very fertile: according to Strabo 'each vine produces seven gallons of wine and each fig-tree ninety bushels of fruit'. For many centuries it has been inhabited only by turbulent horse-breeding Turkomans and has been generally uncultivated. Now that raiding has stopped, extensive agriculture may again be developed in the steppe region. The Qara Su, Gurgan, and Atrek rivers, however, have cut their channels 15 or 20 feet below the level of the plain, and the wells are all brackish.

The modern port of Bandar Shah (p. 510) was built 5 miles north

of the Qara Su, at the entrance to Asterabad bay; it is at the terminus of the Trans-Iranian railway, and of a branch road from the Shahi–Gurgan motor-road. The marshy mouth of the Gurgan is 5 miles north of Bandar Shah; its water is always sweet and it can be forded except after floods; a flat extends west from its mouth. The motor-road north from Gurgan town crosses the river at Pahlevi Diz (formerly Aq Qaleh), 23 miles inland, and then runs north-east along the north bank. An unmetalled road north-west from Gurgan to the Russian frontier crosses the river 5 miles downstream from Pahlevi Diz.

From Gumshan, 6 miles north of the Gurgan's mouth, an ancient wall known as 'Alexander's Barrier' runs inland, parallel with the river, for nearly 80 miles. Gumshan has tracks south to Bandar Shah, south-east to Gurgan, and north-east to the Russian frontier. A track runs along the coast north of Gumshan but stops about 9 miles short of the frontier. Serebrani, close north of Gumshan, is an insignificant hill that stands out from the uniformly low coast. Behind it, an old bed of the Gurgan meanders across the plain for more than 15 miles. A narrow spit runs north for 9 miles and encloses a shallow backwater.

The Russian frontier is at the south entrance to Hasan Quli bay, through which the Atrek river enters the sea. The Atrek valley is marshy for nearly 40 miles inland, and the frontier, after a loop to the south-east, follows the southernmost of its perennial channels. The marshes are inhabited only by wild pig and water birds. The unmetalled road from Gurgan crosses the frontier 11 miles inland.

CHAPTER V

CLIMATE, VEGETATION, AND FAUNA

CLIMATE

PERSIA is the land-bridge between the Mediterranean climate of parts of Asia Minor and the monsoon climate of India. In winter and spring, atmospheric depressions travelling eastward from the Mediterranean cause the bulk of the rainfall that Persia receives; in summer the influence of the south-west monsoon is felt on the shores of the gulf of Oman, but the effect is so weak that no rainfall occurs.

Apart from the changes in wind direction accompanying the passage of depressions, the surface winds of Persia are mainly controlled by the pressure system over central Asia, which is high in winter and low in summer. In winter winds from a northerly quarter prevail almost throughout Persia. In summer a low-pressure belt extends from Sind to the Persian Gulf and Arabia; consequently, at this season also the prevailing winds blow from a northerly quarter and in some areas are strong and remarkably persistent. Since these northerly winds come mostly from land-masses they are relatively dry and condemn the greater part of Persia to intense aridity.

Influence of Topography

Persia lies in sub-tropical latitudes where the summers should be hot and the winters delightfully warm.[1] But, because of the size and relief of the country, there is no moderation in the climate, the winters being abnormally cold for the latitude. The northern and western mountains derive much moisture in winter and spring from easterly-moving depressions and are known as the 'rainy mountain fringe'. The country to the south and east of these highlands suffers from lack of rainfall and is called 'arid Persia'. This area, which covers about two-thirds of the whole kingdom, is a series of vast silt-filled basins lying for the most part at 3,000 to 5,000 feet above sea-level, but varies in altitude from over 13,000 feet to less than 1,000 feet. Here the height tends to increase the intensity of the sun by day and the chill of the air by night. The temperature drops rapidly after sundown all the year, and in winter the nights are bitterly cold; in

[1] At Tehran (36° N.) the extreme diurnal variations in the length of daylight are about 14½ hours and 9½ hours; the altitude of the noon sun varies from about 78° at midsummer to 31° at midwinter.

the same way, the hot-weather season changes suddenly to the cold-weather season. Rains are few and erratic, and evaporation, owing partly to the altitude, is excessive. Winds, blowing unchecked over the flatter areas, bring furnace heat in summer and biting cold in winter. These climatic features are sufficiently distinctive to give the name 'Iranian type' to the climate of other interior plateaux in sub-tropical latitudes.

The aridity prevails right to the shores of the Makran and of the Persian Gulf, but, whereas on the high inland basins the air is dry and usually invigorating, on the seaboard the humidity increases and the heat may become excessively oppressive. Fortunately, the proximity of high mountain ranges facilitates migration from the coast in the hot season, while on the plateau itself none of the inhabited basins is far removed from a cool mountain retreat.

Climatic Regions

Climatically Persia consists of two contrasting areas, the rainy mountain fringes of the north and west, and the arid lands of the interior and south.

These two areas may be subdivided into the following climatic regions:

(*a*) The coastlands of the Caspian Sea
(*b*) The Elburz mountains
(*c*) The Zagros mountains
(*d*) The basins and ranges of interior Persia
(*e*) The lowlands of the Persian Gulf and gulf of Oman.

The first three belong to 'rainy' Persia and the last two to 'arid' Persia. The main characteristics of these regions are outlined below.

The coastlands of the Caspian Sea have a climate that is bad for health and vigour. To the Persians of the plateau this is the 'land of fever', to the inhabitants it is the 'land of eternal spring'. The winters are cloudy and wet, the summers hot and steamy. The rainfall is abundant for 6 months of the year, and showery, cloudy periods occur occasionally even in the hot season.

The Elburz mountains form the greatest climatic divide in Persia. To the north is the winter warmth and feverish summer heat of a green tropical landscape, to the south the frigid winters and dry, torrid summers of the arid plateau. The air on the northern side of the Elburz in Gilan and Mazanderan contains much moisture, and precipitation is heavy on the lower and middle slopes of the range.

Much falls in the form of snow which provides water for irrigation in the piedmont plains and basins. The temperature decreases with increasing altitude, but even on Demavend (18,550 ft.) snow usually remains all the year only in sheltered hollows. The continuations of the Elburz north-westwards into Azerbaijan and eastwards into Khurasan are better watered than the adjacent areas. The influence of moisture-laden winds decreases most rapidly eastwards, so that the narrow belt of highland forests peters out near the borders of Khurasan, where the mountain summits are coloured khaki throughout summer and autumn. At Meshed the annual rainfall has dropped to under 10 inches a year and the summers are practically rainless and cloudless; the need of irrigation for crops also denotes that the rainy fringe has given way to the arid interior.

The Zagros mountains throughout their length of 800 miles maintain an altitude of over 6,000 feet and in many parts exceed 12,000 feet. In summer the temperatures are high even in the valleys at 5,000 feet (Shiraz, mean of 85° F. in July) and the air is dry and invigorating. In winter the temperature drops more rapidly with ascent, and means of 40° F. or less for January occur above 7,000 feet in the south and above 3,000 feet in the north. However, the climate of the Zagros range is distinguished mainly by its precipitation, which greatly exceeds that of the adjacent areas. In the north most of the exposed slopes have 20 inches to 40 inches a year, and rain or snow may fall almost every day for 2 or 3 weeks on end in winter. In the south the rainy belt diminishes in width and the annual falls gradually decline until, near the latitude of Shiraz, they can no longer support the woods of dwarf oak typical of the rainier parts of the Zagros. In southern Fars the Zagros mountains begin to lose most of their climatic affinities with wetter Persia. Throughout the range the snowfalls of winter and spring may be heavy, and snow-cover may continue for some months in the colder, wetter parts.

The basins and ranges of interior Persia cover about 350,000 square miles of territory that is distinguished climatically by its aridity and extremes of temperature. In summer the skies are practically cloudless and the sun's rays so powerful that, despite the altitude, temperatures are little lower than those on the plains of the Persian Gulf. The July means increase from between 80° F. and 85° F. in the north to about 90° F. in the south and east. Winters are cold, the January means being scarcely above freezing-point. On most of the northern half of the area the night temperatures occasionally fall below zero and frosts may occur on any night between early October and the

end of April. The scanty precipitation comes mainly in winter and spring, snow being fairly common in the north. The annual totals average about 10 inches in the north and less than 5 inches in most of the south and south-east. The Southern Lut and the plains of Seistan are the epitome of arid Persia. An inch or two of rain a year, coming in 5 or 6 showers, a blazing, cloudless sky from late April to mid-November, a northerly blast, laden with salt and sand, rising at times to a fury dreaded for its cold in winter and heat in summer, these are the climatic characteristics of desert Persia. Yet nature makes two amends: the air is dry and seldom enervating, and on the mountain ranges much of the precipitation falls as snow which, lingering on the summits till late spring, provides water for irrigation in the valleys below.

The lowlands of the Persian Gulf and gulf of Oman are distinguished from the interior by the intense heat and oppressiveness of their hot season and the mildness of their winters. On the plains of Khuzistan at the head of the Persian Gulf the summers are among the hottest known in Persia, the mean temperatures exceeding 90° F. for 4 consecutive months and often reaching 95° F. to 97° F. for 8 or 9 consecutive weeks. Yet away from the coast the air is dry and the discomfort is further alleviated by a strong north-westerly wind movement. The winters are mild, and slight frosts occur in most years. Unlike conditions in Khuzistan, the air over the coastlands of the Persian Gulf is humid even in summer. Hence at this season the climate becomes unbearably oppressive. A similar hot-weather climate prevails on the shores of the gulf of Oman, where the relative humidity is actually highest at this time of the year. On the coasts of southern Persia the winters are warm and fairly pleasant; at Bushire the temperature never drops below freezing-point; the Makran coast has the warmest winters in Persia, night temperatures below 50° F. being rare. The average rainfall of these areas varies from 10 inches a year on the shores of the Persian Gulf to less than 5 inches on the southern coast. Absolute drought prevails from at least May to September and occasionally extends into December. The climate of the Jaz Murian basin is somewhat similar to that of the southern coast, and the summer weather of the irrigated district around Bampur is as notorious for its heat and unhealthiness as that of Bandar Abbas.

Detailed Account of Climatic Elements

The following accounts of the climatic elements are based on observations at stations shown in Appendix A, Table I (fig. 31).

There are in addition a few stations for which less comprehensive data are available. The tables given in Appendix A summarize the most reliable information. On many details the statistics are too few and cover too short a period to be conclusive. Their geographical



FIG. 31. *Places with Climatic Data*

value, however, is not entirely to be judged by their number since they refer to the most densely peopled parts of Persia. The broad picture they give is accurate enough, but they do not always show the great deviations from the mean so characteristic of the Iranian type of climate. It is the irregular occurrence of violent winds, of unseasonable spells of scorching heat, bitter cold, protracted drought, and heavy downpours that is most disastrous to life in arid Persia. For details of these phenomena in the desert areas reference must be made to travellers' accounts, which usually include descriptions of the worst of the weather.

Pressure

The average monthly barometric pressure over Persia is lowest in July (fig. 33). It then rises to a maximum in December and January over southern Persia and in the period from October to December in the northern half of the country (fig. 32). At station level the range of the average monthly values is about three-fifths of an inch in the south and about three-tenths of an inch in the north. The changes of pressure are much greater in winter than in summer; during a period of 10 years the extreme barometric range on the plains at the head of the Persian Gulf was just under 1 inch (31 mb.) in January compared with nearly ½ inch (14 mb.) in July. In this area the worst weather sometimes occurs without, or previous to, any change in the pressure, whereas on the coasts of the gulf of Oman the pressure usually falls before bad weather begins.

Winds

Prevailing Surface Winds. In winter the high-pressure system of central Asia extends southwards into Persia and the pressure gradient is towards the gulf of Oman. A northerly flow of air prevails, but the direction locally is much influenced by the main mountain ranges and by the movement of western depressions. Over northern Persia north and north-east winds are common; in the southern half of the country north and north-west winds tend to predominate, the latter being especially common in the Persian Gulf area (fig. 34). On the coast of the gulf of Oman the southerly component is stronger than elsewhere in Persia. A marked feature of air conditions in winter is the frequency of calms over interior Persia. At Meshed during the early morning there was no observable wind movement on 9 days out of 10 in December. Calms formed, on an average, 52 to 69 per cent. of all observations (morning and afternoon) during the winter half-year at Tehran, 35 to 63 per cent. of all observations at Isfahan, and 36 to 68 per cent. at Seistan. Yet calms are unusual on the coast-lands of southern Persia; they may occur on 1 or 2 mornings out of 10, but they rarely persist until the late afternoon.

The normal winter air movement is often interrupted by 'western' depressions, most of which travel eastwards across the northern parts of the country. The average number crossing the Persian Gulf at this season is 5 or 6 a month except in February, when the average is 8. Occasionally depressions affect the region as early as October and as late as May. They give a characteristic alternation between south-

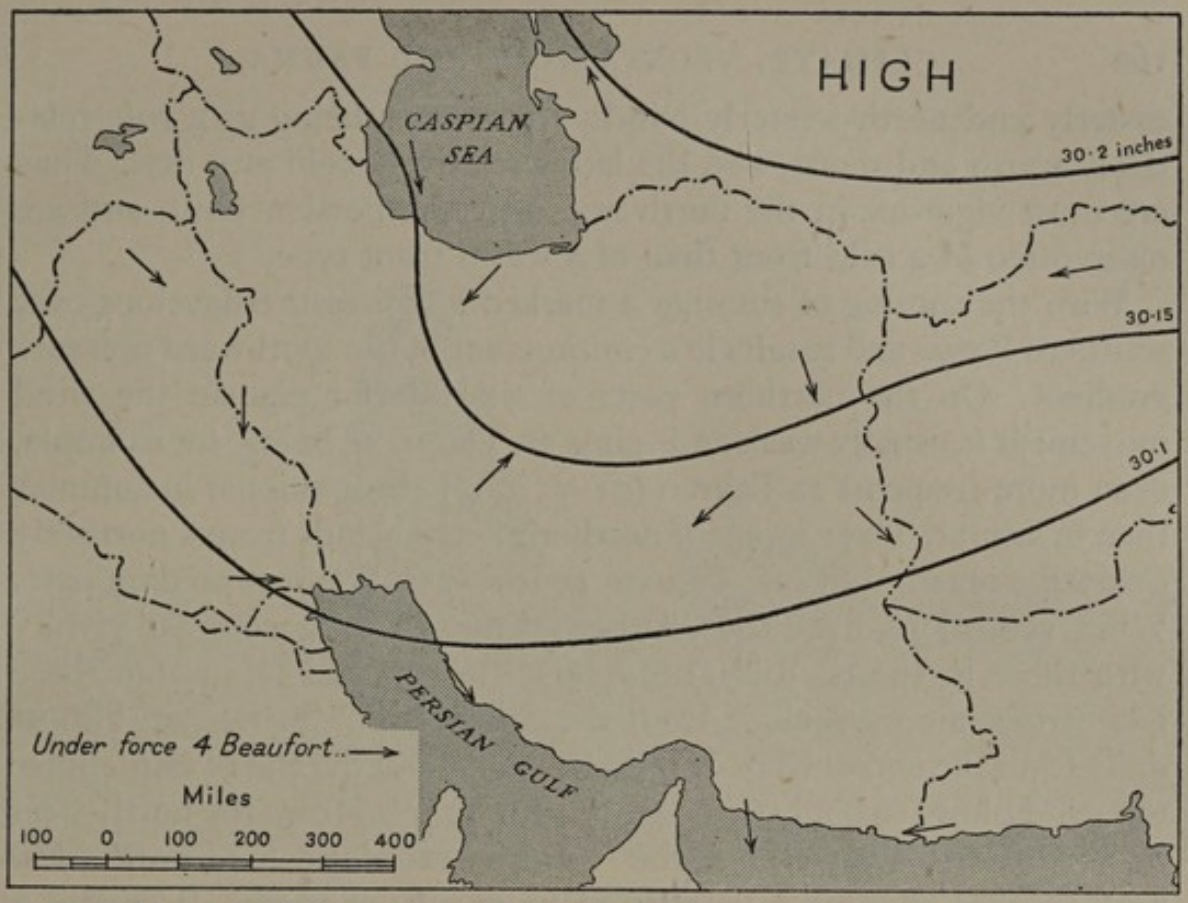


FIG. 32. *Mean Pressure (reduced to sea-level) and Prevailing Winds: Winter.*

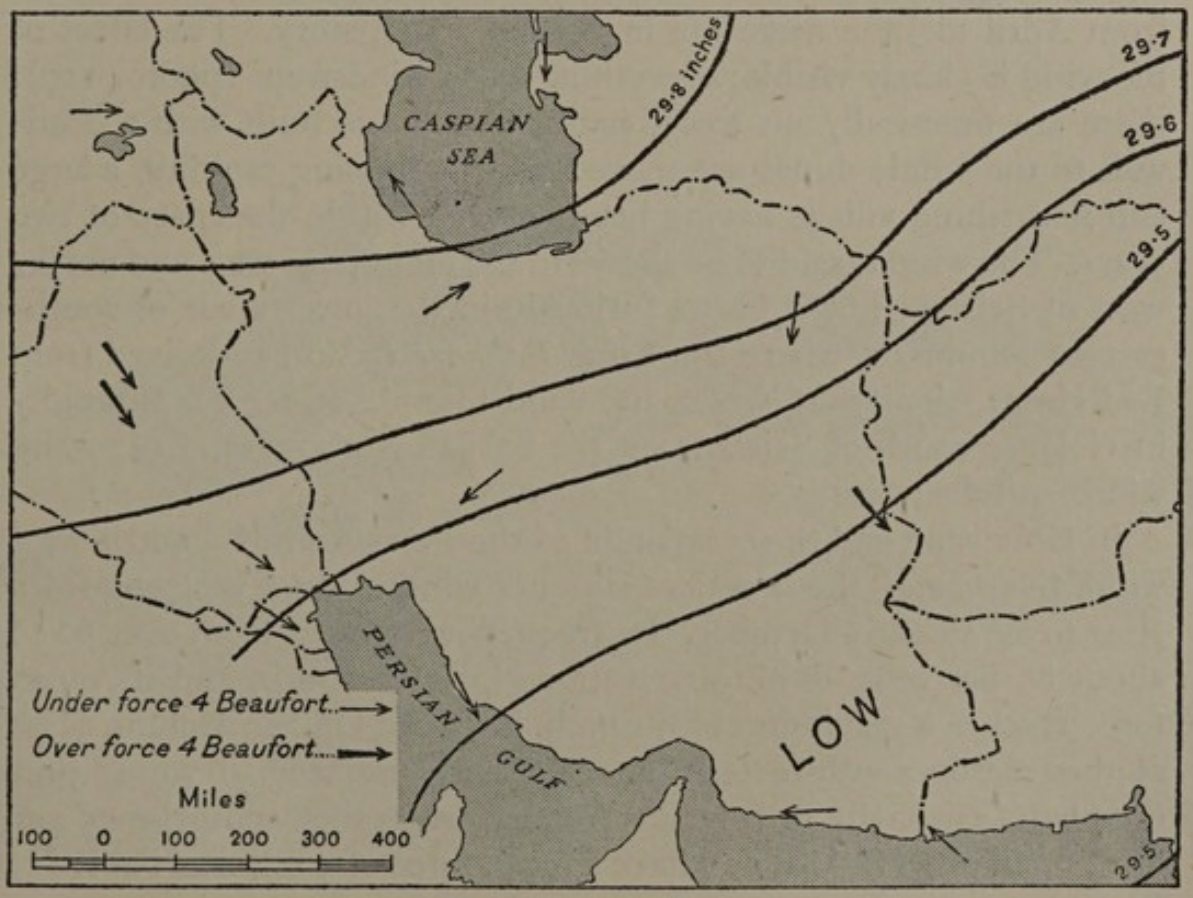


FIG. 33. *Mean Pressure (reduced to sea-level) and Prevailing Winds: Summer.*

easterly and north-westerly winds, the former being as a rule relatively warm and moist, and the latter relatively cold and dry. They are most vigorous in the north and near the Persian Gulf, and are more often of a cold front than of a warm front type.

With the coming of summer a marked low pressure develops over southern Persia and results in a continuance of the southward pressure gradient. On the northern parts of the interior plateau the wind movement is usually weak and calms are common, being, for example, even more frequent at Tehran (71–75% all observations) in summer than in winter. Over much of northern Persia winds from a northerly quarter prevail, but at Tehran south-west breezes predominate. Wind conditions over the southern half of Persia contrast vividly with those in the north. Throughout Seistan and Khuzistan there is a strong air movement from the north-west. In Seistan almost daily from the end of May or mid-June to about the end of September the wind blows strongly (average 13 to 15 m.p.h.) from the north-west or north-north-west. This, the 'wind of 120 days' (*bad-i-sad-o-bist roz*), reaches at times a velocity of 70 m.p.h. or more. It creates a pandemonium of noise, sand, and dust, but, although hot and parching, it mitigates the summer heat and blows away the insects which from April to June make life in Seistan a purgatory. The effect of the wind is clearly visible; everything looks windswept (photo. 117); there are practically no trees; native houses are built with a dead-wall to the wind; dunes are moved with surprising rapidity, a large and flourishing village having been covered within the space of two years. The wind is said to be absent in the mountains west and north-west of Seistan, but it blows furiously in the lower areas of south-eastern Khurasan, where the name *Bakharz* (p. 46) is derived from Bad Harza, signifying 'where the wind blows'. It decreases rapidly in violence south of Seistan, yet the Sarhad is also a land of strong winds and dust.

In Khuzistan and the coastlands of the Persian Gulf a north-west wind, the *shamal*, the prevalent summer wind of Iraq, is strong from June to about early October. Its frequency averages from over 60 to about 85 per cent. of all observations for the month, and its mean force reaches a maximum of 9 m.p.h. in June. On the Makran coast at this season south-easterly and southerly monsoonal winds predominate, especially in July and August, when they comprise 75 per cent. of all observations and have a mean force of 9 m.p.h. (Table II; fig. 34).

Diurnal Wind Changes. Throughout Persia the wind movement



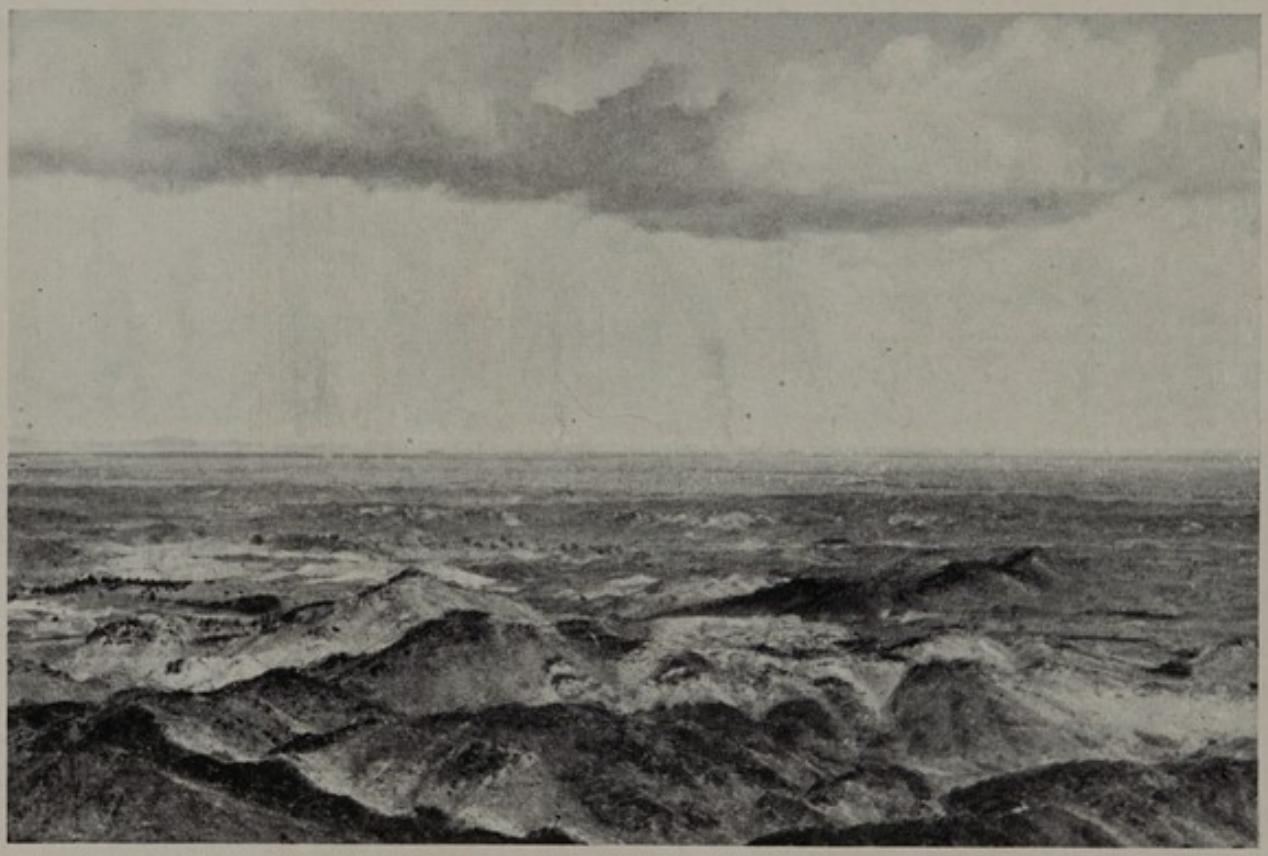
137. *Wind-eroded 'Mil' marking the southern entrance to the ancient route across the Southern Lut*



138. *Wind-eroded topography near Puseh Gushkal, between Khabis and Deh Salm, Southern Lut*



139. *Dust-cloud rising near Khanu, 12 November 1935*



140. *Three dust-devils in the Jaz Murian basin, seen from Khan-i-Mirza, with thunder-cloud above, 4 December 1935*

usually increases considerably towards noon, the increase being greatest in the hot season. The most regular diurnal changes of wind direction occur on the southern coasts. At Bushire there is often a westerly shift during the day at all seasons, whereas on the Makran coast a pronounced change to this direction occurs only in winter, the shift in summer being southerly (fig. 34).

Gales. The records of gales in Persia frequently do not state the actual speed of the wind. At Tehran about 6 violent winds (of unspecified force) occur annually; of these 5 arise between early February and late April and are probably associated with the passage of depressions. At Meshed gales are occasionally recorded at this season. In interior Persia strong winds have troubled travellers in summer and in winter, but there are no long-term observations. On the plains of Seistan and eastern Persia blizzards are liable to occur between December and the end of March, and strong gales during a freshening of the 'wind of 120 days' in summer. A blizzard from the north-west in late March 1905 averaged 88 m.p.h. for 16 hours and reached 120 m.p.h. It destroyed hundreds of camels. In Khuzistan and on the coastlands of southern Persia gales of force 8 or more lasting for several hours are rare and are not to be expected more than once a year. They are most liable to arise in the early months of the year. In addition squalls of wind exceeding force 8 for short periods of time arise occasionally, especially in winter. Winds of force 6 or more (about 38 m.p.h.) are not infrequent from January to April, nor in early summer. On the shores of the gulf of Oman tropical cyclones very rarely (once every 5 years or so) bring gales and even winds of hurricane force.

Local Winds. The great differences in altitude within short horizontal distances and the vast plains enclosed by mountain rims that are breached only by deep gorges encourage the formation of local winds in Persia. The high interior basins which form half of the country are peculiarly favourable to the downward gravitation of cold air during anticyclonic weather in winter; they seem also to encourage an updraught of air from some of the peripheral lowlands in summer. Only where air movements of this nature are concentrated into river-gorges or occur with some degree of regularity do they become strong enough to be of much human significance. In some mountain valleys, as in the Tahrud valley in Kirman province, there is an almost continuous wind movement of considerable force.

At Manjil in north-western Persia a violent wind arises about noon when the hot sunshine causes a rising of air on the Persian plateau.

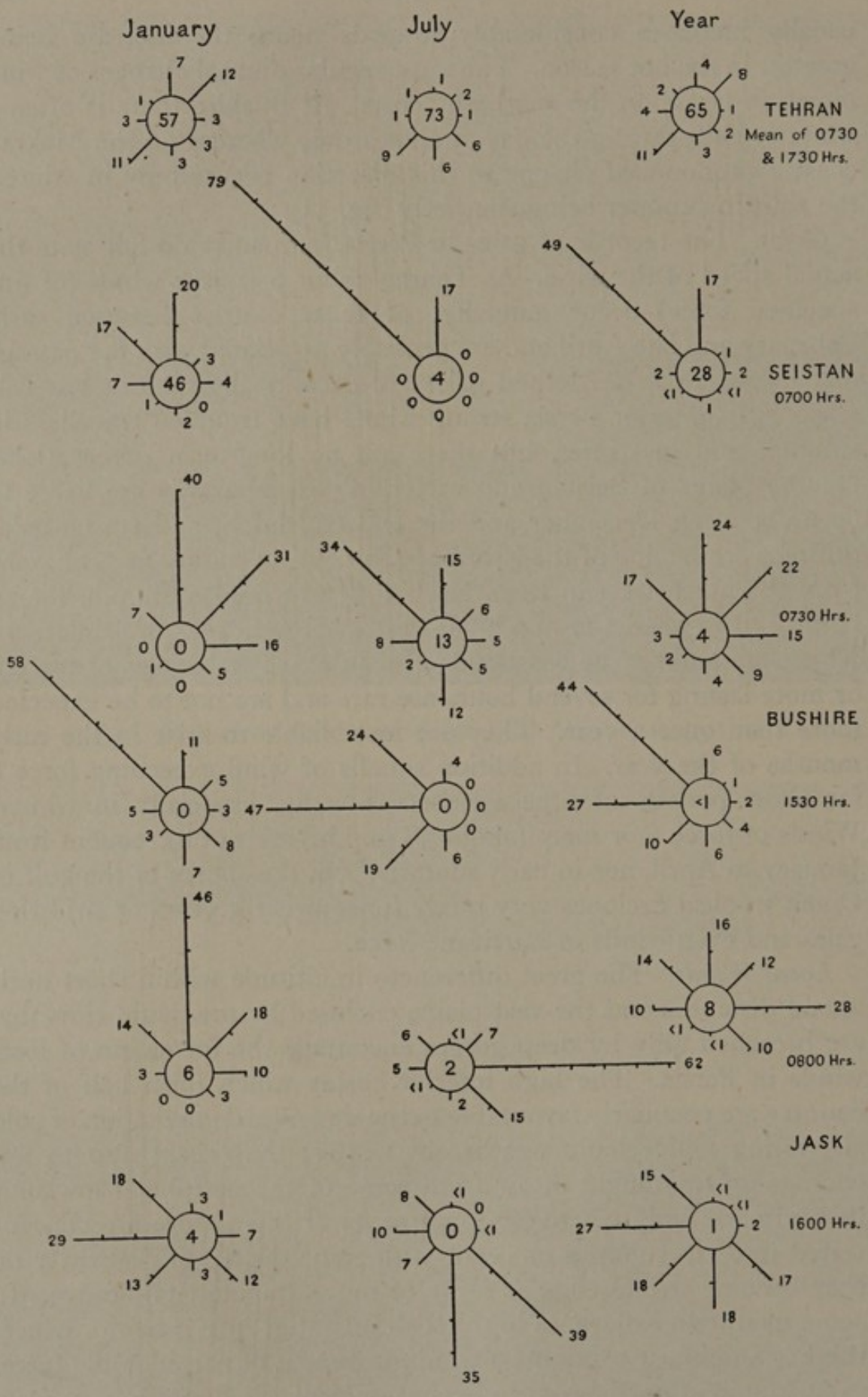


FIG. 34. *Percentage Frequency of Wind Directions and Calms*

The indraught of cooler air from the adjacent lowlands is concentrated in the gorge of the Safid Rud, through which a constant wind blows furiously for long periods during daylight in summer. The wind at times is so strong that laden camels cannot make headway against it; tents can be pitched only during the hours of relative calm in the early morning and late evening, and when pitched may be ripped to shreds. The air movement is weaker in winter. Similar winds, rather less violent, occur at times in many of the deep valleys that furrow the mountain rim of north and west Persia. Thus, in the narrow Sirwan valley, near Nausud, a 'gale' blows almost daily in summer although it is calm outside the gorge.

In contrast to these up-valley winds are those air-movements which arise from or are accentuated by the downward gravitation of cold air. The *nashi* or north-east wind that affects the coastlands of southern Persia in winter appears to be an outflow of cold air from the high pressure over the plateau. The *nashi* is gusty and spasmodic; it usually lasts for one day, but often persists up to five days, being strongest on the third day. The wind is sometimes intensified by the approach of a western depression and it may then bring cloud and rain, especially on the coastal hills. Of much the same nature is a kind of föhn wind that is felt in Gilan and western Mazanderan during autumn, and occasionally even in winter and spring, when the plateau to the south is snow-clad. The dry air brought by the wind brings much relief to the inhabitants of the humid plain, especially in swampy alluvial areas near Resht.

Winds, or land- and sea-breezes, arising from the differential heating of land and water, occur on the coastlands of Persia. They may be felt in all seasons on the shores of the Caspian Sea and Persian Gulf, whereas on the Makran coast their effect is hardly noticeable between April and September. The breezes are most strongly developed during settled weather and when the prevailing winds are light. From October to May a sea-breeze from between south-east and west usually develops in the afternoons on the shores of the gulf of Oman. In the Persian Gulf the land- and sea-breezes are strongest and most regular during spring and autumn, although they are also conspicuous in calm-weather periods of winter. The normal effect of the breezes is to superimpose on the prevailing wind a component from the direction of the land during the cooler hours of the day and from the direction of the sea in the hotter hours. At Bushire in most seasons the wind in the early morning is from slightly east of north, and in the afternoon from north-west or west; at Henjam the wind

often turns to the south-west in the afternoon. In summer the breezes of the Persian Gulf are marked by the prevailing north-westerly wind, but whenever the *shamal* is particularly weak the sea-breeze may do much to mitigate the great heat of the late afternoon. At this season land-breezes are very light and of short duration. The effect of land- and sea-breezes on the direction of the wind is illustrated in fig. 34 and in Table II, Appendix A. The Caspian Sea affects wind direction more than by the mere creation of land- and sea-breezes, and seems to give rise to monsoonal wind movements which blow towards it in winter and from it in summer. These summer winds on the southern Caspian coastlands are reinforced during the hotter hours of the day by the sea-breeze and by an in-draught motion towards the plateau of Persia. The summer wind at Manjil (p. 163) reflects these influences, and even Damghan and Shahrud are said to benefit at times from fresh, humid air coming over the Shah Kuh from the Caspian.

The local winds discussed above are encountered mainly either on the mountain rim or on the seaboards. Throughout interior Persia the characteristic local winds are the dust-devil and the dust-storm (p. 175). The dust-devil is a hot-weather phenomenon which may occur at any time of the day in fairly calm weather. It is a vortex or rotating column of air, sharply delimited and, because of its load of dust, easily visible. It moves slowly about in the desert, following the direction of the wind rather irregularly. Some spirals originate in a whirling patch of dust near the ground and curl upwards to thin out into a diffuse dust-cloud at a height of 600 to 700 feet; some are at least 1,000 feet high though only 20 feet wide at the base; others lose contact with the ground but maintain their existence at an altitude of 5,000 feet or more. Occasionally six or seven vortices may be seen at the same time during the hottest hours of the day (photo. 140). Most of them do no harm, but even a small dust-devil may be violent. A vortex a dozen feet in diameter may empty a particular tent of its contents while objects a few yards away are untouched. Larger vortices have been known to carve a way through a camp, leaving a lane in which not a single tent remained standing.

Upper Winds. Observations of upper winds over Persia are mainly limited to Jask on the gulf of Oman (Table III). These data, however, are supplemented by records from stations in adjacent countries, and notably at Basra (Shuaiba), Bahrein, Muscat, and Gwadar.

Over the Persian Gulf in winter (December–February) winds at heights up to 3,300 feet are chiefly north-west or north. Above 3,300

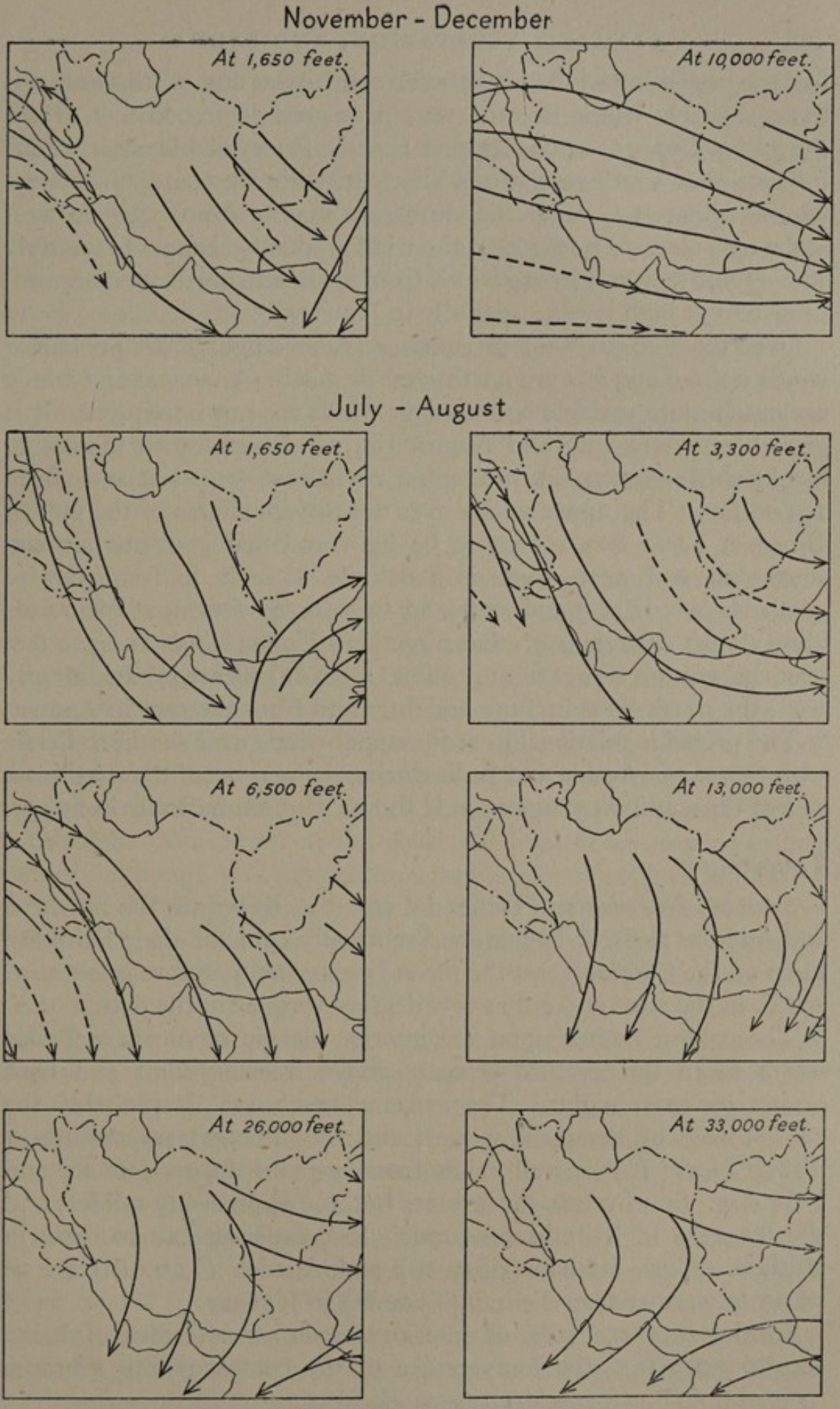


FIG. 35. *Upper Winds of Southern Persia*

feet the prevailing winds are between south-west and north-west, and these westerly winds become very persistent at 10,000 feet. Over the gulf of Oman at 1,700 feet near Jask the few available observations indicate that south-east winds alternate with west and north-west winds, whilst at Gwadar the winds are mainly from between west and north-east. At both places the wind gradually changes to westerly above 3,300 feet, and strong winds from north and north-west are very persistent at high levels, especially in January.

Over the Persian Gulf in summer (June–August) the prevailing winds up to 6,000 feet are north-west or north. At 10,000 feet winds are much more variable and easterly winds are not infrequent. It is probable that in July and August the wind backs with increasing height above 10,000 feet, becoming north-east or east at and above 15,000 feet. The upper winds over the eastern shores of the gulf of Oman at 1,700 feet appear to be light and mainly from between south-east and west; there is a definite increase in frequency of northerly winds at 3,300 feet, and from 6,500 feet upwards winds blow almost entirely from that direction. Upper winds at 1,700 feet over the western shores of the gulf of Oman at Jask are predominantly from the north-west in June and July and from the east in August.

The probable relationship of the upper winds over southern Persia with those over Arabia and India during the seasons of the north-east and of the south-west monsoon is shown diagrammatically in fig. 35.

Temperature

Seasonal Distribution (Tables IV and V). In winter the northern and interior parts of Persia are abnormally cold for their latitudes. Even on the Caspian coast the mean January temperature is less than 40° F. in the west and only a few degrees warmer in the east.

The coldest month upon the interior plateau of northern Persia has a mean temperature scarcely above freezing-point and frost occurs on most nights. The extreme north-west is probably the coldest part of Persia in winter, and the average temperature at Tabriz (4,423 ft.)[1] is well below freezing-point during January and February. Southwards the winters become appreciably milder, and the decrease in latitude does much to compensate an increase in altitude. Thus, Isfahan (5,817 ft.) and Abadeh (6,200 ft.) are as warm or warmer than Tehran (4,002 ft.) in January.

In the southern half of interior Persia, at altitudes of 2,000 feet to 5,000 feet, the temperature of the coldest month averages

[1] See footnote on p. 584.

between 47° F. and 50° F., the thermometer usually rising to about 60° F. at noon and falling to about 35° F. at night. The plains of Khuzistan and coastlands of the Persian Gulf have mild winters, the January mean at Abadan being 53° F., and that at Bushire a few degrees higher since the coastal situation gives appreciably warmer nights. The warmest part of Persia is the Makran coast, where the January temperatures average over 65° F. and daily maxima of 75° F. are not unusual (fig. 36).

Throughout Persia during April and May the temperatures leap upward and winter gives way suddenly to summer. By June the noonday heat is fierce anywhere below 5,000 feet. During July and August the mean temperatures rise to about 80° F. on the Caspian coast, while upon the northern plateau, in spite of the altitude, the averages are between 80° F. and 85° F. In southern Persia the heat is even greater, and monthly means of 89° to 90° F. or over are common below 3,000 feet. The plains of Seistan normally experience a temperature of over 100° F. on most days in summer and occasionally also during the periods March to May and September to October. The Khuzistan plains are sun-baked from May to September and during the hottest months the temperature usually rises to over 100° F. The heat in the Karun and Diz gorges can be stifling. The coasts of the Persian Gulf and gulf of Oman are slightly less torrid, the average temperatures of the hottest month being about 91° F. against 97° F. at Abadan. Moreover, on the coast the heat never much exceeds 100° F., although this temperature may occur as early as April and as late as October. Probably the hottest area of Persia is the southward-facing foothills near, but just outside the maritime influence of, the southern gulfs. Borazjan (100 ft.) has experienced mean temperatures of 100° F. in July and of 99° F. in August.

Except on the Caspian coast, there is virtually no autumn in Persia, the summer heat dropping rapidly to the chill of November and December. These sudden changes are reflected in the great seasonal range of monthly temperatures which averages about 40° F. to 45° F. over most of the country and lies between 45° F. and 50° F. in the enclosed basins of the north and north-west.

The diurnal range of temperature is also considerable. Throughout the inland areas of Persia the temperature on winter nights usually drops by 20° F. or 25° F., except in the east, where the range is slightly greater. During the summer the temperature at night usually drops by 30° F. or 35° F., so bringing a welcome coolness. These conditions contrast greatly with those on the Caspian and Gulf coasts,

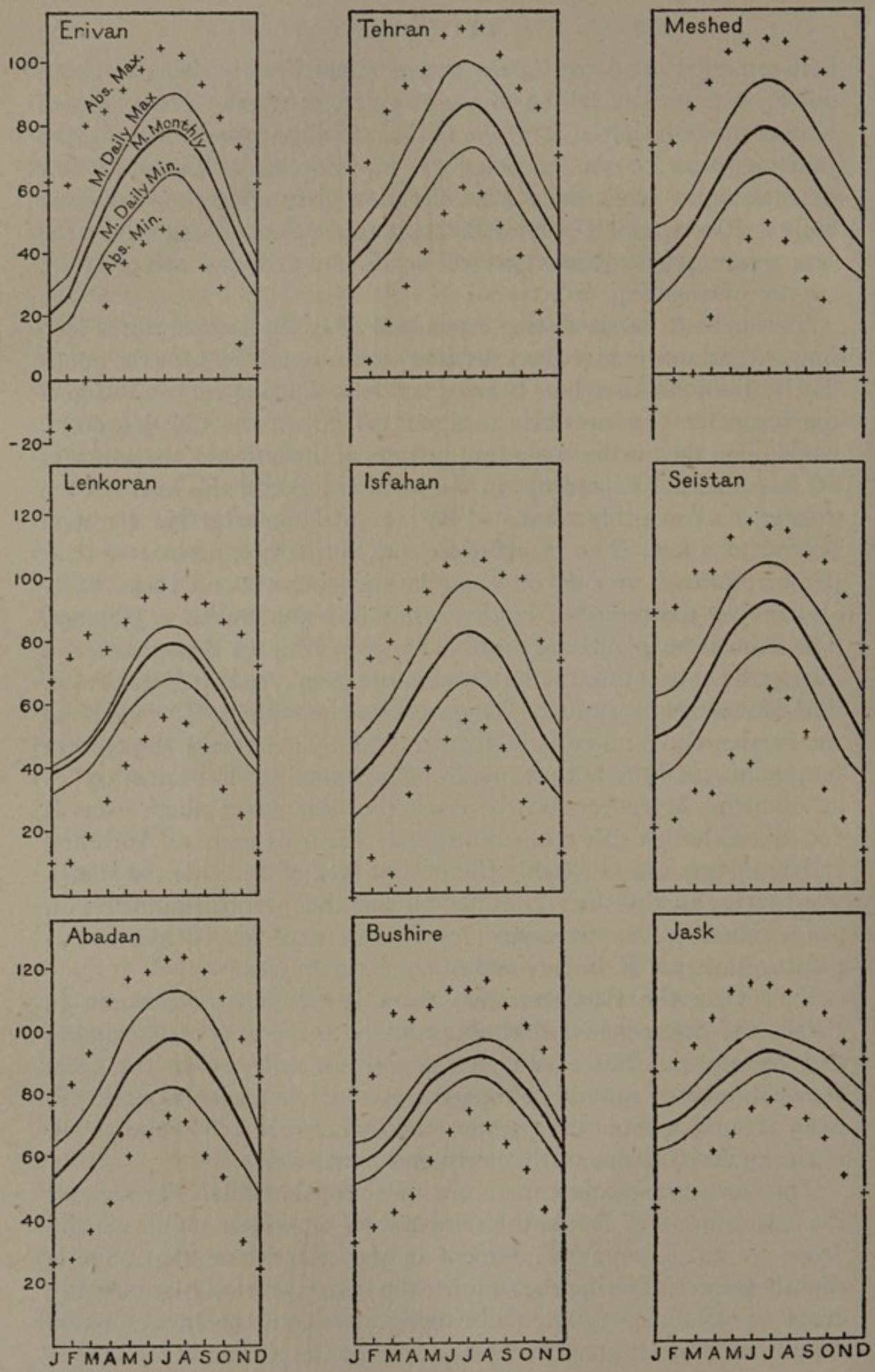


FIG. 36. *Mean Monthly and Extreme Temperatures in Degrees Fahrenheit*

where the diurnal range scarcely averages 15° F. during any month and seldom much exceeds 20° F. on any day. Consequently on the coast in summer, cool nights are rare and the heat of the day becomes intense a few hours after sunrise.

Extreme Temperatures. The inhospitable nature of the Persian climate is well reflected in the highest and lowest temperatures yet recorded here. At Lenkoran on the west Caspian coast, just beyond the boundary, 22° of frost have been experienced, and over most of arid Persia north of the latitude of Isfahan the temperature falls below zero very occasionally in January. The severest cold is experienced in the north-west (Tabriz, −18° F.) and in the north-east, where Meshed has experienced zero temperatures in each month from December to March and has had a temperature of −11° in January (Table V). Severe frosts are rare below 5,000 feet in southern Persia, and if the weather is fine the cold is seldom trying and outdoor life is not unduly discouraged. Yet in times of strong wind the cold can be intense, and in many winters men and animals are frozen to death when caught in a blizzard far from shelter. At Seistan 20° and more of frost have been known, and slight frosts may occur in any month from October to April; in January 1905 the stagnant *hamuns*, lakes, and even the fast-flowing rivers were frozen hard. On the plains of Khuzistan the temperature may drop 8° or 10° below freezing-point during exceptional cold spells and ice may form on the banks of the Shatt al Arab. On the coastlands farther south frosts are virtually unknown, Bushire never having recorded below 32° F. in 53 years and Jask below 42° F. in 38 years of observations.

The extremes of heat from June to August are less bearable than the cold spells of midwinter. On the coastlands of the Caspian the temperature very seldom reaches or exceeds 97° F. But over most of northern Persia, except the highest areas, temperatures of 100° F. or more have been recorded in July and occasionally in June, August, and September. Tehran has experienced 109° F. in August and September. Throughout southern Persia, below 4,000 or 5,000 feet, the heat reaches 110° F. or more in most summers. The highest temperatures occur in the lower parts of Seistan, of Khuzistan, and of the southern coastal strip outside marine influences. Seistan has known 116° F. in June;[1] Abadan has experienced 123° F. in August, while in parts of Khuzistan the shade temperatures have been known to rise to 129° F. with monotonous regularity during June. The heat spells on the southern coasts seldom, if ever, exceed

[1] Absolute maximum is probably over 120° F.

113° to 115° F., but inland the temperature rises several degrees within a short distance of the seaboard. During these extremely high temperatures anywhere in Persia the heat and glare in open country are very trying and travel is usually done by night. On occasions rail traffic has had to be suspended as it was impossible for British or even Persians to fire the trains. In July 1942 fires on locomotives had to be extinguished and crews rested before proceeding through the Diz gorge.

Relative Humidity

In January the Caspian coastlands are the dampest areas of Persia, the relative humidity averaging nearly 90 per cent. in Gilan and about 80 per cent. in Gurgan (Table VI; fig. 37). The air over inland Persia is relatively dry all the year, being seldom raw in winter or muggy in summer. In northern upland Persia the mean relative humidity of the early mornings during January is about 80 per cent. In comparison with this condition, the air over Khuzistan is slightly less humid, that over the coast of the Persian Gulf slightly more humid, and that over the Makran coast considerably drier. The mean relative humidity is less than 70 per cent. at Jask on mornings in December and January, and winter is the least humid season of the year. In southern Persia the humidity in the afternoon is likely to be from 10 to 20 per cent. lower than in the early morning, whereas inland it is often 30 to 40 per cent. lower.

During the hot season, except in the coastlands, the air over Persia is usually very dry. On the plateaux early morning humidities of 45 to 55 per cent. are common in the north and of 35 to 45 per cent. in the south and south-east. During the afternoon the humidity commonly drops to between 15 and 20 per cent. throughout all southern Persia, and at times the air over the Khuzistan plains may be almost completely dry. At this season the mean daily humidity on the Caspian coast does not drop far below 75 per cent. in Gilan and 50 per cent. in Gurgan. Consequently the summer heat is sultry and oppressive over all the coastal region. In Gilan malaria becomes rampant in the rice-growing swamps, so that the hillmen say 'Go to Gilan and die!' The weather is equally unpleasant on the shores of southern Persia, where the relative humidity keeps at about 70 per cent. for 3 or 4 months. Dew is heavy from March to September, and in the morning the sails of native craft often drip with moisture as if there had been a heavy shower of rain. On the Makran coast summer is the most humid period of the year. Here and on the

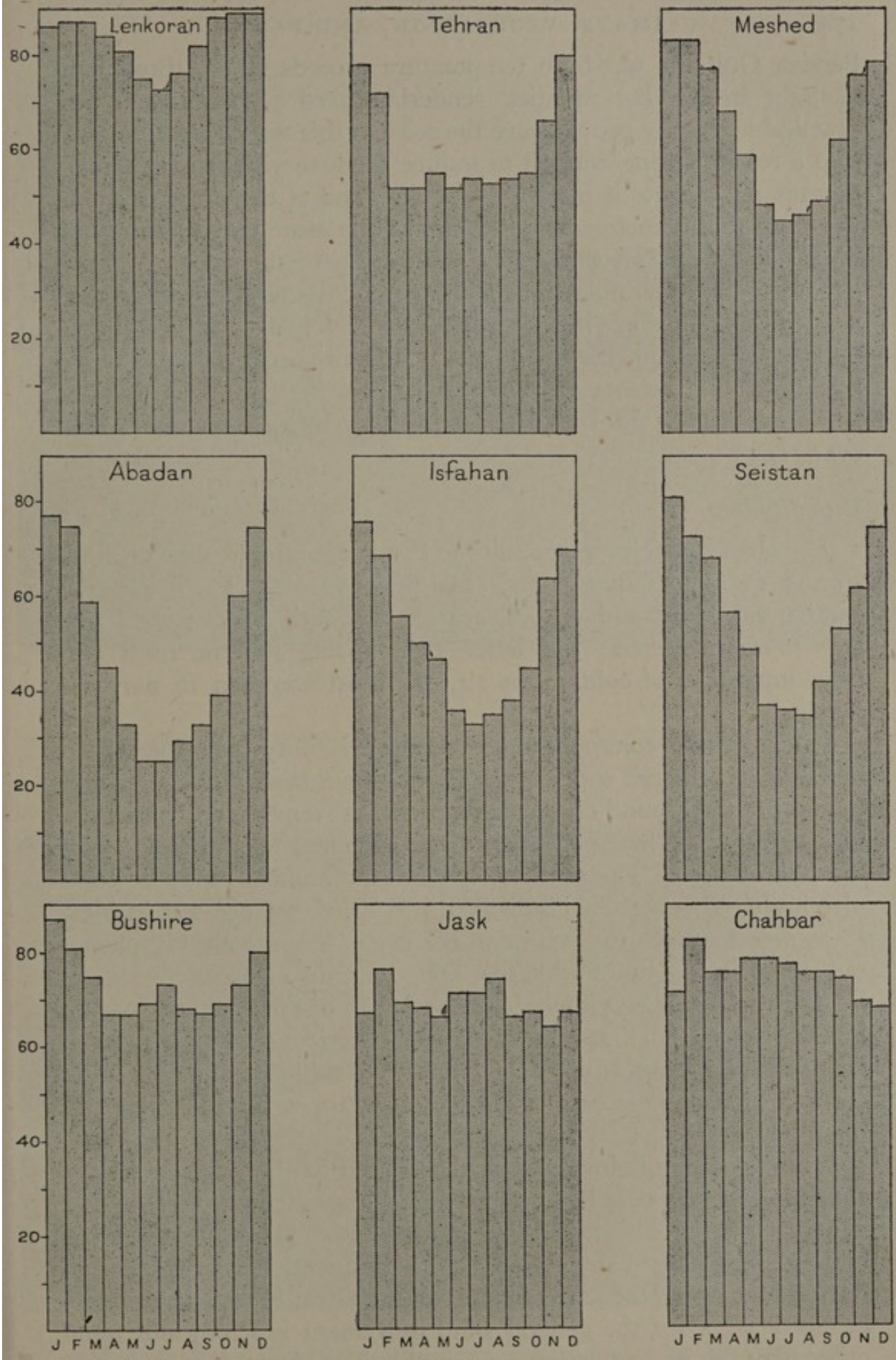


FIG. 37. *Mean Monthly Relative Humidity in percentages*

Persian Gulf the wet-bulb temperature exceeds 78° F. throughout daylight in the hot months, rendering hard physical work impracticable. Many people leave the coast at this season; few Persians find a reason strong enough to induce them to visit it. For 4 or 5 months the climate is incredibly 'sticky', and at times the dry- and wet-bulb thermometers stand at almost the same temperature with disastrous effects on the health and nerves of the people. Yet at stations only a few miles inland from the coast, and not more than a few dozen feet above it, the air is comparatively dry. Hence it often happens that when the inhabitants of Bushire are nearly prostrated by humid air at a temperature of 85° F. to 90° F., the weather is much less unpleasant at from 12 to 20 miles inland with a temperature of over 100° F.

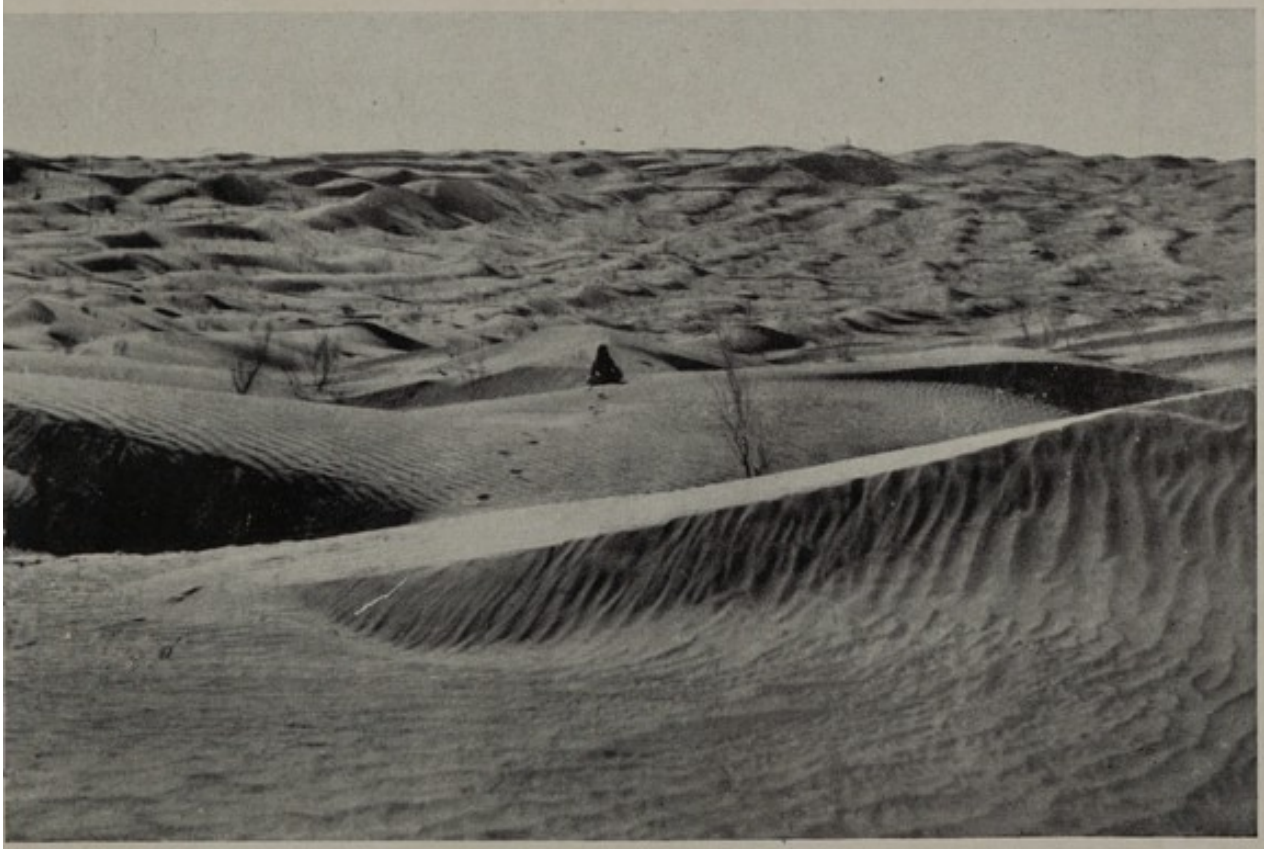
Visibility

The chief obstacles to visibility in Persia are mirage, dust or sandstorms, fog, and falling snow. The first two obstacles, being concomitants of heat and aridity, are characteristic of interior Persia and southern Persia; the latter two, arising for the most part from intrusions of cold moist air, are most common in northern Persia.

Mirage is the commonest obstacle to visibility over the flatter, hotter areas of Persia south of the Elburz mountains. It occurs when the heat of the ground causes convectional movements and variations in density in the lower few feet of air sufficient to distort and blur the line of sight. The outlines of discernible objects may be completely altered or rendered indistinct, and visual distances are falsified, some objects appearing nearer to the eye. Occasionally visibility is reduced to a few hundred yards. The illusions of mirage are of an infinite variety: false mountains arise in the distance; small rows of hillocks appear floating a little above the horizon; low-lying clouds look like solid ground; not uncommonly a semblance of a lake shimmers in the waterless desert, at times even appearing to reflect hills upon its surface.

Mirage commonly forms when the ground has been heated by the sun, as is usual 3 or 4 hours after sunrise, especially in the summer half-year. Although most frequent in the hot season, it may occur on fine sunny days at any period and has frequently been experienced during January on the level stretches of the Great Kavir. It probably cannot arise when the general wind movement is strong nor upon other than flat or undulating topographies. It forms, however, over





141, 142. *Maze of confused sand-dunes, eastern belt of the Southern Lut*



143. *Houses with wind-towers in the desert*



144. *Windmills at Niyazabad, southern Bakharz*

water and salt-marsh as well as over land and is not uncommon in summer in the Persian Gulf. Its worst effects can be mitigated by ascending about 15 to 40 feet above the surface, and it does not interfere with observations from the air.

Dust- or sand-storms, as defined by a dust-laden wind of force 4 or more which reduces visibility to less than 1,100 yards, are common on the Persian plateaux and on the southern plains and coastlands. Their frequency depends partly on the nature of the surface to windward—vegetated, moist, and stony areas being poor yielders of dust—and partly on the strength of the prevailing winds. Whether the debris carried is mainly sand or dust depends on much the same factors; alluvial Khuzistan is liable to dust-storms, wind-swept Seistan to sand-storms, while winds on the lee side of salt-encrusted flats carry a high proportion of salt particles (photo. 139). The storms may occur at any time of the year, and at times may reach gale force with a visibility of a few yards only.

In the winter half-year (November to April) dust-storms may arise over a wide area with the freshening of winds from a southerly quarter on the approach of a western depression, provided the surface has dried sufficiently since the last fall of rain. Dust-laden winds of a more variable direction may be associated with thunder-storms, especially in March and April. Very typical is the following account of a sand-storm on the edge of the Southern Lut near Neh:

> 'At mid-day, the south-eastern horizon became yellow, and a huge tawny cloud rolled towards us. The wind blew freshly but not hard and at the same time the whole sky became overcast. In a short time the squall had passed, leaving scattered sand-eddies careering over the ground. An hour later the phenomenon was repeated with greater force and denser clouds of sand while thunder reverberated in the distance. An hour later more thunder occurred and a yellow bank of sand-cloud advanced rapidly from the west, greatly decreasing visibility. Soon afterwards the strong south-easterly wind returned, bringing with it more swirls of yellow dust.'

In winter the air over central Persia contains more dust than that over the southern coastlands, where dust-haze reducing visibility to 1 mile or less is recorded on 1 or 2 days a month only (Table VII).

From May to October, dust- or sand-storms generally occur during a freshening or increase in gustiness of the prevailing wind. At this period their onset is less sudden than in the cooler months, and is usually heralded by an abnormal glare round the sun and by the rising of sand-eddies from the ground. Usually the dust content of the air is greatest during the hottest hours of the day, but some dust-storms

continue through the night and some, especially if associated with thunder-storms in spring, may arise during darkness. It is probable that dust- or sand-storms in this season are most common in eastern Persia all the way from the Bakharz plain to the Sarhad. Elsewhere in arid Persia the winds are less strong but the supply of fine dust may be more plentiful. In Kirman the westerly winds which prevail from April to October occasionally raise thick dust-storms, while at Yezd in spring and summer strong northerly and easterly winds may at times be so laden with dust that the place becomes as dark as night. Upon the plains of Khuzistan the *shamal* causes, on an average, about 10 dust-storms in July and 7 in June, but few of these storms extend with any severity as far as the shores of the Gulf, though dust-haze may affect visibility at sea. Bushire usually experiences 4 or 5 true dust-storms in the hot season, whereas dust-haze which reduces visibility to less than 2 miles occurs on about 1 day in every 7 or 8. On the coast of the gulf of Oman dust-storms are uncommon and dust-haze is not to be expected on more than 5 or 6 days in any of the hot months.

Fog or mist is rare in Persia except on the Caspian coast, where the sea is often shrouded in a thick veil of mist during anticyclonic weather. Interior Persia has few foggy days; Tehran experiences 3 such days in an average year, and these come mainly between early December and early March (Table VII). On the edge of the Great Kavir, patches of fog that persisted for 3 or 4 days and at times limited visibility to less than 200 yards have been recorded in January. It seems probable that, during calm, anticyclonic weather in winter, the damper basins of north Persia may experience fogs arising from the downward creep of cold surface air at night. Fogs are rare on the lowlands of southern Persia, Abadan having an average of only one a year. On the shores of the Persian Gulf during the winter half-year visibility in the early morning may be reduced to less than a mile by mist or salt-haze on from 1 to 4 days a month. The mists are most frequent in December and January, but even at this period they usually clear soon after sunrise. Here misty weather, apparently due to salt-haze, also occurs occasionally in the summer months and especially from June to August when it may persist until the afternoon. Conditions of visibility on the shores of the gulf of Oman are very similar to those over the Persian Gulf except that early morning fogs are most common from April to June and are rare in July and August. Fogs are virtually unknown throughout upland and interior Persia during the hotter months of the year.

Cloudiness

Persia, the Caspian coastlands alone excepted, has a high percentage of the possible sunshine for its latitudes. In winter there are long periods of clear, sunny skies, while in summer for weeks on end the almost vertical rays of the sun strike with unmitigated intensity from dawn to sunset. Overcast skies are not to be expected on more than 50 to 60 days a year, whereas clear skies normally occur on about 180 days in the north of interior Persia and on 230 days in the south.

Throughout the country winter and spring are the cloudiest periods, since much of the cloud-cover is associated with the advancing fronts of atmospheric depressions. At these seasons the cloudiness of the Caspian region averages about 8/10 near Lenkoran and rather less than 6/10 in Gurgan (Table VIII; fig. 38). The skies are much clearer south of the Elburz mountains, where the cloud-cover averages 3/10 to 5/10 from November to April, the cloudiest months being December, February, and March. As a rule there are more clear days than overcast and 1 day in every 3 or 4 is practically cloudless. Southwards the average cloud-cover of the winter half-year decreases to between 3/10 and 4/10 over most of southern Persia. Here the weather tends to be cloudiest on the shores of the Persian Gulf (4/10 average) and sunniest in Seistan and on the Makran coast (under 3/10 average). In Khuzistan even January, the cloudiest month, usually has 14 clear mornings against 8 overcast. Throughout the cool-weather period there is little regular diurnal variation in the cloud-cover except a slight tendency to an afternoon increase during the early months of the year.

In the hot-weather season the average cloud-cover of the Caspian coastlands decreases from about 5/10 in Gilan to less than 4/10 in Gurgan. Elsewhere in Persia the skies are almost cloudless. In the north-west it is usual for 2/10 of the sky to be covered. On the northern half of interior Persia 1/10 or less of the sky is covered from early June to early October; for 20 to 24 days a month there is no cloud and an overcast day is a rarity even in October. In Seistan the cloud-cover drops to 1/10 as early as May and is practically nil from June to November, when for weeks on end the northerly winds blow fiercely beneath a brazen sky. On the plains of Khuzistan June and September are the clearest months, with 28 or 29 cloudless mornings against 1 overcast. Here a slight increase in cloudiness occurs during July and August, when 2 or 3 mornings a month may be overcast. The shores of the Persian Gulf are almost cloudless

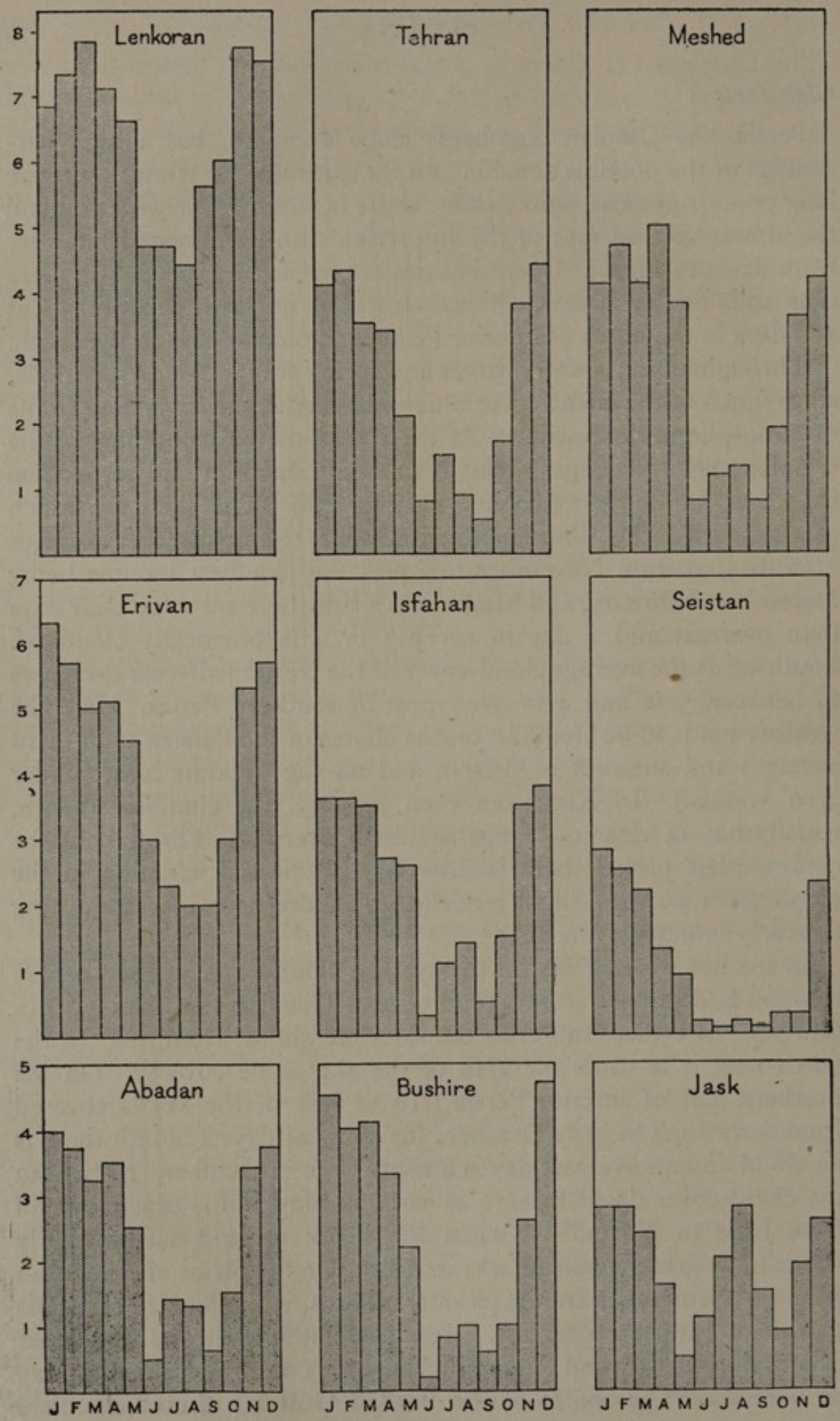


FIG. 38. *Mean Monthly Cloudiness in tenths of sky covered*

from the end of May to mid-October. On the coasts of the gulf of Oman the persistency is broken by the influence of onshore winds which cause an increase in average cloudiness to about 2/10 during July and August; upon the eastern stretches of this coast, and especially between Chahbar and Gwatar, the increase in cloud-cover during these months is very considerable. Throughout the southern coastlands in the hot weather there is usually less cloud in the afternoon than in the early morning.

Precipitation

Annual Totals. Persia may be divided into two rainfall regions, the wetter areas of the north and west, and the arid areas of the centre, south, and east. On the former the annual rainfalls average from 12 to about 65 inches; on the latter they range from under 12 to less than 2 inches. The greater part of the coastlands and mountain slopes north of the Elburz in Gilan and Mazanderan receive 40 inches or more of precipitation a year (photo. 149). The rainfall decreases eastwards to about 20 inches on the coastal plains of Gurgan and to about 30 inches on the adjacent foothills of the Elburz. On the higher, more exposed slopes of the Zagros mountains as far south as Fars the average annual falls exceed 20 inches, the precipitation rising to a maximum of well over 40 inches in parts of Ardalan and Kermanshah. The lower slopes on the western side of this mountain region receive a precipitation over 12 inches a year; on the eastern slopes, however, the rainfall diminishes rapidly towards the interior and some of the foothill basins—as at Isfahan—have less than 5 inches of rainfall a year and are part of arid Persia (fig. 39).

On the plains of Khuzistan and the coastlands of the Persian Gulf the annual precipitation averages between 8 and 12 inches. Similarly, the average yearly rainfalls of the mountains in northern Khurasan seldom much exceed 10 inches. These regions, however, are but the outlying parts of the heart of arid Persia which stretches from the northern kavirs to the Makran coast and from Seistan to Isfahan. The centre and east of this area have less than 4 inches of rainfall in a normal year; elsewhere few localities receive more than 8 inches.

Seasonal Distribution. Throughout Persia most of the precipitation comes between November and late April, when it is mainly associated with the passage of frontal depressions. The summer months are almost or quite rainless (fig. 40 and Table IX).

On the Caspian coastlands in the Talish hills and Gilan nearly three-quarters of the annual rainfall occurs from early September to

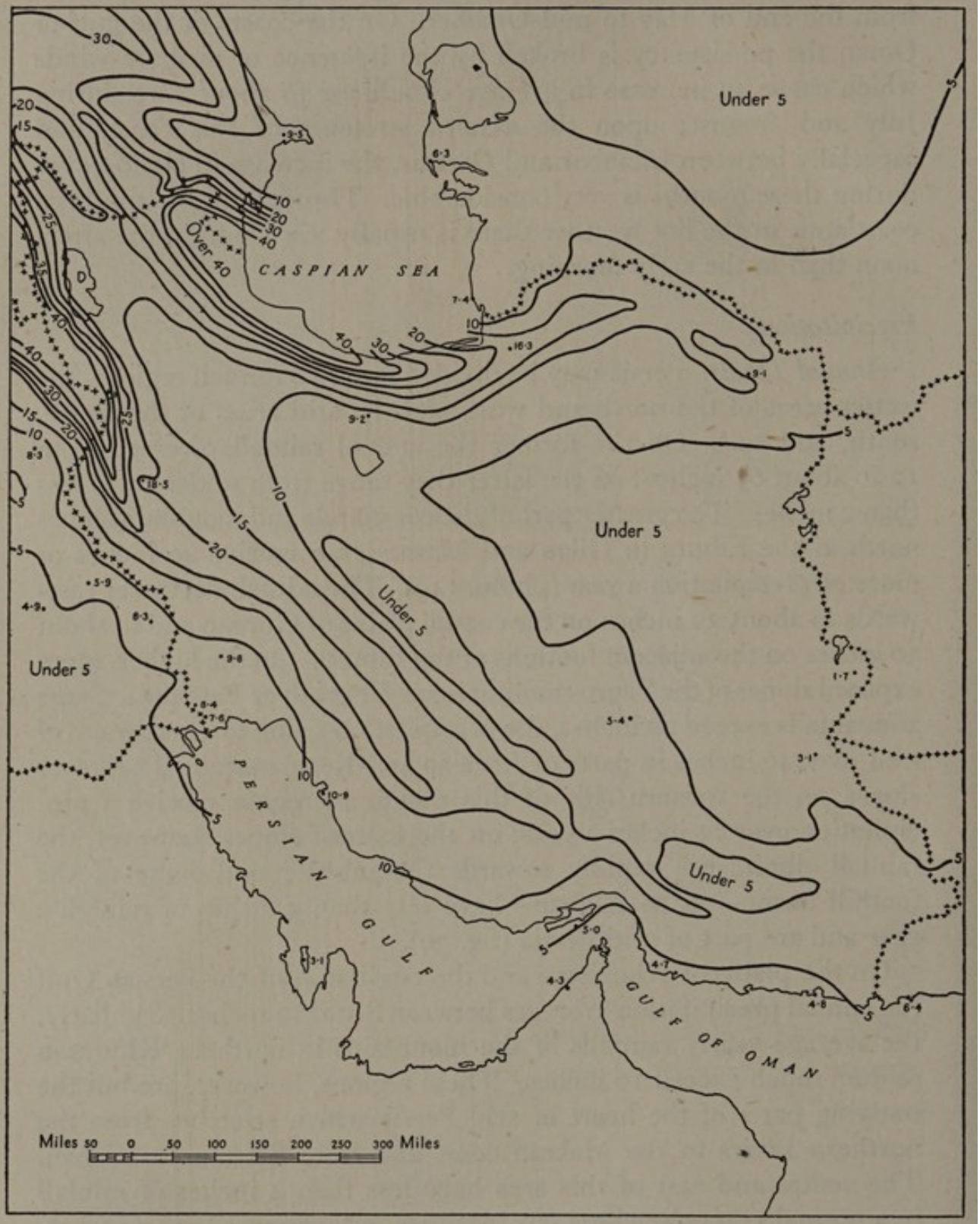
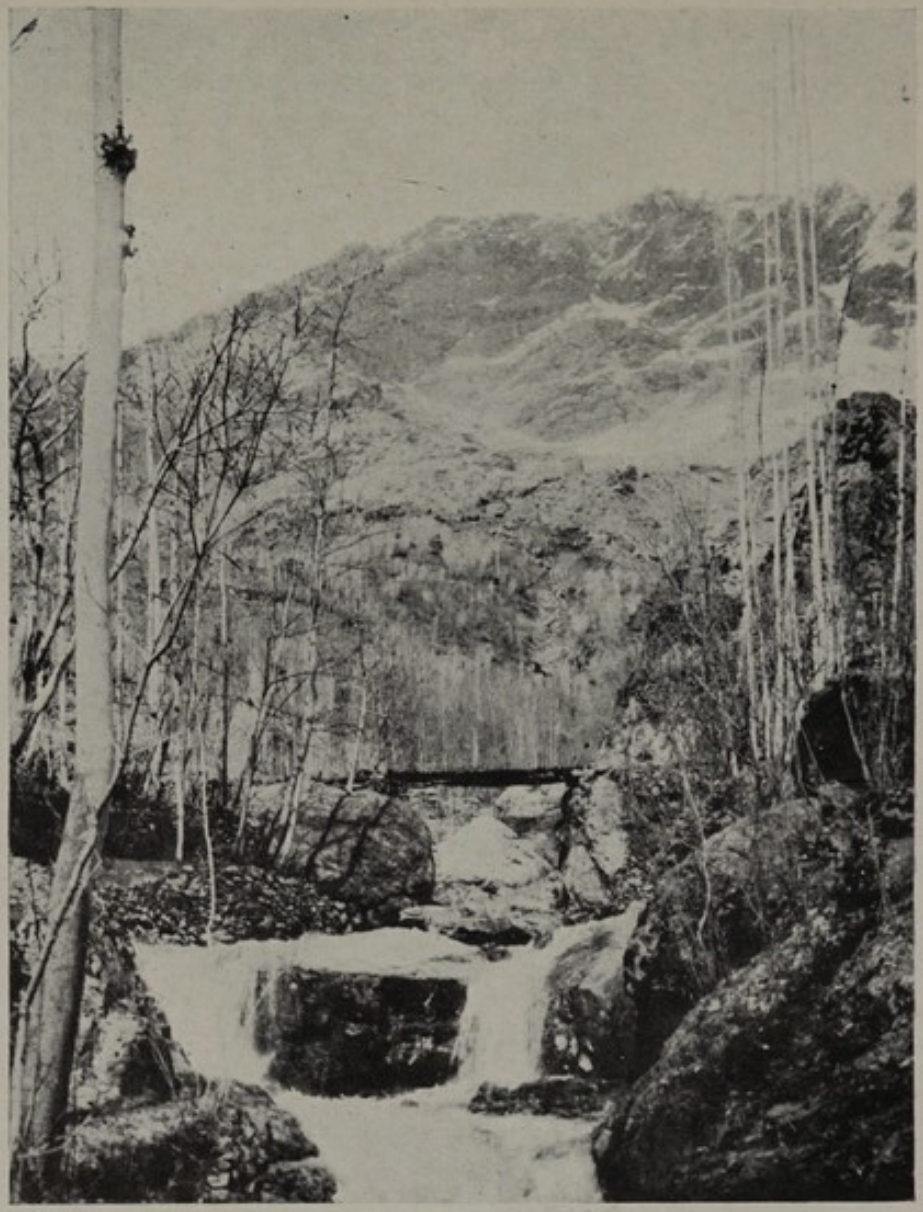


FIG. 39. *Mean Annual Rainfall in inches*



145. *The village of Pas Qaleh, Elburz, north of Tehran, in winter*



146. *Above Pas Qaleh in summer*



147. *After a March snowfall in the Masileh basin*



148. *Road near Iraq (Sultanabad) under snow, 10 December 1936*

late January, the rainiest months being September and October with about 8 inches each. There is a slight secondary maximum in March, which usually has over 3 inches of precipitation. In Mazanderan and Gurgan September and October are still the rainiest months (about 3 inches each), and March is usually as rainy as December. Immediately south of the Elburz November to April is the wettest period, the rainiest month being as a rule March or December with 2 inches of fall on 6 rain-days. It is usual, however, for spring (March–April) to be the wettest period in the north-west and in the north-east. This tendency to a later maximum also prevails over much of the more arid areas of the north. In Khuzistan and in the coasts of southern Persia December to February is by far the wettest time of the year, the monthly averages being about 1½ to 2 inches in Khuzistan, 2 to 3 inches on the shores of the Persian Gulf, and 1 to 1½ inches on the coast of the gulf of Oman. In Khuzistan and the Persian Gulf 4 to 6 days with rain a month are to be expected; on the southern coast 2 rain-days a month normally occur at this period.

The hot-season drought of Persia increases in length and intensity southwards and eastwards from the Caspian Sea. On the Caspian coastlands in the Talish hills and Gilan 1 to 1½ inches of rainfall a month are usual from June to August, and only in lowland Gurgan do the monthly averages drop below 1 inch. Throughout the rest of Persia almost absolute drought prevails from June or July to the end of September. There is little or no rainfall for 5 months (June–October) each year in the northern interior, for 6 months (May–early November) in the centre and south-west, and for 7 or 8 months (April–late November) in the south and east. The midsummer drought of arid Persia is one of the most stable features of the climate; showers may occur very rarely in the north and once in a lifetime on the coast of the gulf of Oman, but at Bushire for over half a century scarcely a trace of rain has fallen in June, July, and September.

Nature of the Rainfall. Two other features of the rainfall of Persia are of great importance—the intensity of the rainstorms and the unreliability of their occurrence.

The intensity of the rains is partly shown by the number of rain-days, which is low even in the wettest months (Table IX). On the Caspian coastlands, where the normal year has no more than 120 days with rain in Gilan and about 65 in Gurgan, an inch or more of rain a day cannot be uncommon, especially in autumn. The annual number of rain-days (over 0·1 in. of rain) averages about 25 to 30 on the basins and interior lower slopes of northern Persia. The

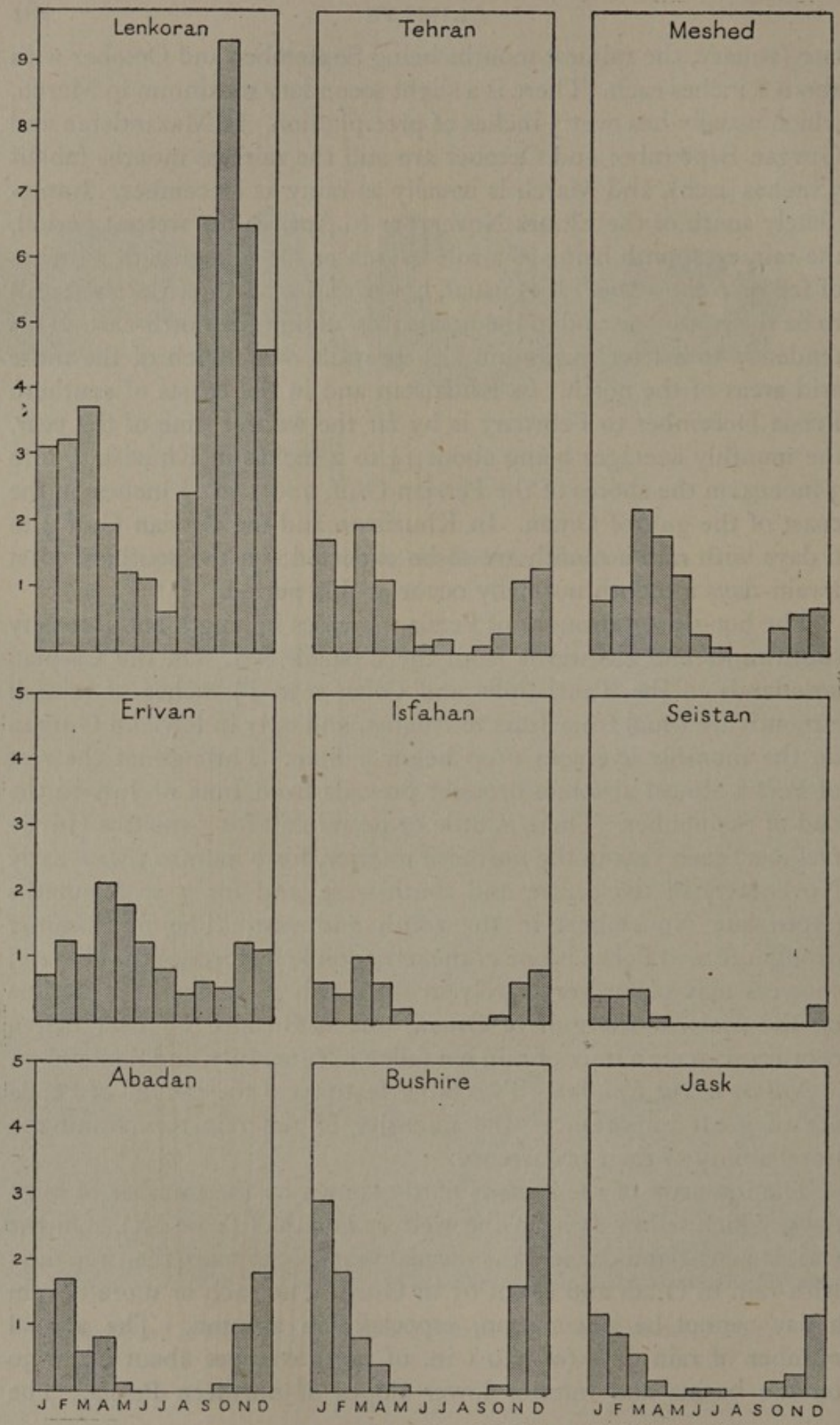


FIG. 40. *Mean Monthly Rainfall in inches*

average drops to under 20 days in the south-west and to less than 10 days over the greater part of eastern and southern Persia. Consequently, the mean precipitation of the rain-day is high. At Meshed the 10 rain-days in March and April give a total of 4 inches of rain; at Tehran the 20 rain-days from December to April give 7 inches of rain; at Bushire the 15 rain-days from November to February bring a total of 9½ inches.

These statistics, however, by no means illustrate the discomfort that can arise from heavy downpours. Throughout all but the driest parts of interior and eastern Persia falls of 1 or 2 inches in 24 hours may occur rarely in the cooler months. Storms yielding 2 to 2½ inches of rain in the day have been recorded at Meshed in March, at Tehran in January, and at Abadan in November and December (Table IX). The heaviest rainstorms on lowland areas probably occur in the south, where falls of 3 inches in a day have been known and Bushire has once recorded 5½ inches in 24 hours. During wet years heavy storms occur occasionally on highlands near the southern coast. Thus, on the mountains overlooking the gulf of Oman 2 inches of rain in about 1½ hours was experienced in January, well over 2 inches in a few hours during the following February, and even in early April a wet spell filled the river-beds. Throughout Persia the heavier rainstorms are usually of this type, sudden, pulsatory, and of short duration. Only in the extreme north and on the wetter slopes of the western mountains is it usual for rain to continue for days on end. Elsewhere, within a few hours of unexpected deluges, the firm, level surfaces of mud-flats may be turned into uncrossable mires; the salt-encrusted kavirs may become slippery underfoot or their thin crust may break under the weight of a camel; the dry floors of wadis may become filled with a moving mass of mud or a strong-flowing river that cuts off the unwary traveller from his camp and presents an impassable barrier to the natives, who view with unspeakable horror their first opportunity of learning to swim.

The rainfall of Persia is extremely variable in quantity on all areas south of the Elburz mountains. At Tehran the annual totals range from under 4 to over 20 inches; at Meshed from under 4 to over 15 inches; at Bushire from under 2 to over 26 inches, and at Jask from under 1 to nearly 9 inches (fig. 41). These variations arise mainly from the occasional extension of the hot-season drought into December and from occasional periods of excessive rains from January to April in the north and from December to February in the south. At Tehran 8·7 inches have been recorded in January and over 6 inches

in March; at Meshed over 5 inches in March; at Jask nearly 6 inches in January; at Bushire 13 inches in December and January and 12 inches in November. Yet throughout the drier parts of Persia each of the cool-season months has been absolutely dry. The variability appears to be greatest in south-west and southern Persia, where the

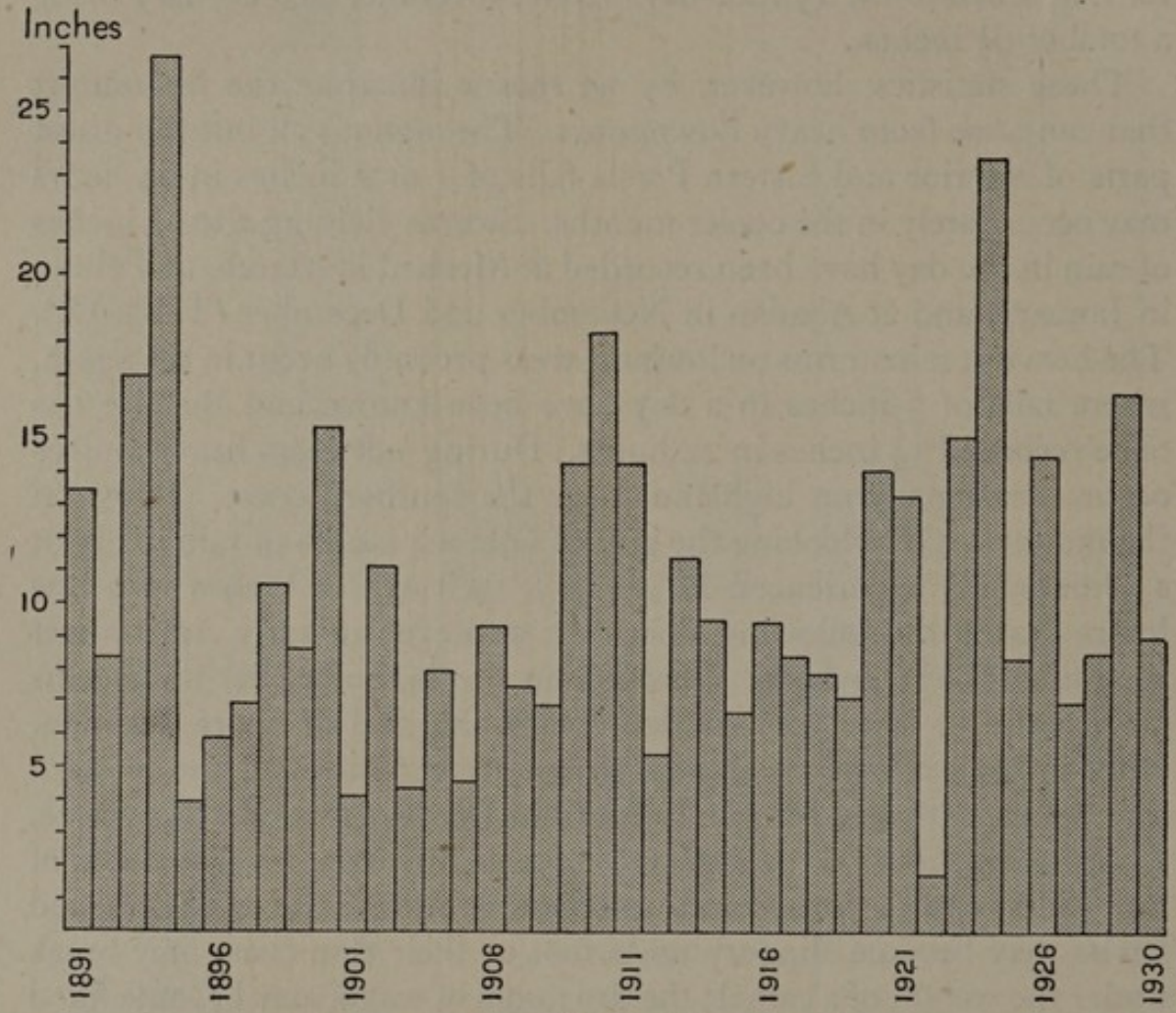


FIG. 41. *Annual Rainfall at Bushire*

influence of frontal depressions is most likely to be variable. Here mean rainfall statistics are of little value to the traveller. Thus, at Jask during January in the decade 1921–1930, 2 months experienced over 5 inches of rainfall and 7 months had under 1 inch, 2 of them being absolutely rainless.

Thunder-storms and Hail. Thunder is heard occasionally from October until May in most parts of Persia. It is most common from February to the end of April, when 1 to 2 thunder-storms a month are not unusual. During the rest of the cool-weather season the average frequency is well under 1 storm per month (Table X). The thunder is usually associated with the passage of a cold front and may

be of considerable violence, especially in spring in the northern interior. After the setting-in of a strong prevailing wind, such as the *shamal* of Khuzistan or the northerly winds of eastern Persia, the district affected seldom experiences thunder. In the hot season thunder is rarely heard except on the Caspian coast, where it is common in May and June, and occurs occasionally in the other hot months.

Sometimes hail falls during thunder-storms, its occurrence being least rare in spring in northern Persia and about midwinter in the south.

Snowfall and Snow-cover. Snow has fallen throughout Persia except on the lowest areas of the extreme south. Few records are available, the only long-term observations being for Tehran and for towns on the southern border of the U.S.S.R. (Table XI). However, the numerous references to snow in the travel literature on Persia allow a fairly broad picture to be drawn of the snow-cover.

In Gurgan and Mazanderan snow seldom falls on the lowlands, but farther west in Gilan and Talish light snowstorms are to be expected on about 12 days in most winters, and heavy falls, which sometimes cover the ground for a whole day, may occur as late as the end of March. At Lenkoran snowstorms occur on about 11 days between early December and late March, January being the snowiest month. The snowfall is heavy on the exposed slopes of the Elburz and may remain for 4 or 5 months (photo. 145); on the highest summits patches of snow may linger all the year in the crater of Demavend and in other shaded hollows. High routes across the Elburz are often blocked with snow, but the lower routes followed by the main roads are not menaced by snow-drifts. During the construction of the railway over the Elburz work had to be suspended at over 5,000 feet for short periods in winter, but traffic is rarely impeded by snow, since this is cleared readily by snow-ploughs.

Snowfall is also heavy and frequent from November to March on the wetter parts of north-western Persia and the Zagros mountains. Here, at elevations above 5,000 feet in winter, most of the precipitation falls as snow, and the snow-cover may persist for 4 or 5 months. Even on the Khurramabad plain of Luristan snow usually lies for 20 to 40 days a year and has been known to stay for nearly 10 weeks. Throughout this part of the Zagros the snow-line on exposed slopes is at about 4,000 feet in January, 5,000 feet in March, and 7,000 feet in May. The snowiest period is from December to late March; during it the inhabitants of many of the higher mountain villages

hibernate and stable their cattle. Even as far south as Fars province snow may close the Zagros passes for a few days or weeks on the main routes; some of the high passes used by tribes must be crossed on snow in August, and it is not until May or June that the tribesmen 'break trail' with their bare feet to allow the first of the flocks to pass on the beaten snow. On Kuh-i-Dina avalanches occur in late winter and a few small patches of snow remain in shaded crevices throughout the summer. On southern faces at about 9,000 feet the snow is usually gone by mid-May and new falls are not to be expected until well into November or December.

On the northern parts of interior Persia, 15 to 20 days a year with snowfall appear to be usual (photo. 147). At Tehran, on an average, there are 8 days with snowfall in January, 4 days each in December and February, and 1 day in March. A snow-cover of 3 to 4 inches is not unusual for some weeks in most years, but snow does not often fall for more than 2 or 3 days in succession. Between 1892 and 1909 the earliest snowfall at Tehran occurred on 26 November and the latest on 6 April; the annual totals varied from about 8 inches to over 40 inches of snow. Farther east on the edge of the Great Kavir the snow-cover is said to reach 2 feet on rare occasions, and snow-storms have been known to reduce visibility to a few hundred yards. In the inhabited valleys of Khurasan the total snowfall averages about 18 inches a year and snow-storms are not uncommon in March; the mountain slopes at 9,000 feet may carry large patches of snow throughout the summer.

On the lower parts of interior Persia south of the latitude of Yezd the snowfall is insignificant and lies for a short time only, although heavy falls have occurred as far south as Bampur. On the higher mountains snow lingers in sheltered spots for most of the year and is used in some towns for refrigeration during the early months of the hot season. In the mountains bordering the Southern Lut snow usually falls only in January and February, but the summit of Kuh-i-Chihiltan (13,034 ft.) is often snow-clad till late May and that of Kuh-i-Lalehzar (14,350 ft.) until mid-June. The routes from Chahbar and Minab to Bam and Kirman are very seldom blocked by snow. On the plains north of the Persian Gulf there are about 2 days with snowfall in the year, while on the lowlands farther south snow is rare, although it has lain for a short time at sea-level near Bushire.

The agriculture of large areas of Persia depends much on snowfall. The quality of the harvest in the colder parts of the country is greatly affected by the degree of protection afforded by snow-cover to the

crops during times of severe frost. The movements of the pastoral mountain tribes are regulated by the freeing of pastures from snow in spring and by the returning snow-cover late in the year. Above all, the melting of highland snows in March and April floods the streams and provides irrigation-water, the supply of which may be prolonged into May and early June by progressive melting at higher levels on the main mountain ranges.

VEGETATION

THE plant species (flora) of Persia and their grouping into communities (vegetation) are still very incompletely known. Travellers and collectors have published observations, but, with very few exceptions, they have either been untrained in botany or they have been resident too short a time to make complete studies even of a single province. In consequence, there are wide gaps in our knowledge and it is difficult to give a precise survey of the plant-life. It is possible neither to prepare a map of the vegetation as a whole nor to subdivide Persia accurately into botanical provinces or domains. Certain features of the flora and vegetation are, however, prominent and correlations can be found between these and what are known as habitat factors. In the following summary these factors and their relation to the main types of flora and vegetation are outlined. This summary is followed by an account of the plant-life in different geographical regions of Persia, though it must be noted that these do not necessarily correspond with different botanical provinces.

Summary

The factors affecting the plant-life of Persia are conveniently grouped under three headings: climate, soil, and biotic factors. While this grouping is convenient, two points must be stressed: first, that the factors—both those within any one group and those in different groups—interact and modify one another's action on plants; and second, that the factors have historical aspects, that is, their action has varied at different periods.

Climatic Factors. The climate of Persia has already been described. It is only necessary to add that the two chief climatic factors affecting the plant-life in the country as a whole are precipitation and temperature. The latter, by itself, probably prevents the growth of plants nowhere in Persia, though the severe winter frosts of the high

mountains and plateaux and the great difference between day and night temperatures in many parts undoubtedly play a part in determining types of flora and vegetation. The main natural limiting factor to plant growth is water-supply, which is dependent on rainfall. For one reason or another this is inadequate over large parts of Persia outside the Caspian provinces and the western mountains. It is often restricted in total annual amount or in seasonal distribution or in both. Low atmospheric humidity, strong winds, and, frequently, the nature of the substratum increase the effects of drought. The consequence is that the landscape of much of Persia varies from 'open steppe' to 'semi-desert' and in some parts absolute desert prevails. Most plants are usually of low stature and have small leaves of a dull green colour. The heat of the sun dries up many of the species as early as May, and the little green visible in spring has by summer become changed to yellow or brown.

Soil Factors. Little is known in detail regarding the soils of Persia. The large variety of rocks, sometimes within small areas, gives a wide range of raw materials for soil formation. Climatic and biotic factors, however, have combined to reduce the soil-cover to such an extent that organic 'living' soil, comparable to that of arable fields or gardens in Europe, is exceptional over large areas, and the term 'substratum' is usually preferable to 'soil' in referring to plant habitats. From the various field observations of travellers and collectors and the very few soil analyses available the following broad conclusions have been reached. In plateau-steppes of central Persia the percentages of clay and sand materials in the soil-cover vary locally within very wide limits. The organic content is generally low, often very low. Soil acidity is rarely marked and many soils have a reaction near to the neutral point. It is possible that there are exceptions to these last two conclusions in the Caspian provinces, but over wide areas of mountain, plateau, and desert, in the absence of a continuous forest-cover and under the given climatic conditions, sufficient quantities of dust and weathered rock particles are dispersed by wind to cause a general mixture of inorganic materials in the surface layers where such can accumulate. This is probably one reason why distinctions between vegetation on limestone and non-limestone soils is apparently less marked in Persia than in many other countries. An important factor is the quantity of salts in the soil, especially of chlorides of sodium and magnesium. The dry climate and high rate of evaporation leads to upward movements of water in the substratum and to accumulation of salts in the upper layers. Drainage to inland sumps, characteristic



149. *Mist and rain, northern slopes of the Elburz*



150. *Grasslands on the Turanian plain east of the Caspian*



151. *Marsh vegetation at Baluch Ab, Southern Lut*



152. *Ilex oak parkland in the Pusht-i-Kuh*

of central Persia, also results in salt accumulation under the given climatic conditions. There are great stretches of salt-encrusted *kavir* (p. 88) and other areas with salt in the substratum, or in underground or lake water, too concentrated for the growth of any plants at all, or only suited to those specially adapted to high salinity.

While the flora in parts of the country is rich in species of flowering plants, it appears to be poor in non-flowering plants, particularly in ferns and mosses. Though these have been little studied, yet it would appear that the dry climate of most of Persia and the high salt content of much of the ground combine to rule them out. They may, however, be more numerous in the humid Caspian coastlands.

Biotic Factors. Under this heading are grouped the reactions of plants to one another and of plants to animals. It is only in the thick forests of the Caspian provinces that there is extensive competition between plants for the necessities of existence—space to grow, light, and so on. Most of the plant communities of Persia are very open, individual plants being so spaced that there is little or no competition between either aerial or underground parts. Competition, from the seedling stage onwards, is mainly with the inorganic factors of the habitat, with grazing animals, and with man. Local exceptions occur to these generalizations where there is sufficient fresh water available, as near rivers and streams, or in some high mountain districts, or where there is artificial irrigation. Apart from such habitats the stages of development are few, the succession is short, and under existing conditions the final type of vegetation is low scrub, 'steppe', thorn-cushion communities, and other open groupings of herbs, sub-shrubs, and bushes. Questions regarding forest are considered below.

It is doubtful if the natural fauna has a marked influence on the vegetation apart from animals acting as agents of pollination and seed dispersal. The most important of all biotic factors is undoubtedly the action of man and his domestic animals. Man has destroyed wide areas of forest for timber and fuel. The large flocks of sheep and goats effectively prevent forest rejuvenation. It is, however, very difficult to decide how much of Persia could naturally be covered with closed high forest. The Caspian provinces are forest lands, and still have much dense high forest; but it is probable that the altitudinal forest limit has been artificially lowered on the northern slopes of the Elburz mountains. At the other extreme, the desert areas to the south and east, as, for example, the Southern Lut, have a climate in which no forest can grow. The high mountains also have forest limits above which woody vegetation is absent or reduced to low shrubs and

sub-shrubs. Between these extremes is the greater part of Persia and especially the highlands and plateaux. Some might carry open forest were it not for the destructive actions of man and his flocks. Large areas are, however, near the climatic limit of forest growth, because of low rainfall. Hence the probable openness of the original forest, where it occurred, its easy destruction, and its low power of rejuvenation. Destruction of forest and scrub not only greatly increases soil erosion, particularly in mountainous and hilly country, but also all the secondary effects of erosion. Whether there has been a climatic change towards greater aridity in historical or recent geological times is disputed. It remains certain that destruction of forest, or of any other type of vegetation, reacts on the habitat and, under Persian climatic and soil conditions, intensifies the effects of drought, increases evaporation from the ground surface, decreases atmospheric humidity near the ground, lowers the water-table, removes humus layers on the surface, and prevents them from re-forming. That trees can grow in many parts of Persia now devoid of extensive forest is shown by remains of forest, the occurrence of scattered trees in certain mountains and valleys, and by their growth in gardens and orchards, not always artificially irrigated. Some remains of forests have been preserved because they are regarded as sacred. Natural or artificial reafforestation would be a slow process under any conditions; it could only succeed within climatically suitable areas, which may be considerable in the aggregate, and only if the destructive habits of man and beast were eliminated.

Flora. Persia is rich in flowering species. No precise estimate of the number can be given, but there may well be 5,000 or more seed-bearing plants. Of particular interest is the large number of species occurring only in Persia (endemics). Three groups are represented in the flora, the Mediterranean, the Persian-Central Asiatic, and the Desert. *Mediterranean* elements are commonest in the north. With them are best included those ancient types which may have survived as constituents of the south Caspian forests and which may well represent in part the prehistoric and even Tertiary Mediterranean flora and vegetation. The constituent trees of the south Caspian forests are, however, with few exceptions specifically different from those of European forests, and even the genera or families may be different. The *Persian-Central Asiatic* group of plants dominates the flora of the Persian plateaux and mountain country. These species form what has been termed the Irano-Turanian group, but the group requires more analysis and study than has yet been given to it. The

Desert group is most largely represented in the south and east. In so far as it consists of species distributed, or whose near affinities are distributed, from the Sahara to north-west India, it is termed the Saharo-Sindian group. There appears, however, to be a large admixture of plants which are also found in central Asia and, even more, whose ultimate origin is to be traced to the north and north-east of the Persian borders.

The more important families in the flora of Persia include: daisy (Compositae), pea (Leguminosae), dead-nettle (Labiatae), cabbage (Cruciferae), grass (Gramineae), borage (Boraginaceae), pink (Caryophyllaceae), figwort (Scrophulariaceae), parsley (Umbelliferae), and goosefoot (Chenopodiaceae).

Many Persian plants have no English names. In the following account of Persian vegetation an English name more or less exactly indicative of the plant is used where possible. For precision botanical names of these have been given in footnotes; where no English equivalent is available the botanical name is given in the text. There is no published handbook to the flora of Persia and no general account of the vegetation of the country. Boissier's *Flora Orientalis* contains descriptions in Latin of all plants known from Persia up till the date of publication of the last volume (Supplement 1888), but there have been many additions to the known flora made since then.

The Northern Borderlands

Caspian Coastlands

Gilan and Mazanderan differ from all other Persian provinces by reason of the abundance of rainfall, fresh surface-water, and air humidity. This fresh water is the main factor in determining the lush growth of vegetation which culminates in tall, closed, almost sub-tropical forest, but, with few exceptions, consisting of deciduous trees, that is, of trees which shed their leaves in the autumn. Proximity to the Caspian Sea and to the background of Talish and Elburz mountains, together with the frequent winds from the Caspian, mainly, but not entirely, through their action on climate, determine the main features of the plant communities.

The strip along the shore has a number of vegetational types which are closely correlated with the nature of the substratum. Much of it is bordered by sand-dunes and sand-stretches with little or no vegetation and at best with scattered plants not forming a closed turf. On the inland sides the dunes are often covered with a low herbaceous

and sometimes even shrubby vegetation. They frequently stretch in several lines parallel with the shore and have between them damp and often marshy hollows with sea-rushes[1] and a general mixed flora of salt-marsh and freshwater-marsh plants. Where the substratum is low and muddy, salt-marshes develop with an abundance of chenopods, sea-lavenders,[2] and other plants capable of flourishing in saline muds. Where streams and rivers flow into the sea, freshwater-marshes may be extensively developed with a tall growth of reed grasses.

The plains behind the coastal strip were formerly clothed with dense closed forest which ascended, with certain changes, into the hills. In places much of this still remains, but over large areas it has been more or less cleared for cultivation. Many parts show a patchwork of forest alternating with fields, villages, orchards, and gardens. On the lower ground, where irrigation is possible, there are extensive rice-fields; rice and cotton are staple products, but a great variety of other warm-temperate and sub-tropical crops are also raised. These include sugar-cane, oranges, lemons, mulberries, sesame, cereals, vines, apples, apricots, and a great variety of winter and early spring vegetables. There are also meadows brightly decked in spring with primroses, violets, and other flowers. Marshes not yet used for rice cultivation and numerous streams elsewhere impede travel. Deserted fields revert more or less quickly to forest, through the stages of a kind of 'steppe', then by a more or less prickly scrub, and finally high forest.

The Elburz Chain: Caspian Slopes

The south Caspian forest is of very great interest. Mazanderan forests are said to contain some forty different kinds of timber-yielding trees. There are probably differences from west to east and also from the lowlands to the higher limits, but they have never been mapped and information is relatively detailed for only a few areas.

In Gilan and the west three altitudinal zones can often be distinguished on the Caspian slopes, though they are not everywhere sharply marked. In the *lowlands* the forest consists largely of a member of the witch-hazel family[3] and oak,[4] together with hornbeam,[5] a member of the elm family,[6] elms,[7] ash,[8] plum,[9] poplar,[10] and such climbing

[1] Especially *Juncus acutus.*
[2] *Limonium* spp.
[3] *Parrotia persica.*
[4] *Quercus castaneifolia.*
[5] *Carpinus betulus.*
[6] *Zelkova carpinifolia.*
[7] *Ulmus* spp.
[8] *Fraxinus* sp.
[9] *Prunus divaricata.*
[10] *Populus hybrida.*

and scrambling woody plants as vines,[1] an asclepiad,[2] blackberry,[3] and ivy.[4] In this zone large marsh areas are characteristic, and are often covered with alders[5] and a rich, lush, marsh vegetation.

The hill or *lower montane* zone has no marshes except some small ones immediately connected with streams. Here the forest of witch-hazel, oak, and hornbeam is still the dominant type, though other associates include a species of *Zelkova*, date-plum,[6] the Caspian honey-locust,[7] plum,[8] maples,[9] an acacia-like plant with pink flowers (*Albizzia julibrissin*), and Caucasian wing-nut.[10] There is often box[11] present as small trees, or more frequently as shrubby undergrowth, together with hawthorns,[12] butcher's broom[13] and its relative known as *Danaea racemosa*, and medlar.[14] Blackberries, an asclepiad, ivy, and smilax[15] festoon the trees as woody climbers or lianes. Alder and Caucasian wing-nut are particularly common near streams (photo. 155).

In the *middle montane* zone witch-hazel disappears, and the oriental beech[16] becomes the characteristic tree, though it is said to grow exclusively on northern slopes. Hornbeam and oak are abundant; less numerous are *Zelkova*, maples, common ash, and Caucasian wing-nut. Yews[17] sometimes occur in small groves.

In the *upper montane* zone, the Caspian type of forest disappears, and the dominant woody plants are a different oak[18] and another hornbeam.[19]

Farther east, in Mazanderan, the Caspian forest—sometimes called the Hyrcanian—is fully developed (photos. 134, 156). The commonest trees here are oaks,[20] witch-hazel, *Albizzia*, nettle-tree,[21] maples,[22] alder,[23] date-plum, Caspian honey-locust, box, hawthorns, wild plum, and wild pear.[24] In open places in the forest there is brushwood of Christ's thorn[25] and pomegranate.[26] The absence of pine, fir, and spruce, even in the higher parts, is very striking, and conifers generally are very rare, though there are some yews, cypresses,[27] and junipers.[28]

[1] *Vitis* spp.
[2] *Periploca graeca.*
[3] *Rubus* sp.
[4] *Hedera* sp.
[5] *Alnus* sp.
[6] *Diospyros lotus.*
[7] *Gleditschia caspica.*
[8] *Prunus divaricata.*
[9] *Acer laetum* and *A. insigne.*
[10] *Pterocarya fraxinifolia.*
[11] *Buxus sempervirens*
[12] *Crataegus* spp.
[13] *Ruscus hyrcanus.*
[14] *Mespilus germanica.*
[15] *Smilax excelsa.*
[16] *Fagus orientalis.*
[17] *Taxus baccata.*
[18] *Quercus macranthera.*
[19] *Carpinus schuschaensis.*
[20] Esp. *Quercus castaneifolia.*
[21] *Celtis australis.*
[22] *Acer laetum* and *A. insigne.*
[23] *Alnus subcordata.*
[24] *Pyrus* spp.
[25] *Paliurus spinachristi.*
[26] *Punica granatum.*
[27] *Cupressus* spp.
[28] *Juniperus* spp.

The closed montane forest extends up the northern slopes of the Elburz proper to between 7,000 and 8,000 feet before being replaced by brushwood. Trees more or less equally characteristic of all altitudes in the forest zone are oaks,[1] oriental beech, and maples. The upper parts, indeed, are only distinguishable from the lowland forest by the reduction in numbers or absence of Caucasian wing-nut, date-plum, nettle-tree, Christ's thorn, pomegranate, and certain other trees and shrubs. The brushwood belt is largely composed of the same species as the upper parts of the closed forest, but so reduced in size as to give a very different appearance. The typical sequence is frequently modified, especially in the valleys. Thus in the Chalus valley the lush forest extends up to only about 1,000 feet; cypress[2] communities then follow up the steep slopes; the forest becomes of the brushwood type at about 1,650 feet, and at 2,300 feet the valley becomes narrowed to a gorge and is without forest over wide stretches; at about 3,300 feet shrubs again appear, but cease just under 8,000 feet. A similar modification is found in the Talar valley farther east (photos. 153, 154). Though it is uncertain to what extent the upper forest limit has been lowered by human activities, there appears to be a marked correlation between this limit and the cloud layer.

The Elburz Chain: Southern Slopes

The northern lower and middle slopes of the Elburz are clothed with the Hyrcanian forest as already described. Above about 8,000 feet the brushwood is replaced by thorn-cushion and herbaceous or sub-shrubby mat communities. The southern slopes, however, have a totally different appearance from the northern, and are characterized by either the absence or the very local occurrence of dense natural forest, by the presence of open plant communities, and, in general, by a flora of different species of herbs, low shrubs, and sub-shrubs. But while the vegetation is inconspicuous, with some exceptions in the spring and early summer, the flora is rich in species, many of which are known only from these mountains. There is no conspicuous division into different vegetational zones, but the open communities, sometimes designated 'steppe' but better termed 'semi-desert', reach an altitude of 10,000 feet on the mountain peaks, with changes in species but with little or no change in general appearance (photos. 157, 158). Thorn-cushion species, which are so characteristic of oriental mountains, increase with altitude, but they appear in scattered form as low as 5,000 feet.

[1] Esp. *Quercus castaneifolia.*

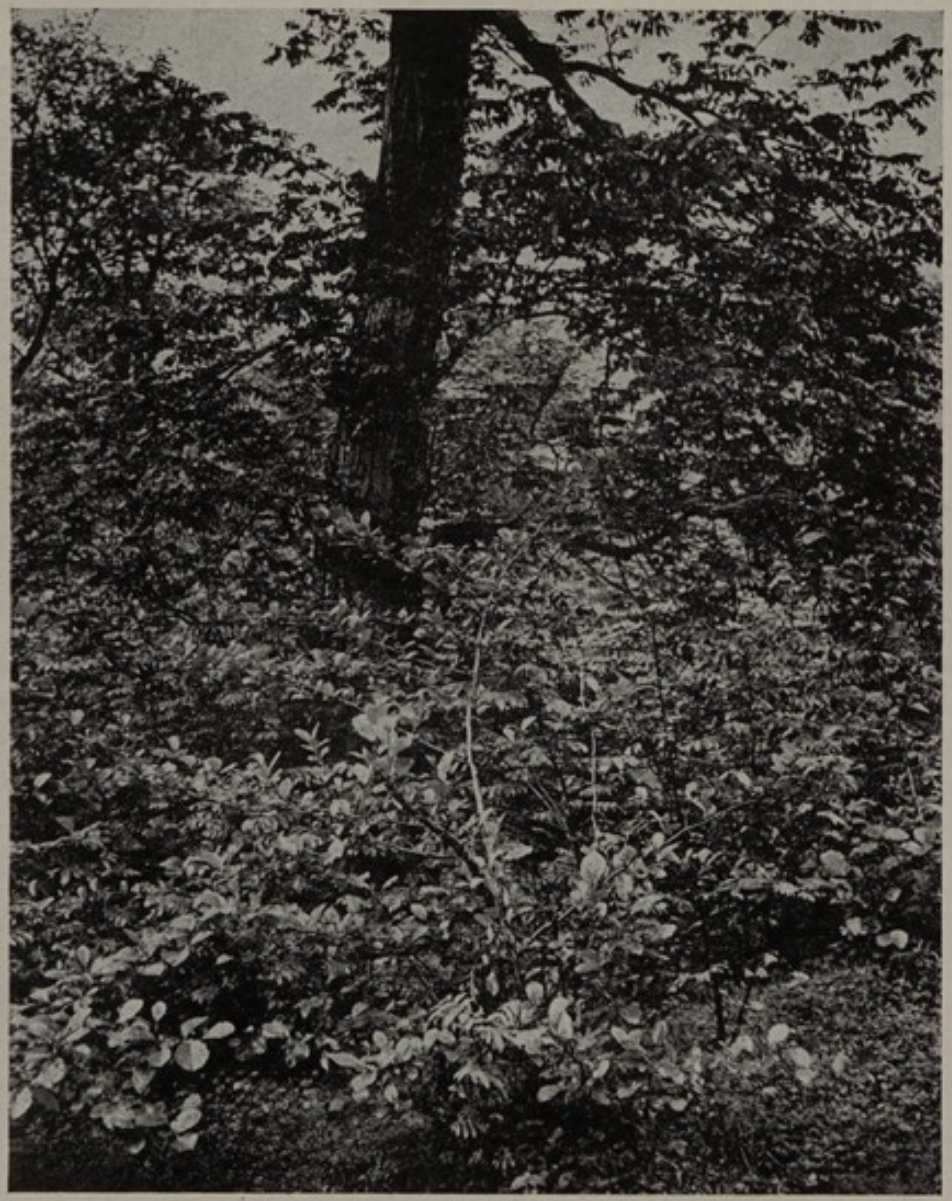
[2] *Cupressus sempervirens.*



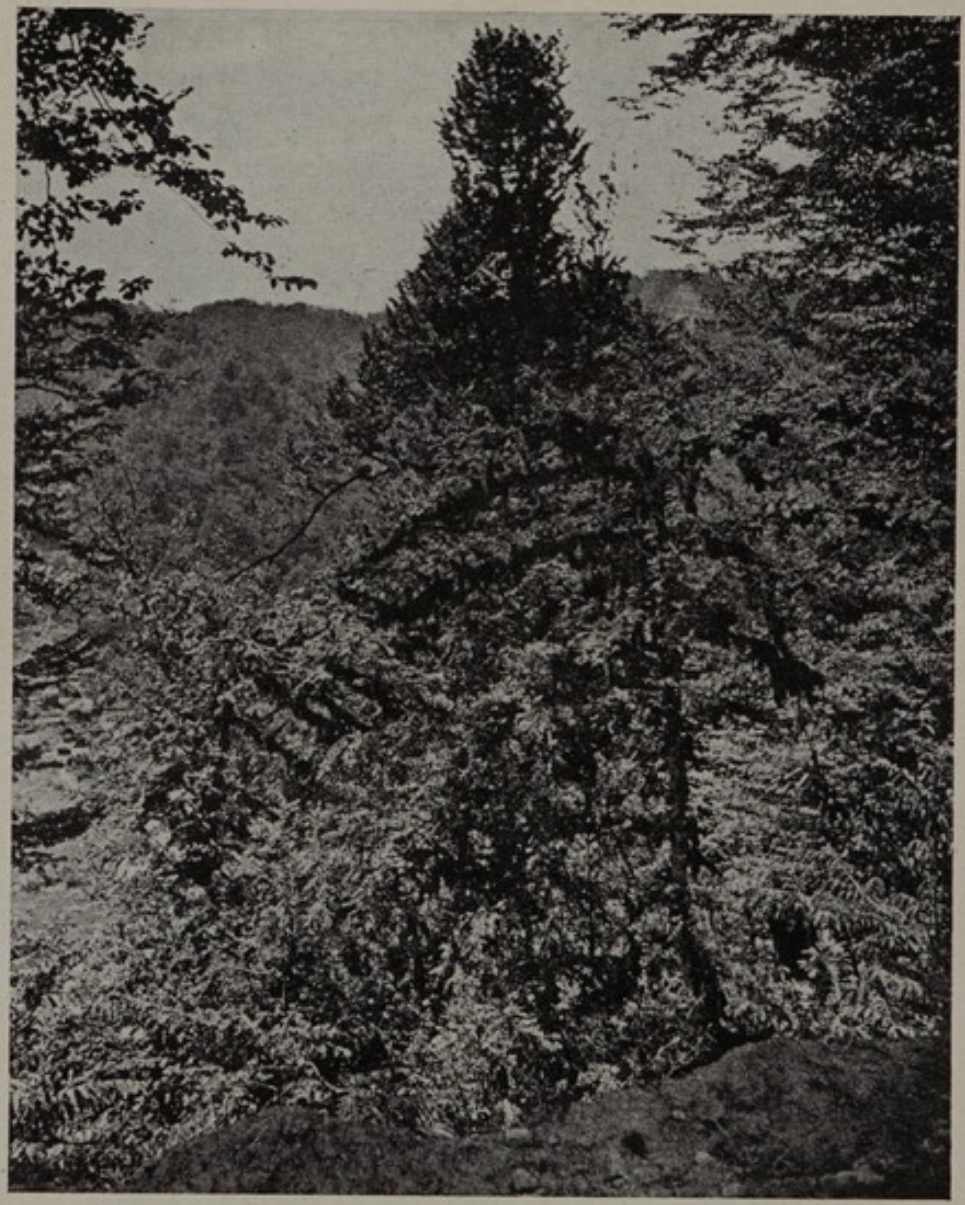
153. *Woodland, brushwood, and clearings in the Chalus valley, northern slopes of the Elburz. Alt. c. 1,650 feet. August 1937*



154. *Woods of witch-hazel (Parrotia persica) with Albizzia julibrissin in the Talar valley below 1,000 feet. August 1937*



155. *Alder (Alnus subcordata) and Caucasian wing-nut (Pterocarya fraxinifolia) in the lower montane zone near Resht. May 1937*



156. *Box, witch-hazel, oak, and Caucasian wing-nut in the Chalus valley. Alt. c. 1,000 feet. August 1937*

Apart from the rare occurrence of a juniper[1] and of poplars and willows along some rivers there are no trees. From a distance the slopes give the impression of bare desert. The few shrubs, such as turpentine bush,[2] buckthorn,[3] honeysuckle,[4] and milk-vetches,[5] do not appear prominent in the landscape because of their low growth and scattered occurrence. Yet, closer examination shows that these slopes have a surprising number of dwarf shrubs and perennial and annual herbs, especially members of the daisy, labiate, crucifer, pink, pea, and umbellifer families. Some of these have brilliant flowers and may for a short time add colour to the landscape. Probably the genus richest in species, not only on the southern slopes of the Elburz mountains but in Persia outside the Caspian provinces, is that of the milk-vetches (*Astragalus*), which shows an enormous variety in form and structure. Some of the species are delicate annual herbs, others tall-growing perennials; some are spiny dwarf shrubs, others make prickly tufts or compact hemispherical cushions, while there are desert species with entire fleshy leaves. The fruit is equally varied. The most striking habit, and one of the commonest in Persia, is that of densely tufted spiny cushions (conveniently referred to as thorn-cushions). These thorn-cushion milk-vetches are low-growing shrubs whose leaf axes persist, become woody, and very sharply pointed, and are often so tightly packed as to give the appearance of a mass of spines. That this thorn-cushion habit is well suited to the climatic conditions of the southern slopes of the Elburz mountains, and to many other parts of Persia, is further shown by its development in species of other genera, such as *Onobrychis* (the sainfoin genus, which like the milk-vetches belongs to the pea family), *Acantholimon* (a genus of the sea-pink or sea-thrift family), and *Acanthophyllum* (a genus of the pink family). Although the structural details of these plants are different, some at least of their species make compact, low-growing, spiny or prickly masses or cushions which withstand drought and are avoided by grazing animals, and which form a very marked feature of the open vegetation of Persian hills and mountains.

The quantity of plant species of the southern face of the Elburz mountains is partly due to the great variety of outcropping rocks and the varied types of soil and substratum produced by them. The range of soil reaction, however, is apparently small and most of the soils are nearly neutral or very slightly acid. The diversity of surface form is

[1] *Juniperus macropoda.*
[2] *Pistacia mutica.*
[3] *Rhamnus pallasii.*
[4] *Lonicera nummularifolia.*
[5] *Astragalus* spp.

another factor increasing the number of types of habitats for plants, since the slopes, ridges, rock-outcrops, valleys, and gorges all influence local conditions, as do also altitude, winds, the drainage from melting snow, and the occurrence of springs. As in most other parts of Persia water is the principal limiting factor, at least below about 8,000 feet. The duration of winter is very different according to altitude and in the higher parts lasts seven months. Then comes the melting of the snow and for a short time there is abundance of water and high air humidity, followed by the drought of summer.

Besides the thorn-cushion plants only a few other representatives of the flora can be mentioned here. A very peculiar member of the pink family is known as *Gypsophila aretioides*. It makes blue-green, stone-hard cushions, about 10 inches tall and 2 ft. 8 in. in diameter, composed of innumerable columnar stems very closely compacted and producing small, white, inconspicuous flowers (photo. 160). The tufts are so hard that they can only be hacked apart with an axe. A spiny barberry[1] and dwarf almonds[2] are included among the low-growing shrubs of the Elburz. Thyme[3] is locally abundant and more nearly dominates some communities than any other species, for a common characteristic of the vegetation is the mixture of species rather than the dominance of one or a few over considerable areas. It is somewhat unexpected that succulents are extremely rare. A species of pennywort[4] is one of the few representatives of this habit group occurring in the Elburz mountains.

Northern Khurasan

East of the Caspian the rainfall diminishes and the Caspian forests gradually disappear. Much of north-eastern Persia has the same semi-desert appearance of so much of the country round the rim of the central depression. The following zonation, recorded for the mountains on the Russo-Persian border, is probably fairly typical for much of the province apart from the desert areas south of the Damghan–Meshed road. The lower-lying parts have a mixed vegetation, where water is sufficient, of grasses and other herbs with some shrubby plants. 'Steppes', often dominated by species of wormwood (*Artemisia* spp.), cover large areas of the hills. Many thorn-cushion plants are associated with the wormwoods (photo. 159). Still higher there is a zone of grass steppes with a great variety of herbs. Above

[1] *Berberis densiflora.*
[2] *Amygdalus spartioides* and other species.
[3] *Thymus kotschyanus.*
[4] *Umbilicus sempervivum.*

these herbaceous areas juniper woodland may be developed before the highest mountain zone of semi-desert nature is reached.

The hill country to the north-east of the Great Kavir, the foothills of the southern slopes of the eastern Elburz, have the same general flora and vegetation as recorded for the Elburz proper. Where water is available, or made available, there are fields, gardens, and orchards, but most of the country is relatively barren. On the borders of the desert tamarisk bushes are sometimes numerous, as are also those of the cottager's tea-plant.[1] The scattered saline areas have a vegetation of plants specially adapted to withstand salt; this halophytic vegetation occurs not only in the lower parts but also in the hills. It varies a great deal, in part according to the concentration of salt in the substratum and ground water. Members of the goosefoot family (Chenopodiaceae) are very numerous in genera, species, and individuals. Some of these are annual herbs but others are perennial shrubs or sub-shrubs, these latter occurring especially when the ground is hummocky. Most of these chenopods have fleshy leaves or are nearly leafless with succulent stems. They usually bloom in the late summer or autumn, but the flowers are rarely conspicuous, though the fruits are often beautifully shaped and coloured. The general appearance of chenopod communities is of a bright green or bluish-green 'meadow' when growing, though they tend to become straw-coloured as the plants pass into the fruiting stage. Many of the species are peculiar to Persia, but others show connexions with central Asia or even with Arabia and Egypt.

In the more arid parts, besides the salt-withstanding vegetation, there is a meagre flora on sand wastes, sand-dunes, and stony areas. In these semi-desert conditions the sparse vegetation becomes relatively important, and a few members must be mentioned. The camel-thorn,[2] a much branched spiny shrub of the pea family, not only provides grazing for camels but also has a honey-like sap which exudes and hardens into small brownish lumps known as *manna*. In a good manna year, which occurs about one year in five, a handful of manna can be collected from a single shrub. Another legume of importance is a branched perennial herb, known as *Goebelia* (or *Sophora*) *pachycarpa*, with white flowers in dense spikes; it is widespread in north-eastern and eastern Persia. There are milk-vetches, spiny convolvuluses, wormwoods, thistles, and thistle-like plants of many genera (especially species of *Cousinia* and *Echinops*), figworts (*Scrophularia* spp.), and umbellifers (such as species of *Dorema*,

[1] *Lycium barbarum.* [2] *Alhagi camelorum.*

yielding an ammoniacal resin, *Ammodendron*, *Zozimia*, *Scorodosma*, with stems used as fuel and umbrella handles, and *Ferula*). Locally a shrub, with whitish branches, growing 3 or 4 feet tall, and known as *Zygophyllum atriplicoides*, is very conspicuous, as are also tall perennial herbs of the labiate genus *Eremostachys*, and a member of the spurge-laurel family, with the name *Stellera lessertii*.

Villages and towns are usually surrounded by fields, gardens, orchards, and plantations. Where water is available for irrigation rich crops can be grown, for in many parts both temperature and soil conditions are suitable for plant-growth and water is the only limiting factor apart from salt accumulation. In the south, as in the Tabas district, there are date and orange groves, as well as figs and pomegranates.

In places in the eastern hills on the Afghanistan border there are brushwoods and low open woods with a species of the turpentine-tree genus,[1] wild almonds,[2] and a barberry.[3]

North-west Provinces

The province of Azerbaijan, apart from some of the higher mountains, possesses the same general features as many other parts of the Persian plateau, in the sparseness of its vegetation, in the scarcity or strict localization of tree and shrub communities, and in seasonal aspects. The flora, however, is different since its closest affinities are with Transcaucasia and Armenia to the north and north-west and not with central and southern Persia. The soil is fertile but produces little unless irrigated. The greater part of the country presents a desolate and barren appearance, mainly because of the absence of forest and brushwood and the very open nature of any herbaceous vegetation. Most of the land has to be described as semi-desert merging at best into some open kind of steppe, if this term be used in a wide sense. It is only in the well-watered localities and at the higher altitudes that anything approaching luxuriant wild vegetation can be found. Orchards, often enclosed in mud-brick walls, are, however, a great feature of the country. The trees most commonly planted are almond, apricot, peach, plum, *Elaeagnus angustifolius* var. *orientalis*,[4] and, along the water channels, willows,[5] poplars,[6] and

[1] *Pistacia* sp.
[2] *Amygdalus* spp.
[3] *Berberis* sp.
[4] Turki *ida*, Persian *sindjif*, sometimes known as 'Persian dates'.
[5] Esp. *Salix fragilis* and *S. medemii*, the latter known as *bid-i-Mishk* or 'musk willow'.
[6] *Populus euphratica*.

small-leaved elm.[1] Many arable crops are associated with the orchards. Under and between the fruit-trees are sown wheat, barley, rye, cotton, or quite frequently the whole space is sown with sainfoin,[2] with some hemp, castor-oil plants, and sesame.[3]

Soil differences apparently occasion differences in the vegetation, though it is not possible to say how constantly the vegetation and soil types are correlated over the whole district. In the semi-desert parts, on ground with a loose upper layer (volcanic ash on various slopes) annual plants dominate a seasonally short-lived vegetation; on firm ground (gypsum slopes, limestone, and Tertiary conglomerate) perennials are dominant.

The winter is long and cold and is a resting period for plant-life. Spring growth commences about 21 March (the Persian New Year) with the flowering of dwarf irises[4] on the hills around Tabriz. By June the spring and early summer flora is at its best. While there are large stretches with a very meagre low plant-cover, the landscape, especially in ravines and depressions, is broken by colonies of mullein,[5] enormous clumps of golden yellow *Phlomis armeniaca*,[6] of yellow-flowered *Onosma*, of white-flowered sage,[7] and of a white or pink member of the pink family with prickly leaves;[8] there are brilliant tufts of thyme[9] and a dark-blue borage,[10] carpets of bright yellow skullcap,[11] long-stalked rosettes both of a ruby-coloured everlasting flower,[12] and of a violet-flowered germander[13] and large patches of a pink-purple woundwort[14] with silvery grey foliage. Where small cornfields occur in the neighbourhood of rich vegetation sheep are excluded till after the harvest; they are then turned on to the stubble and wandering over the surrounding areas soon leave little or nothing of the varied herbaceous vegetation save poisonous or unpalatable plants. On the wind-swept ridges separating ravines are clumps of the white, cream-coloured, or pink flowers of a member of the pink family known as *Allochrusa persica*. In July large purple thistles[15] provide a little colour on the hills, after which all is grey-brown and sunbaked until autumn or late autumn when various chenopods break the monotony with their crimson, ruby-coloured, or orange infructescences, and a few

[1] *Ulmus glabra.*
[2] *Onobrychis viciaefolia* var. *persica.*
[3] *Sesamum indicum,* locally known as *kundjid.*
[4] *Iris persica* and *I. reticulata* var.
[5] *Verbascum speciosum.*
[6] Var. *subcordata.*
[7] *Salvia sahendica.*
[8] *Acanthophyllum squarrosum.*
[9] *Thymus kotschyanus.*
[10] *Moltkia caerulea.*
[11] *Scutellaria pinnatifida.*
[12] *Helichrysum eichwaldii.*
[13] *Teucrium orientale.*
[14] *Stachys inflata.*
[15] *Onopordon heteracanthum.*

plants of a bright violet broomrape[1] appear on the edge of ploughed patches. Water is always the limiting factor in summer, both to the development of natural vegetation and to the cultivation of crops. Around the mouths of wells which lead to the artificial underground water-passages (*qanats*) are delicate plants of a crucifer.[2]

The flora and vegetation of the mountains in north-western Persia are, to a considerable extent, distinct from those of the hill and plateau country. Thus the flora around the Yam pass, on the Tabriz–Julfa road, and on the Kuh-i-Mashu (or Mashu Dagh) differs in many respects from that in the vicinity of Tabriz. North of Sufian the landscape changes rapidly. Green meadows appear in the Aras basin, and interspersed with the more typically Persian flora are to be found plants common in Europe, such as purple loosestrife,[3] marsh orchids, and selfheal.[4] Round Yam itself and in the mountain meadows and damp grassy places on Mashu Dagh the grass of Parnassus[5] occurs plentifully, and in the higher reaches of the mountain the common juniper[6] is abundant. The more oriental plants of the Yam and Mashu area are also different from those of the lower districts and include a number of plants whose known distribution is limited to this area (endemics), such as *Astragalus mishouensis*, one of the milk-vetches. The flora of the Sahand volcano to the south of Tabriz is rich and also contains many endemics, but there are no modern accounts of its vegetation, nor of other high mountains, such as Savalan Dagh, in this district.

The great salt-lake of Urmia has many streams running into it (p. 50). These are often lined with poplars and willows, and provide water for irrigation. In fact, parts of the Urmia plain are heavily cultivated. Gardens and vineyards, also flax, cotton, rice, tobacco, melons, and the opium poppy, do exceedingly well in the rich black alluvial soil. Castor-oil plants grow 7 or 8 feet high. The lake itself contains an abundance of microscopic plankton and fluctuates greatly in area seasonally and from year to year. Islands in the lake have walnut-trees[7] and a kind of steppe vegetation with wormwood and other plants. Animals are sometimes pastured on them. The lower marshy parts around the lake are said to 'exhibit rank growth of rushes and blue irises', while the country farther from the water is described as 'a thistle-covered steppe'. In the spring and early summer the

[1] *Orobanche aegyptiaca.*
[2] *Aethionema arabicum.*
[3] *Lythrum salicaria.*
[4] *Prunella vulgaris.*
[5] *Parnassia palustris.*
[6] *Juniperus communis.*
[7] *Juglans regia.*

lower hills in the Urmia district are gay with white and pink crocuses, irises, and many other flowers, but by August these have all disappeared and the most conspicuous plants are large blue thistles, dwarf yellow hollyhocks, yellow-green spurges,[1] and yellow everlastings[2] with here and there a few daphne bushes. On the mountains west and north of the lake are the remains of 'forest', mostly a scrub of small trees or bushes, widely scattered, from 15 to 20 feet high. The commonest woody plants are oaks,[3] almond,[4] plum,[5] small-leaved maple,[6] hawthorn,[7] ash,[8] poplars,[9] and *Zelkova*. The most important 'forest' is that of Sardasht, officially stated to be 300 square miles in area. Oaks, yielding galls and acorns of economic importance, are the principal trees. Since gum tragacanth, derived from various species of *Astragalus*, is also an important export it would appear that the woodland is very open or discontinuous. In some of the hill valleys there are pasture-lands which provide bush herbage in May and June but have a short growing season. Under heavy grazing and the hot summer sun, the pasturage quickly dries up and disappears and there is said to be little herbage left by July. These pastures are mainly used by nomadic tribes from Turkey and Iraq. Near springs and streams and where marsh develops locally the vegetation is more permanent.

South-west and West-central Persia

Precise details of the vegetation of many parts of the Zagros are lacking. This applies in particular to the middle courses of such rivers as the Saidmarreh, Diz, Karun, and Rud Shur, where travel for scientific purposes has always been difficult. Much more is known of conditions on the high plateaux near the headwaters of such rivers, as for instance around Kermanshah, in the enclosed basins of Niriz and Shiraz, in the Qum–Masileh catchment (particularly around Hamadan), and in the two belts of inland basins from Isfahan to Sirjan, and from Kashan to Yezd and Kirman, along which have passed the most frequented routes for many years. Though these last have been included geographically as part of the central basins, it is better, in the present state of botanical knowledge, to treat all these high plateaux as one area, bearing in mind the differences in climate

[1] *Euphorbia* spp.
[2] *Helichrysum* spp.
[3] *Quercus* spp.
[4] *Amygdalus communis*.
[5] *Prunus* sp.
[6] *Acer* sp.
[7] *Crataegus* sp.
[8] *Fraxinus* sp.
[9] *Populus* spp.

and the increasing salinity of water towards the basin sumps, which must create differences in vegetation.

The general appearance of the landscape throughout this area is of more or less barren rocky or stony semi-desert. Exceptions to this generalization are local and striking by contrast. Trees are limited to remains of former forests in some of the valleys and on occasional slopes, to the margins of watercourses or springs, to gardens and orchards, and to towns and villages. The hill-forest remains are mostly composed of oak scrub. Along the rivers and usually associated with villages and towns are small plantations of the Euphrates poplar[1] and occasionally the white poplar,[2] of willows[3] and of *Elaeagnus angustifolius*.[4] At Kermanshah such plantations are treated by well-devised forestry methods. The fastest growing poplar poles are removed when they have reached a height of 25 to 30 feet and a diameter of about 9 inches in 14 to 15 years. Thus the commercially mature plantation, at the age of about 20 years, consists of a fine stand of straight trunks from a foot to 18 inches apart in the woods. A series of age classes maintains the supply. Such trees help to meet the demand for timber, needed especially in the construction of the flat roofs for Persian houses. Oriental planes or chenars[5] occur near some watercourses and springs or in gardens, and occasionally even on roadsides. Walnut-trees, sometimes reaching enormous dimensions, are also found where water is sufficient. Moreover, closer examination of the apparently rocky ground often reveals a rich and varied flora of low shrubs, sub-shrubs, and herbs, usually in open communities but sometimes making a gay cover in spring. There are areas, particularly in the inland basins, which have to be designated desert, but these are far less extensive than in the kavirs farther east, or in eastern and south-eastern Persia.

The plateaux and mountainous country have mainly plants adapted to dry conditions (xerophytes). There are thorn-cushions of *Acantholimon* and *Astragalus*, members of the sage group (*Salvia* and other labiate genera) which are often aromatic, wormwoods (*Artemesia* spp.) and numerous kinds of thistles. Special mention must be made of plants with perennial underground modifications of stems which both perpetuate the species and serve as food reservoirs during the unfavourable season, whether the summer with its drought or the winter with its low temperatures. In the Persian flora there is a high pro-

[1] *Populus euphratica.*
[2] *P. alba.*
[3] *Salix* spp.
[4] Locally *sangit.*
[5] *Platanus orientalis.*

portion of these earth-plants (geophytes). Many of them flower in the spring and then die down entirely to below ground-level; a smaller number are autumn flowering. Typical examples are: bulbous plants like tulips, onions, fritillaries, grape-hyacinths, and star-of-Bethlehems; rhizomatous plants like irises; cormous plants like crocuses, gladioli, and autumn crocuses; and root-tuberous plants like orchids. Some of these occur in quantity and for a short period cover quite large areas with brightly coloured flowers. Other plants found growing among the rocks and stones of the hills and plateaux include species of *Dionysia* (a genus of the primrose family, with the plants often forming compact tufts), gentians,[1] convolvuluses,[2] bell-flowers,[3] primulas,[4] umbellifers,[5] poppies,[6] crucifers,[7] spurges,[8] and composites.[9]

In the summer when the majority of the herbs have flowered, set their seed, and died or died down, numerous thistles and thistle-like plants may flower. These can withstand the drought and are protected by abundance of prickles from the ravages of herbivores, even of Persian sheep and goats. The importance of thorn-cushions in the Persian landscape has already been noted. Prickly and spiny plants are, indeed, a marked feature in Persian vegetation. It has been estimated that there are between 500 and 1,000 species of such in the flora, ranging in habit from trees (as some hawthorns and wild pears), through numerous shrubs and sub-shrubs, to herbs. These belong to many different botanical groups, their armature varies widely in structure, and they occur in various habitats, but particularly in those in which the water-supply is sparse but not entirely absent or saline.

In many parts of Persia there are areas where the ground or ground-water is more or less permeated with salt. While such saline stretches are commoner and more extensive in east-central, south-eastern, and eastern Persia than elsewhere, they are by no means rare in the west-central provinces and in these they frequently carry a characteristic vegetation. Here species of tamarisk, flowering in April, may form prominent communities. There are also chenopods (members of the beet family, such as *Anabasis*), camel-thorn (*Alhagi*), species of *Calligonum* (a genus of the bistort family), and *Peganum harmala*, a plant whose seeds yield turkey-red.

Even on the west-central Persian plateaux there are communities

[1] As *Gentiana olivieri*.
[2] As *Convolvulus leiocalycinus*.
[3] As *Campanula incanescens*.
[4] As *Primula capitellata*.
[5] As *Ferula oopoda*.
[6] *Papaver* spp.
[7] *Hesperis* spp. and species of many other genera.
[8] *Euphorbia* spp.
[9] *Senecio, Achillea, Anthemis*, etc.

of trees and shrubs, often degenerate and very open as a result of abusive exploitation, but nevertheless indicating that but for man the country would have a much less barren appearance. Thus oak[1] forms open forest south-west of Shiraz, and nettle-trees[2] are characteristic of some of the higher moister valleys. In the neighbourhood of Kirman the slopes of the mountains are sprinkled with a scanty 'jergeli' vegetation consisting of scattered shrubs or trees of fig[3] up to 9,500 feet, various kinds of almond,[4] Persian bladder-senna,[5] daphne,[6] honeysuckle,[7] hawthorn,[8] maple,[9] turpentine tree,[10] buckthorn,[11] cotoneaster,[12] and joint-fir.[13] Very similar sparse woodland also occurs between Kirman and Shiraz and no doubt elsewhere.

As an example of the vegetation and flora of the higher mountains, those of the Kuh-i-Alwand, south of Hamadan, may be briefly described. From Hamadan to the foot of the mountain there are vineyards and orchards of apricot, cherry, and plum, and in spring and early summer the hedges are ablaze with a golden-flowered briar[14] with blooms 3 inches across. This ascends also in clumps and tangles to about 7,500 feet and amongst the briars grows a tall arum.[15] The slopes of the mountain are rough and have only scattered thorn-cushions and other drought-resisting plants, except near watercourses where the flora is different and the vegetation occasionally even lush. One reason for the general poverty of the vegetation is the large number of sheep and goats grazed throughout the summer on the mountain slopes; very little has escaped their ravages by the end of the season except such species as have protective armament. Above about 9,800 feet there are areas of green turf with primulas,[16] buttercups,[17] tormentils,[18] and tulips. The bulbs of the tulips are grubbed out for food by wild boars as are also the tubers of *Corydalis verticillata*. On the top slopes of the mountain, which rises to nearly 12,000 feet, there are mats and cushions of milk-vetches and species of *Acantholimon*. Everywhere in the moist sand at the crest there grow plants of a member of the pink family, known as *Minuartia hirsuta*. A little lower down there are very dwarf gnarled clumps of a cherry[19]

[1] *Quercus persica*.
[2] *Celtis transcaucasica*.
[3] *Ficus carica*.
[4] *Amygadalus* spp.
[5] *Colutea persica*.
[6] *Daphne acuminata*.
[7] *Lonicera nummularifolia*.
[8] *Crataegus azarolus*.
[9] *Acer canescens*.
[10] *Pistacia* sp.
[11] *Rhamnus* sp.
[12] *Cotoneaster nummularia*.
[13] *Ephedra* sp.
[14] *Rosa foetida*.
[15] *Arum conophalloides*.
[16] *Primula auriculata*.
[17] *Ranunculus elbrusensis*.
[18] *Potentilla* spp.
[19] *Prunus microcarpa* var. *tortuosa*.

with masses of pink flowers. Amongst the rocks of tumbled granite and growing in the loose sand at the rock bases occurs another rose,[1] with pure white flowers about 2 inches across and very abundant, but the whole plant does not exceed a foot in height above the ground.

Zagros Foothills

The foothills on the Perso-Iraqi border are markedly desolate in many parts. The lower sandhills have little or no vegetation and the rocky hills beyond them eastwards and northwards have little soil except in occasional depressions and in crevices. The low-growing shrubby and herbaceous vegetation, however, though of a very open and even widely scattered type, is composed of a considerable number of species, many of which have beautiful flowers. Here and there are sparse scrub-forests of oaks providing acorns for use instead of flour (p. 352). These gnarled oak forests have, in part, been preserved because they are considered to be sacred groves. One of the most beautiful plants of the hills of western and central Persia is the Persian wild rose,[2] which grows on slopes, along ditches, and in ploughed land. It is kept low by constant cutting for fuel and gives a first impression of a cistus with rather large golden flowers having a red-chocolate blotch in the centre. Bread baked on the hot ashes of rose fuel is said to be the best flavoured. Bales upon bales of the prickly bushes are collected annually.

Plains of Khuzistan

The lowland north of the Persian Gulf, with Ahwaz near its centre, has many rivers, streams, and marshes (p. 83). In spring everything is green, except where patches of white reveal the underlying gypsum. By August everything has turned brown except plantations and orchards, some scrub, and areas of reeds. Along the Shatt al Arab date-plantations flourish and much of the plain country furnishes pasture for flocks and herds till these are moved up into the mountains in April.

Persian Gulf Coast

Very few investigations of the vegetation along the coast of Persia have been made. The salinity of the waters of the Gulf is high and the nature of the bottom, often sandy or muddy, is frequently unfavourable to marine plant-growth. Where there are rocks or coral reefs, as

[1] *Rosa elymaitica* var. *albicans*.
[2] *Hulthemia berberidifolia*, or sometimes called *Rosa persica;* Pers. *varek*.

for example south of Bushire, there are zones of seaweeds (marine algae), the zonation being well marked in correlation with depth and exposure at low tides. The land vegetation along the coast varies with the substratum, but is often very meagre and even desert-like. In places towards the north there are good date-groves and fruit-gardens of oranges and pomegranates. Tamarisks and tamarind also grow well. Towards the south-east the level parts are covered with coral-sand and reaches of rock, all with a sparse plant-growth at best; behind the foreshore there are sometimes sand-dunes with a scanty low scrub, and in between them patches of rushes. The sandy and stony strand near Bandar Abbas has a poor vegetation, but it includes a fairly large number of legumes and grasses; near the coast, acacia and the small crown-of-thorns tree or shrub[1] are almost the only woody plants, apart from date-palms and trees in local gardens and orchards, and some dwarf shrubs and sub-shrubs (photo. 122).

East-central, Southern, and Eastern Persia

This area includes the greater part of the Lut (Great Kavir and Southern Lut), the Jaz Murian basin and Persian Makran, and the Eastern Rim and Frontier Lowlands. The landscapes of these arid regions have been already described; they include considerable areas of true desert and much semi-desert. Most of the drainage is to inland basins, rainfall is low, evaporation excessive. As a consequence, not only climatic but soil conditions are, over great stretches of country, most unfavourable to plant growth. Many of the depressions have accumulations of salt, salt-encrusted *kavir*, or salt-saturated water. At best the only plants which can grow in such habitats are those structurally and functionally adapted to withstand high concentrations of salt water (halophytes). The flora has therefore a high proportion of halophytes and xerophytes (drought-withstanding plants), the former associated with salt-marsh, the latter with stony and rocky slopes or with sandy stretches and sand-dunes, as, for instance, in Persian Makran. With only local exceptions the vegetation is low, open, and of little or no economic value. Land can only be cultivated in patches where fresh water can be obtained by irrigation, occasionally from mountain streams or rare springs, but more often by tapping underground supplies by wells and *qanats*. In irrigated districts orchards and gardens with oranges and other citrus fruits, pomegranates, &c., flourish, and arable crops of wheat, barley, sesame, and

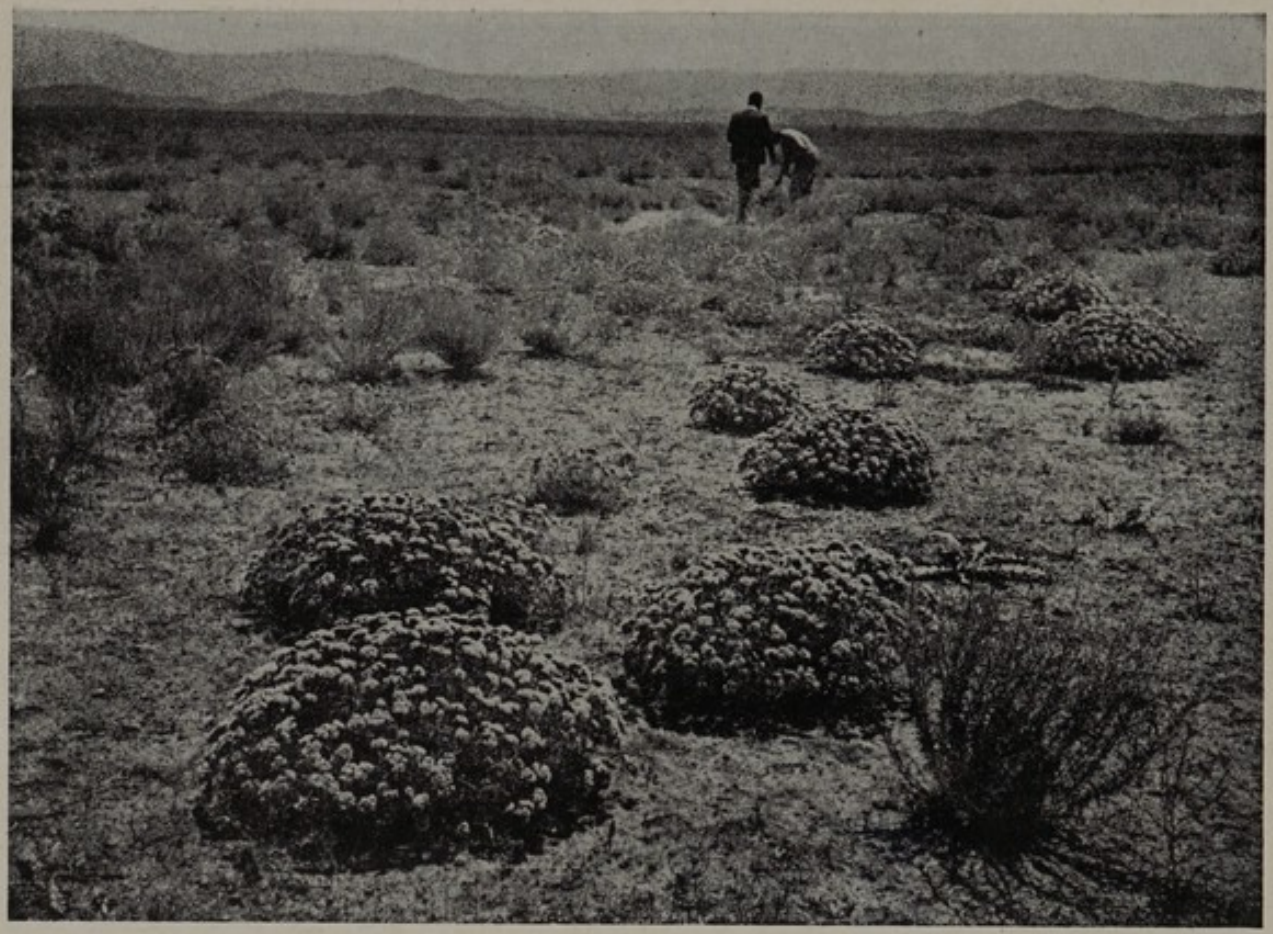
[1] *Zizyphus spinachristi.*



157. *Northern slopes of the Kandavan pass. Chalus road, Central Elburz. Alt. c. 9,200 feet. May 1937*



158. *Southern slopes of Kuh-i-Dasht above Karaj, west of Tehran. Alt. c. 6,200 feet. May 1937*



159. *Thorn-cushions of Acanthophyllum elatius in the 'wormwood steppe' south of Fariman. Khurasan, July 1937*



160. *Gypsophila aretioides, a hard cushion-plant of the pink family, on the rocks of Firuz Kuh, southern slopes of the Elburz. Alt. c. 6,200 feet. June 1937*

opium are grown. In many of the oases there are palm-groves, under which, and especially along the irrigation canals, there often develops a rich herbaceous and sometimes even shrubby vegetation. Among the herbaceous weeds are species of vetch, melilot, sea-heath, buttercup, mallow, pimpernel, spurge, and various grasses.[1] Along the watercourses grow scented oleander,[2] reeds, a tall asclepiad,[3] a mimosa-like plant known as *Prosopis stephaniana*, and a member of the bistort family, known botanically as *Pteropyrum aucheri*, with the Persian name of *piarend*.

It is probable that a floristic boundary has to be drawn in eastern Persia between the southern portion and the northern portion somewhere through the Great Kavir. To the north of this the flora is more nearly related to that of the Aralo-Caspian basin and to the south to the widely ranging Saharo-Sindian flora. Another floristic boundary may run more or less north and south about the longitude of Yezd. Both boundaries are most likely very irregular and rather of the nature of broad belts than well-defined lines.

In the inner Persian desert and semi-desert areas the most striking feature is the wide districts without plant life. The more northern parts lie at about 3,000 feet and in the south at about 1,200 to 1,500 feet, and even lower. Some are encrusted with salt, others covered with sand-dunes both mobile and fixed. In hollows and depressions where there is salt water which is not completely saturated, a salt-marsh vegetation may develop. This is usually dominated by chenopods,[4] many of which are more or less succulent in their vegetative stages, though they often become dry and brittle as they ripen their fruits. The importance of this salt-marsh vegetation is that it provides nutritious grazing for camels, which before the coming of the motor provided the only means of transport in these regions. Amongst the salt-marsh plants are species of the several genera of the chenopod family.[5] Special mention may be made of one species known as *Haloxylon ammodendron*, since it is a striking plant of sandy saline places. Known by the Persian name of *tagh* or the Turki name of *saxaul*, it grows as a shrub to 10 feet high and is frequently covered with almost cone-like galls caused by insects. Another important

[1] *Vicia, Melilotus, Frankenia, Ranunculus, Malva, Anagallis, Euphorbia, Lolium, Brachypodium*, etc.

[2] *Nerium odorum.*

[3] *Calotropis procera.*

[4] Members of the Chenopodiaceae family, to which beet and samphire belong.

[5] *Atriplex, Kochia, Halopeplis, Suaeda, Bienertia, Haloxylon, Salsola, Girgensohnia, Anabasis, Halocharis, Cornulaca*, and others.

family well represented in saline habitats is that of the bean-capers,[1] many of which also have fleshy stems and leaves and are represented by the genera *Fagonia* and *Zygophyllum*. The wormwoods (*Artemisia* spp.), belonging to the daisy family (Compositae), are important constituents of both salt-marsh and semi-desert communities. Different species grow in the saline substrata as halophytes or on sandy or stony ground as xerophytes.

Where sand has been piled up as dunes, vegetation may be entirely absent if the dunes are in a state of mobility through continued wind action. Where there is some stabilization of the dunes an open vegetation of xerophytes can become established and is itself an important factor in stabilization. Species of wormwood are most important constituents of these communities, which occur also on the dry stony rubble and talus slopes of hills surrounding the desert areas. Hollows between stabilized sand-dunes sometimes have patches of relatively lush vegetation, as here a freshwater table may be near the surface. Tamarisks, *Haloxylon*, and *Calligonum* spp.[2] may form quite dense thickets in such places.

In many places especially near the desert margins, a varied and fairly rich flora of small annuals may develop in the early spring or immediately after any sufficient fall of rain. These annuals are better termed 'ephemerals' because their seeds germinate, the seedlings grow, flower, and themselves set seeds all in the period of a few weeks. The plants then shrivel, die, and disappear to powder. This ephemeral flora, which in many ways is similar to the *acheb* of the Sahara, is particularly well developed near foothills of ranges bordering desert districts.

The eastern and south-eastern highlands, attaining in the great volcano of Chihiltan in the Taftan group an altitude of over 13,000 feet, have often a richer plant-cover. Some of the valleys, particularly in northern Sarhad, are well watered and there are arable fields and orchards of apricot, mulberry, quince, and other fruit-trees. The streams are sometimes bordered with poplars, willows, ash, and other trees. Cypresses, 'Persian dates' (*Elaeagnus*), and planes also occur. The drier and more nearly barren hill-sides have scattered low maple[3] and turpentine trees,[4] mountain almonds,[5] and some others. The number of low shrubs, bushes, or sub-shrubs is sometimes surprisingly large. In addition to wormwoods there are joint-firs[6] and a

[1] Zygophyllaceae.
[2] Of the bistort or dock family, Polygonaceae.
[3] *Acer.* spp.
[4] *Pistachia khinjuk.*
[5] *Amygdalus* spp.
[6] *Ephedra* spp.

labiate known as *Perowskia*. In good seasons, in the spring, an ephemeral flora of annuals appears. It is probably dependent on winter precipitation and is soon burnt up by the sun's heat. High up in the mountains some at least of the grassy areas appear to be more permanent.

FAUNA

In the space available it is possible only to sketch briefly some of the more conspicuous mammals, birds, reptiles, and fishes; nothing can be said of the smaller forms of life. Detailed knowledge is often incomplete and much systematic work remains to be done.

Mammals

In the 'sixties and 'seventies of last century the lion—the national emblem of Persia—was far from rare in Khuzistan, the valley of the Karun, the oak-woods of Shiraz, and the wooded hills to the south and south-east of that place as far as about longitude 53° E. The village of Dashtizan, west of Shiraz, was at one time notorious for lions. They were hunted in the Niriz basin in ancient times and probably in the western inland basins, but do not seem to have extended to the central kavirs and Lut. The introduction of breech-loading rifles has doubtless caused their decrease in numbers. They are now extremely rare. A few have lingered on in the Karun: in 1908 Sir Arnold Wilson met one near Dizful, and in 1942 some Indian military surveyors are reported as having seen a female near the same place.

Hyrcanian tigers were famous in Roman wild-beast shows, and possibly they were the first shown alive in Europe. They are confined to the forests of Mazanderan. Panthers are widely distributed, and animals with pale coats have been mistaken for snow leopards which, however, are not found in Persia. The tawny-coloured jungle-cat is not uncommon in the south, less so in the north, and the desert cat is found in the drier parts in the north-east and in the south-west about the plains of Persepolis. The cheeta and caracal—a species of lynx, the *Sujah-gush* ('black ears') of the Persians—are now extremely rare, if not extinct.

The Indian wolf is found all over the country, and the jackal has likewise a wide distribution and is especially abundant in Seistan and about Dizful, but it is not common in central Persia except near

towns. The large Indian mongoose ranges from the Indian border to Shiraz and Khurramshahr and the small Indian mongoose is known from the lower valley of the Karun and Seistan.

There are three kinds of fox: the white-footed fox in the south from the Indian border to the Karun; the Persian desert-fox, a larger animal either 'fulvescent' or 'red in colour', in Seistan and the north; and Blanford's fox, the smallest, which has a black tip to its tail, confined to the eastern borders of the country.

There are brown bears in the Elburz, and a smaller cinnamon-coloured animal is reported from the Zagros. Badgers are not uncommon on the plateau and in the Caspian provinces, and the ratel, which is similar in colour but with black underparts and legs, is found about the Ab-i-Maima (Tib river) and Ram Hormuz. Otters frequent the Gilan and Mazanderan rivers and doubtless the perennial streams of the western and north-western basins. The beech martin is known from the Zagros, and there is a mottled polecat of a curious brown and yellowish-white colour in Seistan. Porcupines are by no means rare in many places. The fulvous squirrel inhabits the oak-woods of the south-west, ground squirrels abound in Kazvin and Meshed, and dormice in the woods of the Caspian provinces.

Throughout Persia, except in the forests and mountains, there are several different kinds of desert gerbils and jerboas, yellowish-sandy rats with white underparts, long tails and elongated hind legs. The brown rat is confined to the ports (p. 414), but the black is found farther inland. Mounds of earth hide the entrances to mole-rats' burrows in the Caspian provinces and eastern borders, and may easily be mistaken for mole-hills. Pale-coloured house-mice are common in towns. Several kinds of wood-mice, very similar to our British species, are found in forests and gardens, and vesper-mice, coloured like miniature jerboas, but no bigger than a house-mouse, occur in the more open country, especially in the north.

Shrews, all small species, are found in many parts. The Baluchi hedgehog is local, principally met with between 6,000 and 7,000 feet, and about Abadeh is reported to be plentiful.

There is little information regarding bats in Persia. The largest, the Arabian short-nosed fruit-bat, inhabits caves on Qishm island and, in spite of its name, feeds on mollusca left exposed by the tide. About Shiraz there is the Persian horse-shoe bat similar to our species, and another bat with a complicated leaf nose peculiar to the country. Other kinds, closely related to European forms, occur in many places, and near Shulistan, in the south-eastern head-basin of the Mand

river, the Egyptian mouse-tailed bat has been recorded. It is readily distinguished by its long mouse-like tail.

Voles and hamsters of different species are found on the plateau and farther north. Hares are common in many parts of the country, and about Kohrud and in the neighbouring mountains above 8,000 feet there are mouse-hares or pikas. The Sind wild goat inhabits the mountains from Baluchistan to about Shushtar or Shiraz and is replaced in the north by the Persian wild goat. Of three species of wild sheep, the urial ranges through the hills of the south as far west as Shiraz, and north along the eastern frontier to Kopet Dagh; the red sheep roams the Elburz, and the Laristan sheep is found in the mountains of that name in the south. Throughout the greater part of the country the Persian gazelle is the common species, but in Seistan it is replaced by Kennion's gazelle, with a range southward towards the coast. The Seistan gazelle is also found in the same district, and Merica's gazelle in the low country bordering Iraq. The maral or Eastern red deer lives in the mountains of the Caspian provinces, where the roe deer is also found, as well as in Kurdistan. The Persian fallow deer, the eastern representative of the inhabitants of the English parks, was at one time common in the valley of the Karun, but is now extinct.

Wild pig are common in the better watered parts and in some places are very abundant. Wild asses inhabit the deserts to the east of a line between Shiraz and Tehran, more especially where there are patches of kavir, and move about according to the season. In the waters of the Persian Gulf the large Indian rorquel may be met with, and no doubt other whales or dolphins also occur.

Birds

Because of the regional differences in physical features and climate, Persian birds include a great variety of types and many closely resemble British species. Comparatively few species are resident throughout the year, many come to breed, others to winter, while a large proportion are only seen on migration in spring and winter. There are two distinct migration routes in Persia, from north to south and from west to east. Birds using the first are on their way to winter quarters in Arabia and Africa; those using the second are destined for Sind and neighbouring parts of India.

The raven is generally distributed in the higher regions and in the autumn some move to near the coast and to Seistan. In the eastern

part of the Gulf coast the brown-necked species occurs. Hooded crows are winter visitors in the north-west, the paler Sharpe's crow is common in northern central Persia, and in winter occurs in Seistan and along the southern coast, where it meets the Mesopotamian crow (with back almost white), a resident on the coast from Bushire westwards.

Rooks breed in the north and west, moving in autumn as far south as the Karun and in large numbers to Seistan. Jackdaws nest in the same areas, red-billed choughs on the higher hills descending into the valleys in the autumn, but the yellow-billed alpine chough is less widely distributed. Magpies are found throughout Persia except in the coastal districts, and of the two jays, the Syrian is confined to the oak-woods of Fars, and the Persian to the Caspian provinces. Starlings nest in considerable numbers from Shiraz northwards and many from beyond Persia pass through on migration. The rose-coloured pastor, a rare visitor to the British Isles, is an erratic breeder in the north-west, and in the autumn and spring passes eastwards in vast numbers to spend the winter in the plains of northern India. To the orchards and open country the golden oriole is a summer visitor and only visits the coastal belt during the migrating season.

Many European finches, such as the hawfinch, scarlet grosbeak, chaffinch, linnet, goldfinch, and bullfinch, breed in the country, principally in the north and a few as far south as Shiraz. In the autumn immigrants from farther north arrive with bramblings, siskins, and greenfinches. About Ahwaz and in parts of the plateau there is the trumpeter bullfinch; less common is the Persian desertfinch, while the crimson-winged finch is confined to the west and north. On the higher hills are snowfinches, lower down rock-sparrows which are replaced by another species in the plains. The yellow-throated sparrow is common in parts of the Fars district, and along the coast, and in Seistan. There are tree-sparrows in the north, and house-sparrows and the more heavily marked Spanish sparrows throughout Persia. The small, handsome scrub-sparrow builds its nest like that of a magpie in bushes in the Karun valley and Seistan. Buntings are less numerous than finches, though several—such as the corn, black-headed, yellow, meadow, and reed—nest in the northern and western areas. In the autumn their numbers are increased by immigrants from other countries and with them come the ortolans. The commonest species breeding in Persia is the grey-necked meadow bunting which nests in the hills above 8,000 feet; the striated bunting is not rare in the sandy plains and hills near the coast. The calandra

lark appears in the cultivated fields of the Fars province and farther north; it is replaced higher up in the rolling grass country by the Eastern bimaculated lark. Short-toed larks nest in many parts of the country inland, and large numbers, including the lesser short-toed species, also appear on migration, when they are common in the coastal areas. Desert and crested larks have a wide range and are far from rare on the coastal plain; skylarks nest locally in the hills, and woodlarks in the oak-woods of Fars. The bifasciated lark is not uncommon in Seistan and other dry areas, as well as along the shores of the Gulf, and horned larks are resident on some of the higher hills in the north-west. A few pipits, such as the meadow, tree, and tawny, breed in Persia, but others are migrant. The grey wagtail is an abundant migrant; so too are various forms of the yellow and white wagtails, although several species of the former breed in the north, and the Persian white wagtail is the only common nesting bird. There are nuthatches similar to the British species in the Elburz mountains and other suitable localities as far south as the Shiraz oak-woods. They closely resemble the common nuthatch but lack the chestnut on the flanks and below the tail, and they whistle shrilly like a man. The great, the blue, the cole, the sombre, and the long-tailed tits inhabit the same woods, and penduline tits the more open wet country, building their globular nests of vegetable down with a funnel-shaped entrance. Bearded reedlings nest in the reed-beds of the lagoons of the Caspian province. Lesser grey and red-backed shrikes are common on the plateau and the great grey shrike is local as a breeding species; the isabelline nests in the south and the woodchat in the north.

The grey hypocolius—a bird of uncertain affinities—breeds on the borders of Persia and Iraq, arriving at the date-ripening season and nesting in the palm trees. It is a great wanderer and has strayed as far east as Bombay in winter. White-cheeked bulbuls and Hutton's babblers are not rare in Seistan and along the coastal plains to north-west Fars. Only three flycatchers are recorded, the spotted, the pied, and the red-breasted. All breed in the country and are passage migrants as well, but only the first is common. Numbers of willow and other warblers pass through on migration but are difficult to recognize. Others, such as the moustached warbler, Upcher's warbler, and lesser whitethroat, breed on the plateau, and the reed, olivaceous, and marsh warblers, as well as Ménétrie's warbler, farther north. The small desert warbler, the wren warbler, and the scrub warbler are common in the desert areas along the coastal plains to

north-west Fars, and the rufous warbler nests in many parts of the country.

The song-thrush does not breed in Persia, but some pass the winter in the north along with the redwings, fieldfares, and a few mistle-thrushes. Blackbirds are not uncommon in the Elburz mountains; a few wander as far south as Shiraz in winter, and black-throated thrushes are winter visitors to widely separated areas. Rock-thrushes are both resident and migratory. A large number of chats, including the common, red-rumped, black-eared, and desert, breed in Persia. They nest in varying numbers but by far the most abundant species is the isabelline. Whin-chats and stone-chats are also resident and migratory, and the Indian bush-chat occurs in the extreme east of the country. Common and black redstarts nest in suitable localities in the north; the beautiful Eversman's redstart is a winter visitor and at that season is common in northern orchards. The nightingale, the bulbul of the Persians, is very plentiful as a summer visitor in the south-west about Ram Hormuz, but farther north it is rather local, sometimes nesting as high as 8,000 feet in the Elburz. The darker-coloured thrush-nightingale winters about Fao. Blue-throats are common on migration, a few breeding in the south-west and north.

Many of the robins that breed in the Caucasus winter in the Caspian provinces along with the locally bred birds which have not moved south. The white-throated robin also nests in the west and north, and winters in Arabia and the adjacent parts of Africa. The hedge-sparrow is found along the Caspian and as far south as Isfahan; the brown accentor is common above 8,000 feet in the Elburz where, too, the Alpine accentor is resident at high elevations. Wrens are not uncommon at Kermanshah and other places on the plateau in winter, but probably go farther north to breed. Dippers haunt the streams on the lower slopes of the Elburz and Bakhtiari mountains. The common swallow and the house-martin breed as far south as the plateau, and throughout the country may be seen migrating south in September, along with the striated swallows which may also nest. There are large colonies of sand-martins in northern Persia, but some no doubt nest farther south. Two species of crag-martins breed on the plateau northwards. The common cuckoo is a summer visitor and in some years greater spotted cuckoos are very numerous. Numbers of swifts breed at Shiraz and the large Alpine swift may occasionally be seen.

The small green bee-eater is resident in the south, but both the

brightly coloured European and Persian bee-eaters are summer visitors and passage migrants, as is the European roller.

Among the woodpeckers the green breeds in the Caspian provinces, the pied and Syrian as far south as Shiraz, and the St. John's spotted woodpecker in the wooded hills of the south-west. Wrynecks pass through on migration in the spring and autumn. Sykes's nightjar is common in Seistan, but the common European nightjar is the most generally distributed, and the Egyptian has been recorded. Hoopoes are found along the Persian Gulf in winter and many move inland in spring, when their numbers are augmented by immigrants from overseas. The common kingfisher is found wherever there is suitable water, but the white-breasted is more dependent on trees than water, and the pied is scarce and confined to the larger rivers.

Owls range in size from the large eagle-owl to the little scops-owl, not much larger than a thrush. The first is generally distributed though not common, and the scops-owl abounds in the gardens of the highlands; the striated scops-owl is less common. The brown fish-owl is met with north-west of Fars, and the short-eared owl is common near the Caspian and occasionally encountered elsewhere on migration. Tawny owls nest in the Elburz mountains, while the little owl commonly haunts ruined buildings in the southern half of the country.

The Persians are great falconers; indeed they are supposed to have introduced that sport to the Greeks. Peregrine falcons, lanners, and shahins are annually caught in the hills inland from the Persian Gulf and brought into the coast towns for sale. Hobbys nest in the Caspian provinces, common kestrels throughout the country; and large numbers of lesser kestrels assemble in the winter in palm groves near Bushire.

There are records of various eagles, but all are rare except the booted eagle which nests to the north-west of Fars and the sea-eagle along the Caspian coasts. During the winter, marsh-harriers may commonly be seen hunting in reedy marshes throughout the country. Montagu's harrier and the pale harrier only occur on migration. Sparrowhawks are not rare, and goshawks, which breed in the northern forests, are caught in the autumn in the woods farther south for sale to rich Persians. The black kite nests over a wide area and later departs to warmer countries. One of the commonest birds of prey is the desert buzzard which hunts on the open hillside. The griffon vulture breeds in the Elburz mountains and near Shiraz, whence many move, after breeding, to the coast. Although less

common, the Egyptian vulture is also resident, and the bearded vulture is far from rare in the mountains. Large numbers of pelicans frequent the Hindian river in winter, at which season they are very common in the Safid Rud delta as well as on the Makran coast, and the lakes of Seistan. Cormorants—both the large and small species—are abundant in winter on the Caspian lagoons; the large species is also common in the Gulf.

Whooper swans winter along the Caspian coast and are very numerous in Seistan, where they are said to breed. Geese too are found in these places, and a species is said to nest near Shiraz. Among the ducks, sheldrake, ruddy sheldrake, mallard, gadwall, pintail, shoveller, widgeon, tufted, white-eye, are all winter visitors in varying numbers, while the marbled duck, teal, tufted pochard, and red-crested pochard are visitors to the greater part of Persia as well as breeding in Seistan. Scoters, scaup, and golden-eye occur in the Caspian, and the last is very abundant. Both the goosander and merganser are met with about Pahlevi, and the smew and white-headed duck are common in Seistan and plentiful on Bahm-i-Shur lake; there flamingoes also occur and are not rare in some other parts of the country. The grey heron breeds on the Abdulla bank, and, along with the purple heron and various egrets, is found inland as well as on the coast. The reef heron haunts the shore of the Persian Gulf, and bitterns have been met with, but the little bittern is more often heard than seen, and there are records of the night heron.

Storks nest in the towns of the plateau and many are seen on passage, but the black stork is far from common. Spoonbills and glossy ibis frequent the Caspian and the latter breeds in Seistan. The houbara is the common bustard of Persia, spending the summer on the plateau and departing in autumn to the coastal plains. Great bustards are not rare at that season in Seistan and have occurred elsewhere, but the little bustard is scarce and the lesser florican is a rare wanderer from Sind to the coastal areas as far west as the Karun. Norfolk plovers, cursors, and pratincoles are found in suitable areas throughout the country, and the common and jack snipe are plentiful in winter; the great snipe is not rare in the north and the pintail is often seen in Seistan.

Many waders, redshanks, curlews, whimbrels, stints, and others pass the winter on the shores of the Caspian and the Persian Gulf as well as by inland waters, while more pass on farther south. Lapwings breed north of Shiraz and possibly stilts and avocets. The red-wattled and white-tailed lapwings are common on the coastal strip,

where there are ringed plover as well. Oyster-catchers occur on the Caspian and are not rare on the south coast. The black and white crab-plover breeds near Fao and Bushire; it is an abnormal plover laying white eggs and nesting in holes.

Among the gulls the greater black-headed nests on the Caspian coast; in the winter the herring, lesser black-backed, common, and slender-billed gulls are common on the shores of the Persian Gulf and Hemprich's gull is often seen. Little terns breed on the shores and islands, and sooty, white-cheeked, and lesser crested as well. The large crested and gull-billed terns are only seen on migration or in winter. During the cold months great-crested grebes are common, and the little grebe is a resident. The marshes and reed-beds in different parts of the country are the winter homes of several rails and crakes; coots and the purple gallinule are resident.

Rock-doves are local, stock-doves and wood-pigeons breed in forests, and the turtle-dove is a summer visitor arriving about March. There are several kinds of sandgrouse: the imperial or black-bellied is the common species of the plateau, the coronetted is local, the large pin-tailed and close-barred are found in the south, and the spotted confined to the Baluchi border. The grey partridge inhabits the Azerbaijan and Caspian provinces and many quail breed on the plateau, although the majority pass farther north. Chukor are the commonest partridges in Persia and met with at all elevations; small coveys of see-see range over the country on the barren hillsides from sea-level to 7,000 feet. The common black partridge, or francolin, occurs in the south, is exceedingly common in Seistan, but much less so in the damp forests of the north. From the Zagros mountains eastward there are grey francolins, but only near the Baluchi border are they numerous. On the higher mountain ranges such as the Elburz and Zagros, the Caspian snow-cock, or ram chukor, is not rare. Forms of the common pheasant inhabit the forests of Gilan and Mazanderan, and a specially handsome bird, the Prince of Wales's pheasant, is a native of the woods where the frontiers of Russia, Afghanistan, and Persia meet.

Tropic, or boatswain birds are not rare in the Persian Gulf and breed on some of the islands. The Socotra cormorant which, apart from certain adult differences, has the nestling covered with white instead of black down, also nests. Small flocks of Persian shearwaters are often seen, and little companies of grey phalaropes spend the winter near the entrance to the Gulf. Here too, the little Wilson's petrel from the Antarctic may occasionally be noticed in summer.

Reptiles and Amphibia

The Orders of reptiles inhabiting Persia are the Chelonians, the Lizards, and the Snakes. There are no Crocodiles, although the mugger (*Crocodilus palustris*) is not uncommon in British Baluchistan. Amphibia are very poorly represented, largely because of the dry and mountainous nature of the country. In the Northern Borderlands and North-west Provinces, all the common species, both of reptiles and amphibia, are the same as those found in Europe. Our knowledge of the herpeto-fauna of the country, however, is still very incomplete.

Chelonians

The Greek tortoise (*Testudo graeca*), the common tortoise of south-west Asia and the Mediterranean coast, occurs throughout Persia, but never at high altitudes. It is the kind often kept in England as a pet, and is easily recognized by its black and dirty-yellow shell and club-shaped feet. The European pond tortoise (*Emys orbicularis*) is found only in the northern part of the country, inhabiting ponds, lakes, and rivers, but although plentiful is, on account of its aquatic habits, not often seen. The marine turtles, namely the green or edible turtle, the provider of turtle soup, and the hawksbill turtle, from which comes the tortoise-shell of commerce, have both been recorded from the Persian Gulf, but they do not breed there and must be regarded as occasional visitors.

Lizards

Geckos, so strongly represented in India, are comparatively rare in Persia. *Hemidactylus persicus*, easily recognized by the adhesive plates on the under surfaces of its fingers and toes, which enables it to climb vertical surfaces, is the common house gecko of the south, clambering about on the walls in search of food as soon as darkness falls. Several species of ground gecko (*Gymnodactylus*) occur in the country, mainly in the east. They have no adhesive plates to their digits, are unable to climb and, on account of their secretive habits, living under stones or fallen timber, or in cracks in the ground, are less often seen. All the geckos have the body covered with soft, often tubercular, skin, and not with scales like the other lizards.

By far the commonest lizards of the country are the Agamids (genera *Agama* and *Phrynocephalus*) and in some districts, particularly in rocky country, may be seen in colonies of hundreds. Of the many species of *Agama*, seven or eight inhabit Persia, but their

identification is not easy. As a genus they are stoutly built lizards, with somewhat flattened body and long tail covered with small rings of hard horny scales. In colour they are a speckled mixture of brown, black, and dirty yellow. The males are provided with a pouch under the throat which in the breeding-season is deep blue or violet. The three best-known species are: *A. agilis*, found on rocky hills and open stony plains in the coastal areas of the southern half of the country; *A. nupta*, particularly common in cultivated areas in the south and east; and *A. caucasica*, restricted to the hilly country of the north. They grow to a length of 12 or 15 inches.

The genus *Phrynocephalus* is less strongly represented than *Agama*, with which it is closely related. Its members can be recognized by their smaller size, 6–7 inches in total length, absence of tympanum and strongly fringed eyelids, a special adaptation to protect the eyes against blown sand. The commonest species is *P. olivieri*, which is particularly abundant in stony and gravelly districts in southern Persia. It has been found at very high altitudes.

After the Agamids the commonest lizards of the country are the Lacertids, small, active, gracefully-built creatures with the body covered above with minute scales and the head with symmetrical plates. They have a strong family likeness to the two well-known English lizards, namely the sand lizard and the viviparous lizard. The two common species of Persia are *Eremias persica*, which is found over the whole country but mainly in the lowlands, and *Ophiops elegans*, particularly common in the central basins.

The desert monitor (*Varanus griseus*), by far the largest lizard found in Persia, is widely distributed over the dry regions of south-west Asia, and is most numerous in the coastal areas. It reaches a length of 3 feet or more and is greyish or brownish in colour, thickly speckled all over its upper parts with dark brown or black.

Seven or eight species of skinks have been recorded from Persia, but none are common. Some live their lives almost entirely underground, burrowing easily and quickly in soft sandy soil.

Snakes

The sand boa (*Eryx jaculus*) is found in east Persia, and is the only member of the boa and python families found in the country. Its sluggish and placid disposition makes it easy to handle, and it is often carried by snake-charmers as part of their equipment and exhibited as a two-headed snake, that is to say, with a head at each end. The tail, which is thick, blunt, and very short, makes this possible.

The grass snake (*Natrix natrix*), identical with the English species except for minor differences in colour, is found all over the northern part of the country; another closely allied form (*Natrix tessellata*) is abundant in marshes and streams, particularly in the neighbourhood of the Caspian. It lives entirely in the water.

Racers (genus *Coluber*) are the commonest snakes throughout Persia and at least six species are known. Many inhabit cultivated areas and may be seen moving about in search of food at all hours of the day. All have a fine turn of speed. *C. ventromaculatus* is common in the lowlands of the southern half of the country; it is about 3 feet long and light greyish in colour above with a series of black cross-bars or rhomboidal spots. Another species (*C. karelini*), almost as common, differs chiefly in having an orange stripe down the middle of the back. A third (*C. ravergieri*) can be distinguished from the preceding two only by differences in scalation.

One species of sand snake (*Psammophis schokari*) is fairly common, and is widely distributed. It has four dark-brown stripes down the whole length of the back and tail.

Of the poisonous land snakes there are many vipers, but no cobras or kraits have been recorded. The horned viper (*Cerastes persicus*) abounds in many districts on the coast of the Persian Gulf; its two 'horns', which are elongated scales, project from the upper eyelids. The Levantine viper (*Vipera lebetina*) is found throughout the country but never at high altitudes; it varies enormously in coloration. The saw-scaled viper, so-called on account of the serrated keels to the scales on the sides of the body, also occurs in many districts. It is particularly abundant in eastern Persia.

Sea snakes are common in the Gulf, and particularly off the Makran coast. On calm days they can be seen basking on the surface of the water. They can be distinguished from the land snakes, some of which are occasionally found in the sea, by having vertically compressed paddle-shaped tails, and by having no ventral shields. All the sea snakes are poisonous. A paper by Volsøe published in 1939 lists nine species from the Gulf.

Amphibia

Frogs, toads, and salamanders are very poorly represented, largely on account of the dryness of the whole country and the lack of suitable breeding-places. Water is a necessary requirement for their survival. The common frog of the north is the edible frog (*Rana esculata*), and

the common toad found all over the country is the beautiful green toad (*Bufo viridis*). No salamanders or newts have yet been recorded from the country, but some will certainly be found in the north.

Fishes

Rivers and Lakes

The freshwater fishes of Persia have been discussed by L. S. Berg, the Russian geographer and ichthyologist, in a publication of 1936. In the rivers of the Caspian coastlands, and of north-west Persia, the fish fauna is characteristic of the Ponto-Aralo-Caspian region, though a rather poor sample of it, since most of the rivers are comparatively short. Lake Urmia is too salt to support fish life, but it is a typical home of the brine-shrimp, *Artemia*. Its tributaries contain a fauna that presents nothing strange to anyone familiar with European freshwater fishes; here the catfish (*Silurus glanis*) grows to a good size, but not to the gigantic proportions claimed for it elsewhere. There is a subspecies of the European chub in these north-western rivers, and the district has its own species of gudgeon, bleak, and loach. The genus *Alburnoides*, related to the bleak, has one species peculiar to the Urmia tributaries. The genus *Varicorhinus*, resembling a barbel, but with a horny cutting edge on the lower jaw and a more fleshy snout, is represented by a Caspian species here, and by other species elsewhere in Persia.

In the Persian tributaries of the Tigris there is a species of the genus *Barilius*, a shapely, sharp-nosed carp with a large mouth and a silvery head. Little is known about the fishes of the southern Zagros rivers, which have scarcely been studied, but it is known that even the Mand river is well stocked.

In the rivers draining the Elburz near Tehran the Eastern chub is again found, as well as a true barbel (*Barbus miliaris*), a trout, and some species of *Alburnoides* and *Varicorhinus*. The meagre waters of central Persia contain a meagre fauna, but there are some characteristic genera of the carp family, including *Cyprinion*, which extends from Syria to the Punjab, *Chondrostoma*, a genus of Europe and western Asia resembling *Varicorhinus* in the horny edge of the lower jaw, but having one row of teeth on each side of the pharynx instead of three, and *Garra*, a widespread genus of India, Persia, Iraq, southern Arabia, and east Africa, having a disk behind the mouth with which it can cling to stones. The genus *Barbus* itself seems to be absent from the desert parts of central Persia, but the whole region is inadequately known from the ichthyological point of view.

The Seistan Hamun and the lower reaches of the rivers entering it are remarkable for a number of species peculiar to the locality, some showing affinity with those of central Asia, to which region the upper waters of the Helmand belong. The rivers of north-east Persia draining to the Qara Qum desert and to the Hari Rud also provide a fish fauna linking the Persian region with the central Asiatic. The genus *Schizothorax*—like *Barbus* but with some characteristically enlarged scales on either side of the vent—is found both here and in the Helmand delta. *Schizothorax* has the reputation of being very poisonous to eat, but the poison is said to reside in the eggs and the black lining of the body cavity, and if these are removed the flesh is said to be wholesome.

Caspian Sea

The Caspian coast gives access to some of the richest fishing in the world. The fish fauna of the Caspian is lacustrine, its only marine elements being a little pipe-fish (*Syngnathus*), a silverside (*Atherina*), and some Gobies. The two endemic genera of 'Caspian herrings', *Caspialosa* and *Clupeonella*, are also of marine origin, dating from the time when the Aral, Caspian, and Black Seas formed one sheet of water continuous with the Mediterranean. The great shoals of these fishes provide a most valuable fishery. The 'herrings' ascend the northern rivers of the Caspian, but enter the southern ones only to an insignificant extent. The most famous of the Caspian fishes are, however, its sturgeons and the Caspian salmon (*Salmo trutta caspius* Kessler), the roes of which are used for caviare (p. 456). Roach and bream swim in the Caspian as well as in its rivers, and this basin has its own endemic genus of lampreys, *Caspiomyzon*.

Persian Gulf and Gulf of Oman

The seas off the southern coasts are richly represented by the varied fauna of the Indian Ocean. The ambitious angler will find swordfish and the famous seer, called 'surmai' in the Gulf (*Scomberomorus commersoni*), as well as members of the horse-mackerel family, Carangidae. One of the latter, known at Jask as the 'pirao', receives an enthusiastic eulogy in a spirited article on 'Game Fishes of the Persian Gulf' by W. H. Lane in vol. xxiv of the *Journal of the Bombay Natural History Society*, which describes the angling possibilities of the Gulf.

Shoals of grey mullet (*Mugil*) of several species gather in the off-shore shallows, and the *Hilsa* or 'Indian Shad' is the object of an

important fishery when it ascends the Shatt al Arab. The small but voracious *Harpodon*, better known as 'Bombay duck', also abounds off the Persian coast. The milk-fish, *Chanos*, which is cultivated in lagoons in the Philippines and Java, extends to the western Indian Ocean, and has been described swimming with its snout above water through the red scum of minute algae which sometimes makes its appearance in the Gulf as well as in the Red Sea. Several species of sea-perch and sea-bream abound, and there are many kinds of brilliant reef-fishes, wrasses, and parrot-wrasses. Among the bottom fishes are rays and sting-rays. Devil-rays, some of which attain enormous size, swim at the surface, probably in pursuit of shoals of small fishes. With their huge 'wing-span'—a width of 24 feet has been reported for one giant—they may become a danger to small boats, but it is unlikely that they would deliberately attack man, their natural diet being small fishes and crustaceans. There are several sharks, some of which are said to travel up the Shatt al Arab and Karun as far as Ahwaz and even occasionally to Shushtar. W. H. Lane records the capture of a 188-lb. specimen of *Cancharias tricuspidatus* (Day) with rod and line. The largest of all fishes, the whale-shark, *Rhineodon*, takes its inoffensive way through all tropical seas, including Persian waters. It is easily recognized by its conspicuous pale yellow spots and stripes and its broad terminal mouth. *Rhineodon* feeds on small invertebrates and sardine-sized fishes, and is famous for allowing itself to be rammed by steamers.

The fishing industry is briefly described on p. 456

CHAPTER VI

HISTORY

I. ANCIENT HISTORY

For convenience 'Persia' is used in the ancient history to include all the provinces of the former Persian empires (fig. 42) between the Zagros and the Hindu Kush. The western frontiers of modern Persia correspond roughly with those of the Persian-speaking provinces of the Persian empires of antiquity, but the ancient Persian realm



Fig. 42. *Provinces of the Achaemenid Empire*

stretched in the east through Afghanistan to the Hindu Kush and the borders of India, and in the north-east reached beyond the Oxus valley to include the Zarafshan oases and even touched the Jaxartes. Western Persia was divided between Media, Persis, and Susiana. Media consisted of the regions between the Elburz and Zagros mountains from Azerbaijan to Isfahan. Persis contained Fars. Susiana or Elam was northern Khuzistan and Luristan. Eastern Mazanderan and the Gurgan-Atrek plains formed Hyrcania. Modern Khurasan was Parthia, Seistan was Drangiana or Zarangiana (later Sacastene),

Kirman Carmania, and Makran part of Gedrosia. Outside modern Persia lay Aria, Bactria, and Arachosia. Aria was Herat and the Hari Rud valley, Bactria was the upper basin of the Oxus, limited in the south by the Hindu Kush (Paropamisadae) and in the north by Sogdiana, the district of the Zarafshan oases, including Bokhara and Samarkand. South of the Hindu Kush was Arachosia, which included Kandahar and much of the upper Helmand basin. Of these regions the history of ancient Persia is mainly concerned with Media and Persis in the west, and Parthia and Bactria in the east.

Pre-Iranian Persia, c. 4000–1000 B.C.

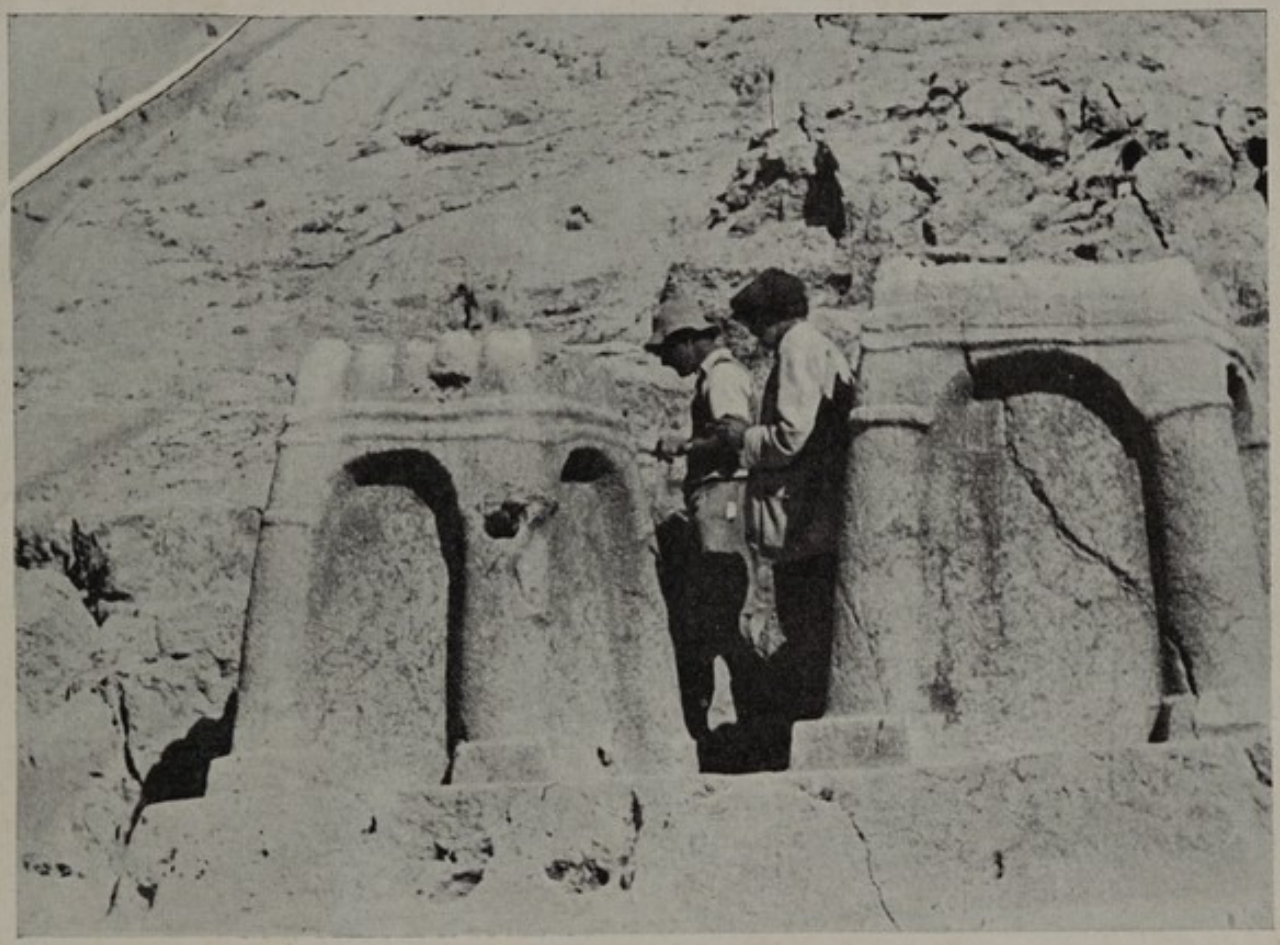
These regions were named after the major divisions of the Aryan-speaking Indo-European or Iranian peoples who settled in Persia during the second half of the second millennium B.C. The pre-Iranian inhabitants, known to the Assyrians as Ellipi, Lullubi, and Elamites in the western Zagros, were probably of Caucasian origin and akin to the early Sumerians of southern Mesopotamia and to the Dravidians who still persist in peninsular India; communities of similar peoples still exist in Baluchistan. These prehistoric folk have left a simple chalcolithic (Copper or Bronze Age) culture dating back to at least the beginning of the fourth millennium B.C., which closely resembles the earliest culture of Mesopotamia. In Persia such excavated sites as Tepe Hissar near Damghan in Khurasan do not show continuous development through later millennia. Settlements when abandoned were often never again occupied. In Elam alone this prehistoric culture, strongly influenced by the fully developed Sumerian civilization of Mesopotamia, developed into a distinct civilization with a political organization based on kingship and a capital city at Susa (*mod.* Shush). This kingdom embraced the Karun–Karkheh lowlands, but drew its strength from its mountain population and was continually raiding or at war with the cities of the Mesopotamian plain. Its maximum power was in the reign of Shilhak-In-Shushinak (*c.* 1165–1151 B.C.), whose influence reached to Kirkuk in northern Mesopotamia and to near Shiraz in Fars. This kingdom was eventually destroyed by the Assyrian king Ashur-Banipal, who thoroughly sacked Susa in 648 B.C. Elam, like modern Khuzistan, turned its back on Persia, and its history belongs to the Mesopotamian orbit. The town life of Elamite Susa, revealed by excavations, was closely akin to that of the great cities of Babylonia. Its importance is that it acted as a channel whereby the Iranian invaders of Persia were introduced to Babylonian civilization. This influence appears very clearly in the

bronze objects discovered in tombs scattered through Luristan; though most of these date from the early part of the first millennium, they extend backwards to early Babylonian and Sumerian epochs and have close affinities with the products of Mesopotamia.

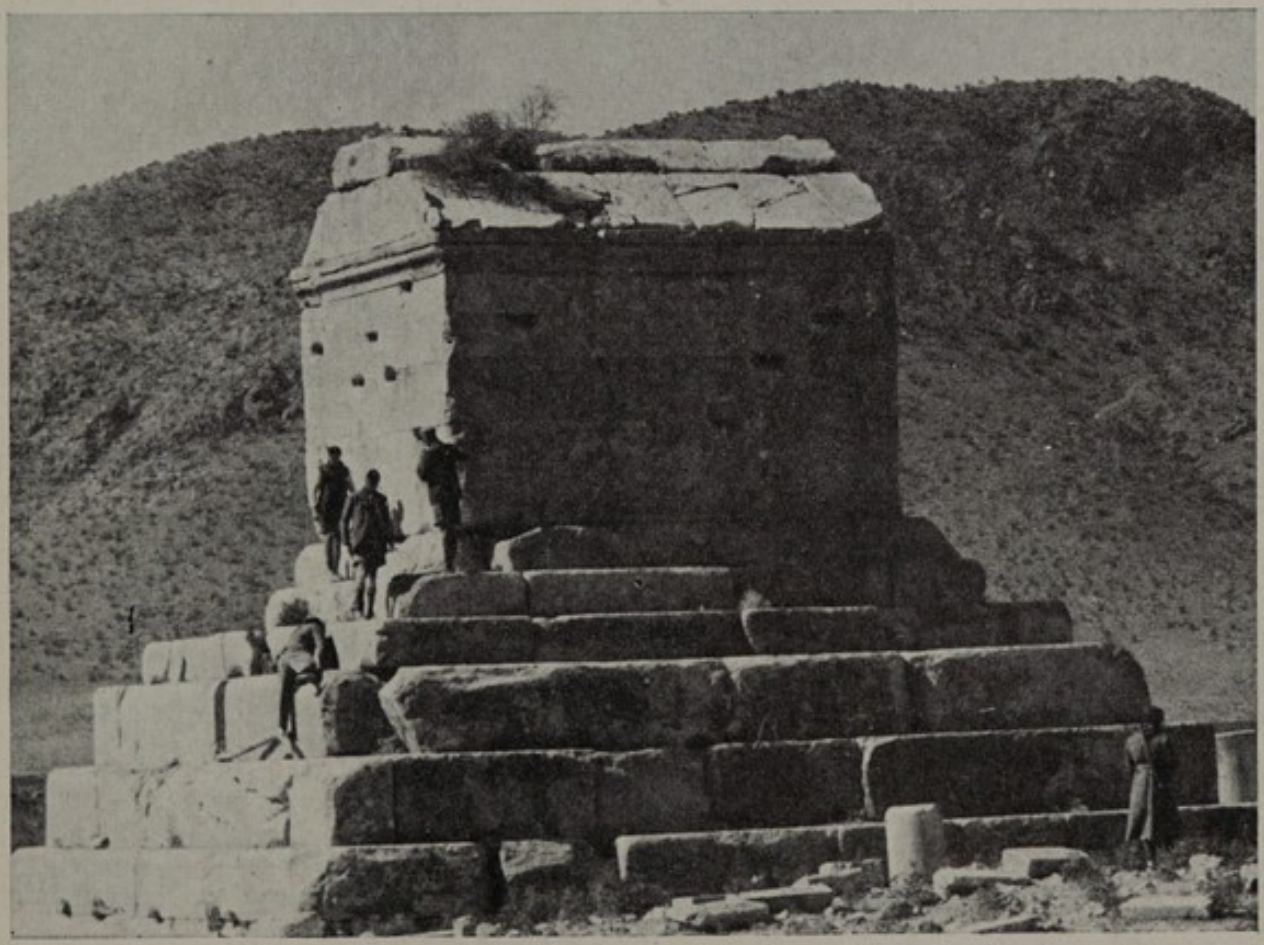
Advent of the Iranians

The forerunners of the Indo-European invasion are found in elements among hordes which between 2000–1600 B.C. passed through the Zagros into Mesopotamia, where they were known as Mitanni and Kassites and popularized the use of the characteristically Indo-European animal, the horse. In following centuries great numbers of Indo-Europeans speaking some form of Old Persian entered Persia from the central Asian steppes east of the Caspian, while other Sanskrit-speaking Indo-Europeans passed through Afghanistan into India. The generic name of these peoples was Arya, whence 'Iran' is derived. Their presence in the Zagros is first attested by the record of the Assyrian king Shalmaneser III, who in his campaign of 836–835 B.C. found a people called Parsua west of Lake Urmia, and Mada or Medes in the Saqqiz district of north Persian Kurdistan. A century later King Sargon (722–705 B.C.) had to repress Medes in western Azerbaijan, where they had seized the towns and strong places of the pre-Iranian inhabitants, with whom they intermingled.

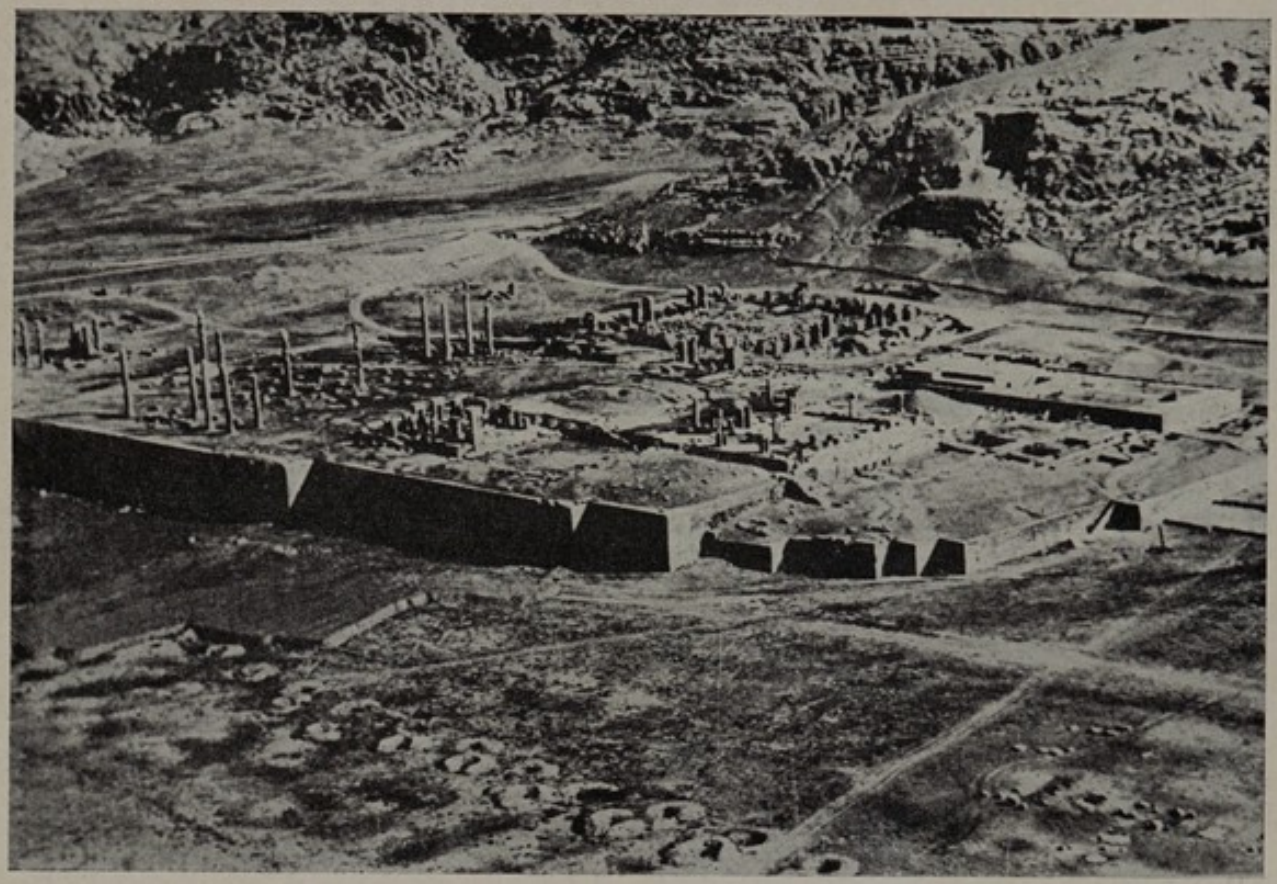
Kingdom of Media, c. 675–553 B.C. Checked in the west by the Assyrian Empire, the Median tribes developed a latent talent for organization. The unification of a Median kingdom out of six independent tribes and the establishment of a capital at Ecbatana (*mod.* Hamadan) was due to two kings, Phraortes (Khshathrita, 675–653 B.C.) and Cyaxares (Uvakshatra, 625–585 B.C.). Cyaxares increased his realm by reducing to dependence the southern Iranians who, under kings of the Achaemenid family, had established a separate power in the regions known to the Assyrians as Parsumash, Anshan, and Parsa, the future Susiana and Persis, left vacant when the Assyrians destroyed the Elamite kingdom. He also subdued and absorbed into his kingdom a new Indo-European people, the Ishguzai or Scythians, who had entered Persia about 653 B.C. from the north-west through the Caucasus passes and disturbed the land for 28 years. Then, organizing a new-model army of spearmen, bowmen, and cavalry, he set about the westward expansion of his kingdom. Systematic warfare replaced tribal expansion. First came the destruction of the Assyrian power (612–606), for which he made alliance with the revived kingdom of Babylonia, followed by the conquest of



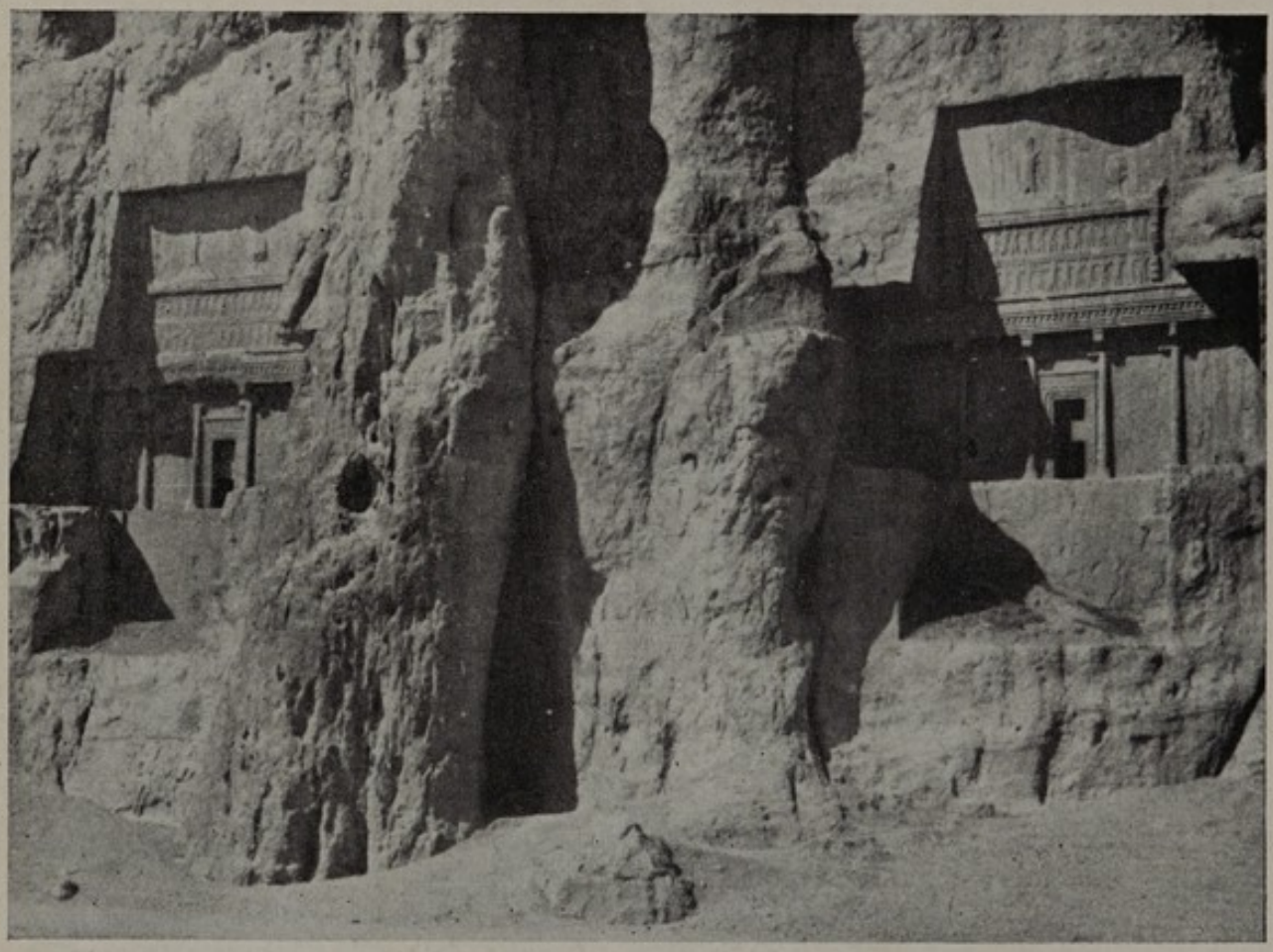
161. *Fire altars at Naksh-i-Rustam*



162. *Tomb of Cyrus at Pasargadae*



163. *Persepolis*



164. *Royal tombs at Naksh-i-Rustam*

Armenia and Cappadocia in Anatolia as far as the Halys river (*mod.* Kizil Irmak), beyond which lay the west Anatolian kingdom of Lydia (fig. 42).

The Achaemenid Empire, 553–331 B.C.

In 553 Cyrus, the sub-king of Persis, revolted and overthrew his overlord Astyages, the successor of Cyaxares, and established the Achaemenid dynasty as rulers of the Median Empire, which his campaigns rapidly expanded eastwards to include all the Iranian regions of the plateau as far as the Oxus and the Hindu Kush, and westward by the overthrow of the Lydian and Babylonian kingdoms to reach the Aegean coast of Anatolia and the Mediterranean coast of Syria. Thus the Iranian peoples were first united, and an Oriental Empire was formed which continued to exist in one form or another until the end of the Abbasid Moslem Caliphate 1,800 years later. Cambyses (529–522) added Egypt, while Darius (522–486), and Xerxes (486–466) tried to carry their power across the Aegean and the Black Sea into European Greece (Hellas) and the Ukraine but were driven out by the Greek victories of Marathon (490), Salamis, and Plataea (480–479). This empire was the first world-empire of antiquity, incorporating vaster lands, more numerous peoples, and more diverse civilizations than its predecessors of Babylon, Egypt, and Assyria.

The impact of this empire caused profound changes in the outlook of the Iranian ruling class, who absorbed, particularly from Mesopotamia, the richest and most highly civilized of their provinces, many 'oriental' and Semitic ways of life and thought. This was only the beginning of the oriental influence on the Persian people, which was continuous through the following millennium and culminated after the Arab conquest in the Abbasid Moslem civilization. In the Achaemenid Empire oriental influences were mostly limited to the kings, who adopted the secluded and despotic characteristics of the Mesopotamian monarchies, and built themselves vast palaces which were largely modelled on those of Babylon and Egypt (p. 230). Though contemporary Greeks (Hellenes) contrasted the 'slavery' of the Persian subjects with their own freedom, there was little that was oriental in the life of the peoples of the Iranian plateau at this time. In religion indeed the Achaemenid Persians were characteristically 'European' in outlook, while the aristocratic education summed up as 'to ride, to shoot, and to tell the truth' was essentially chivalrous.

Administration

The Persian Empire was divided into vast provinces governed by 'satraps', responsible for the civil and military administration and controlled by itinerant inspectors, the 'Eyes and Ears' of the king, and also by independent commanders of the Persian garrisons within the province. The strength of the central government and the well-being of the provinces were increased when Darius changed the system of indiscriminate taxation in kind to a tribute assessed in money, and based on a general survey of the resources of each province. To this end he adopted the Lydian invention of coinage and established an imperial currency of gold *darics*, which replaced the older system of barter and metal ingots, greatly to the benefit of commerce. Government was superficial and did not penetrate to the life of individual communities, except for the collection of taxes and the keeping of the peace, because there was no 'civil service': towns, villages, and tribes continued to live according to their ancient customs.

The two elements of Achaemenid government were thus the absolute monarch and the powerful satrap. This duality has continued to be the pattern of Persian government down to the end of the nineteenth century A.D. and is of Persian, not Mesopotamian, origin. Its vitality is due to its suitability to the controlling physical factors. Persia has no political centre: the fertile and inhabited regions are strung round the circumference of the central deserts, and capitals have been transitory in all ages. The country readily breaks up into its component parts when the monarchy is weak, and gains unity only through the monarch. Hence the ancient monarchies were dynastic, not territorial; loyalty was not to an idea of the state or nation but to the royal family and the person of the monarch, and the 'kingdom' was easily reconstituted after disasters which would have shattered a territorial state. But the material strength of the Persian Empire depended upon the goodwill of the provinces, each of which had a very distinct character, while distances from the capital were very great. Hence the wisest monarchs have seen the difficulty and undesirability of any intense centralization of the administration. An imperial post was created and maintained down to the end of the Mongolian period, precisely to diminish this adverse factor of distance.

The general control of the central authority was rendered efficient by the creation of a system of military highways and posting stations which linked the strategic centres of the satrapies to the political capital of the empire, situated first at Susa and later at Babylon

instead of the inaccessible royal cities of Persis. Little is known of the Achaemenid road system, except for the route from Sardis in western Anatolia to Susa and Persepolis; a second passed through Persia to the Oxus by Ecbatana (Hamadan), Rhagae (Rai), Hecatompylos (Damghan), Margiana (Merv), and Bactra (Balkh), and thence to Maracanda (Samarkand); and a third linked Drangiana (Seistan) by the Helmand valley to Kabura (Kabul) (fig. 43).

Army. The same talent for organization created the Persian army, consisting of six army corps of 60,000 men, each containing six divisions of 10,000 men subdivided into ten battalions. The cavalry, mounted on great 'Nisean' horses, which Media bred in large numbers, and armed with missile weapons, bow and javelin, was the most formidable force. There was little distinction in army and State between the 'Persians' of Persis and the Medes. Though Persis had the primacy as the home of the royal family and the special corps of 10,000 Immortals was recruited in Persis, the political and military aristocracy was drawn from Media and Persis alike.

Thus the Achaemenids accomplished the unification of the Iranian people in western Persia, though considerable enclaves persisted for many centuries of pre-Iranian peoples in remote mountain areas, such as the Cadusii and Gelae of Gilan, who accepted neither the authority nor the civilization of the Persian Empire.

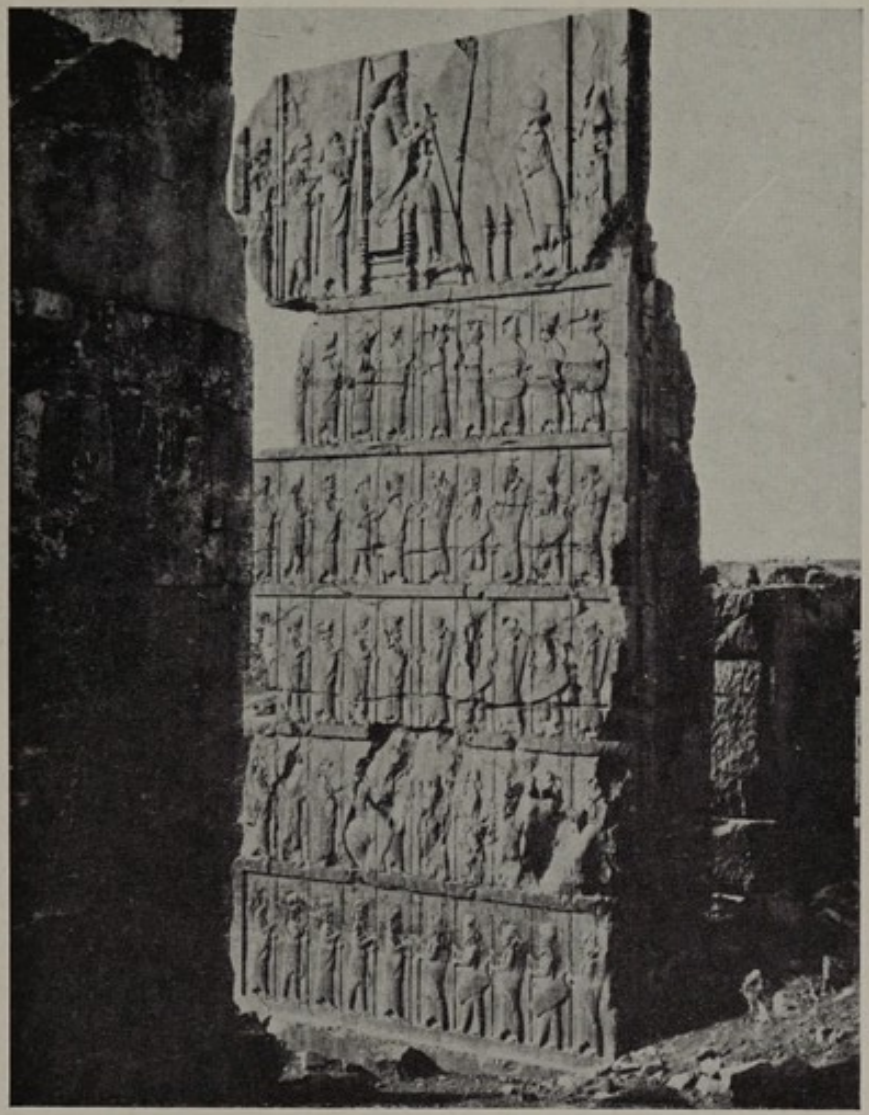
Mazdaean Religion

In religious and ethical thought the Persians made a notable contribution to ancient civilization in the Zoroastrian faith, which some of the Achaemenid kings championed in its purest form. Zoroaster or Zarathustra was born in western Media, though his preaching was in Bactria. His date is uncertain, but it is unlikely that he lived many generations before Cyrus and Darius. Against the current pagan polytheism personifying natural forces and human passions he set a universal system of ethical and metaphysical ideas, a religion in the modern sense. The basic notion is the struggle between good and evil apparent in daily life. All good men are the helpers of the single Lord of Good, Ahura Mazda, with whom truth and light are associated. His opposite is Ahriman, lord of evil, darkness, and the 'lie'. Man's duty is to choose the light, speak the truth, and combat the 'lie'; by his free choice he determines his fate. There is a doctrine of judgement and reward, of heaven and hell, and there are subsidiary deities, abstractions such as Good Thought, Orderly Government, and Holy Character, by the side of Ahura Mazda, but more personal

Devas or evil spirits on the other side, including the old gods of the popular paganism. This system was too abstract to persist unchanged, and the connexion of Ahura Mazda with light, in which he was manifest, encouraged the extension of a popular 'fire worship'. The old Iranian deity Mithras, the 'unconquerable sun', and Anahita, by origin the water goddess of the Oxus, were ranged among the helpers of Ahura Mazda, instead of being rejected as demons, and it was largely through their cults that Mazdaeism spread. In western Media there also existed a clan or hereditary priesthood known as Magi, rather like the Brahman caste of Hindus, who gradually developed a formal ritualistic system of life with many rules of purification. This system, which incorporated much of the older paganism and many elements of Babylonian astrology, differed greatly from the original code. In the fifth century B.C., however, the Greek Herodotus distinguished the Persians from all other peoples in that 'they had no temples', i.e. their fire altars were inconspicuous compared to the great shrines of the pagan world (photo. 161).

Palaces and Arts

The Median towns known to the Assyrians had high walls, fortified towers and houses, palaces often built with wooden columns, gardens, vineyards, and groves. Ecbatana was unwalled but had a strong citadel; its palaces had columns and roofs of cedar and cypress, plated with tiles of silver and gold leaf. The royal cities built by Cyrus at Pasargadae (Murghab) in Persis (559–550 B.C.) and by Darius and Xerxes at Persepolis, the ruins of which still exist, were somewhat different. The palaces of Pasargadae were scattered over a wide plain like nomads' tents, and the town proper was very small. At Persepolis they were gathered within a wall. The most impressive, such as the *apadana* of Darius, were elevated on lofty artificial platforms approached by staircases and adorned with sculptures, reliefs, and enamelled tiles (photos. 163–168). These elements were borrowed from Babylon and Assyria, but in plan the buildings were essentially Persian: a colonnaded portico between closed rooms with a vast hall behind. In the use of columns, too, the Persian architecture was distinct: the capitals show collateral kinship with the nascent architecture of the Indo-European Greeks. The same features are found in the impressive rock tombs of the kings (photo. 164). The artistic sense of the Achaemenid Persians is also known from the remarkable collection of gold objects known as the treasure of the Oxus (photos. 169–172).



165. *Audience of Darius*



166. *Xerxes, King of Kings*



167. *Palace of Xerxes at Persepolis*



168. *Palace of Darius at Persepolis*

The administrative language of the Persian Empire was the Semitic tongue of Aramaic, the language of Mesopotamia and Syria, written in 'cuneiform' script, which the Achaemenid Persians adopted, by reducing the symbols to forty-three, for use in the rare inscriptions of their own language. The greatest of these cuneiform texts is the trilingual inscription of Darius at Bisitun, which gives a valuable account of his reign. Except for these inscriptions the Achaemenids have left no written history. There is no other early Persian literature, apart from some metrical hymns called *Gathas* incorporated in the Avesta.

The Greek Period, 330–140 B.C.

Alexander, 334–323 B.C. (fig. 43)

Despite many campaigns the Persians never succeeded in reducing the free republics or city-states of southern Greece to dependence. The ineffectiveness of Persian troops against the well-trained Greek infantry organized in the massed phalanx formation was established by a division of Greek mercenaries (the Ten Thousand of Xenophon), who in 401 B.C. accompanied the prince Cyrus to Mesopotamia in his vain bid for the Persian throne and fought their way back through Armenia to the Black Sea. But it was not until the Greek republics were federated under the leadership of the northern Greek kingdom of Macedonia in 338 B.C. that large Greek forces could be organized. The invasion of the Persian Empire, nominally to avenge the ravaging of Greece by Xerxes (480–479 B.C.) and to free the Greek cities of the Anatolian coast, was undertaken by Alexander, king of Macedon, with an army of 35,000 men. In 334 he crossed the Dardanelles into Asia in the absence of the Persian fleet, and in a series of remarkable campaigns, culminating in the battle of Gaugamela or Arbela (*mod.* Erbil) in northern Mesopotamia, destroyed the Persian armies west of the Zagros by 331 B.C. The Persian king, Darius III, withdrew to Ecbatana and thence to Hecatompylos, while Alexander hastened to secure the royal treasuries at Susa and Persepolis, containing bullion to the total nominal value of £63,000,000, wherewith to finance his expedition.

In 330 Alexander, following the royal roads (p. 229), took Media and Parthia without heavy fighting. Farther east the Iranians of Bactria, Aria, and Sogdiana, instigated by the satrap Bessus, who had murdered Darius, put up a formidable resistance which took three years to subdue (330–327). Alexander fought his way through the

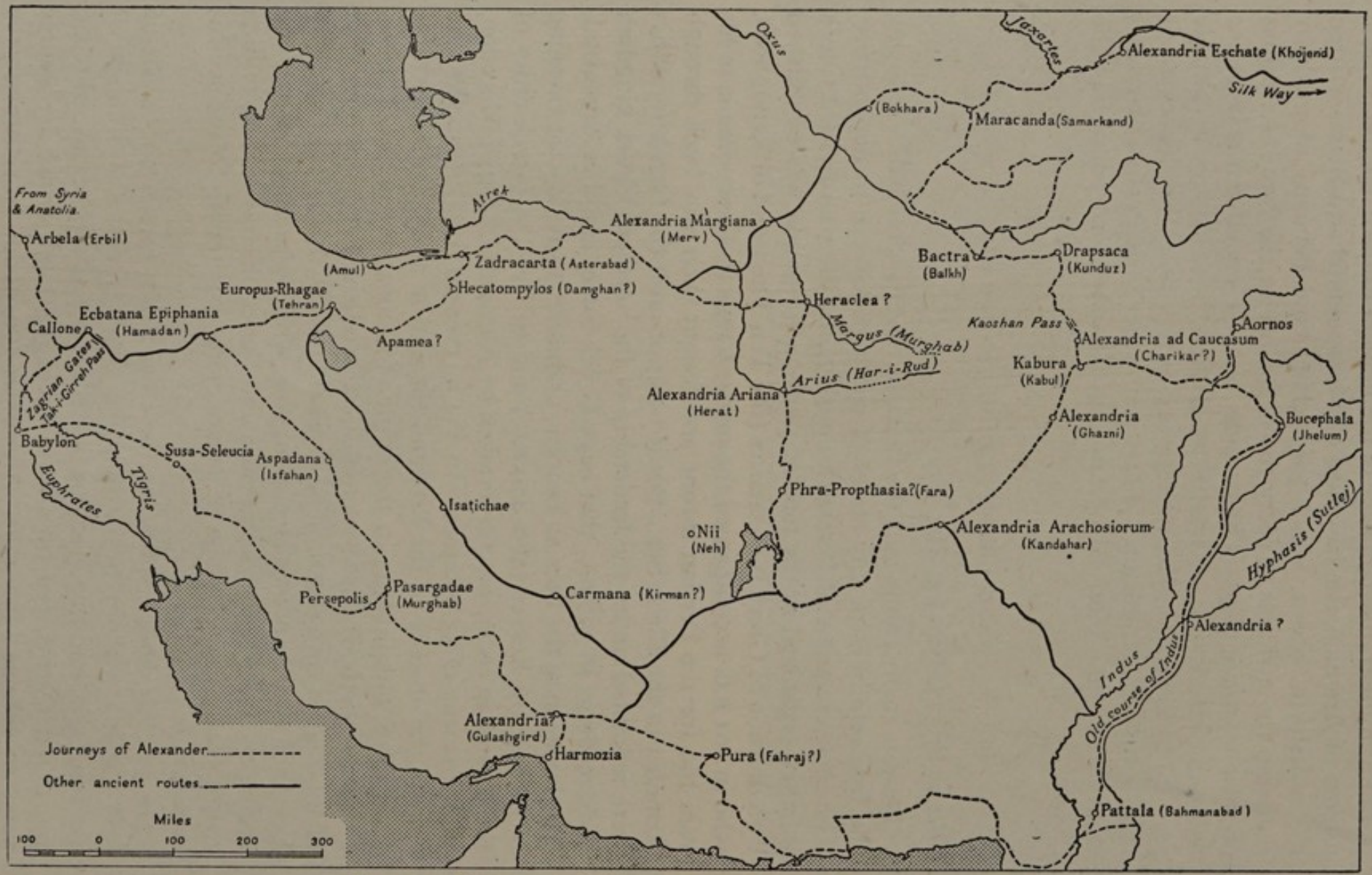


FIG. 43. *Journeys of Alexander and later Greek Settlements*

eastern satrapies, generally following the line of the royal roads but with considerable divergences for local campaigns. The line of his march was from Aria (Herat) south to the Helmand and up its valley to the Paropamisadae (Hindu Kush), which he crossed northward to the Oxus basin of Bactria. His most northerly campaign took him from Bactra (Balkh), the capital of Bactria, to Maracanda (Samarkand) and thence to the neighbourhood of Khojend on the Jaxartes (Syr Darya). After these conquests Alexander invaded north-western India—a former region of the Achaemenid Empire—down the Kabul valley and eventually to the mouth of the Indus, whence he returned in 325 to Carmania and Persepolis through the coastal wilderness of Gedrosia (Baluchistan), while a fleet, with which he vainly tried to keep in touch, explored the coasts of southern Persia, discovered the route to the Persian Gulf and sailed up the Karun and Tigris. This seems to have been the sole expedition in which there was no royal highway to guide Alexander, and his army suffered accordingly. Another force made its way back from India, apparently with less difficulty, through the Bolan pass to the region of Quetta and to Kandahar, and thence down the Helmand and along the southern fringe of the Lut desert to a rendezvous with Alexander in Carmania.

It is of geographical interest that Alexander neither conquered nor ruled the inaccessible western satrapies of northern Asia Minor and Armènia. Even in Persia Azerbaijan escaped his arms, and a Persian general Atropatis established a kingdom of Media Atropatene which lasted until the second century A.D.; its capital Ganzaca was probably at Takht-i-Sulaiman, 70 miles east-south-east of Miyanduab.

Alexander ruled the Persian Empire as the successor of the Achaemenids, whose kingship he adopted. He encouraged collaboration between his Macedonians and the Persians, who were never treated as subject peoples but admitted to the army and the administration of the satrapies. He married a Bactrian princess as his legal wife and encouraged his officers and men to take Persian wives. This proposed formation of a Perso-Macedonian ruling class was made possible by the similarity in way of life of these two Indo-European peoples, neither over-civilized (unlike the southern Greeks and the Babylonians) and both bred in a tradition of military chivalry.

The Seleucid Empire, c. 311–140 B.C.

After Alexander's sudden death in 323 his generals, known as the Successors, divided the empire between them. Eventually Seleucus secured the Iranian satrapies, and also Mesopotamia, Syria, and parts

of Anatolia (311–302 B.C.). He retained his Persian wife and founded the Seleucid dynasty which lasted in western Persia for 170 years.

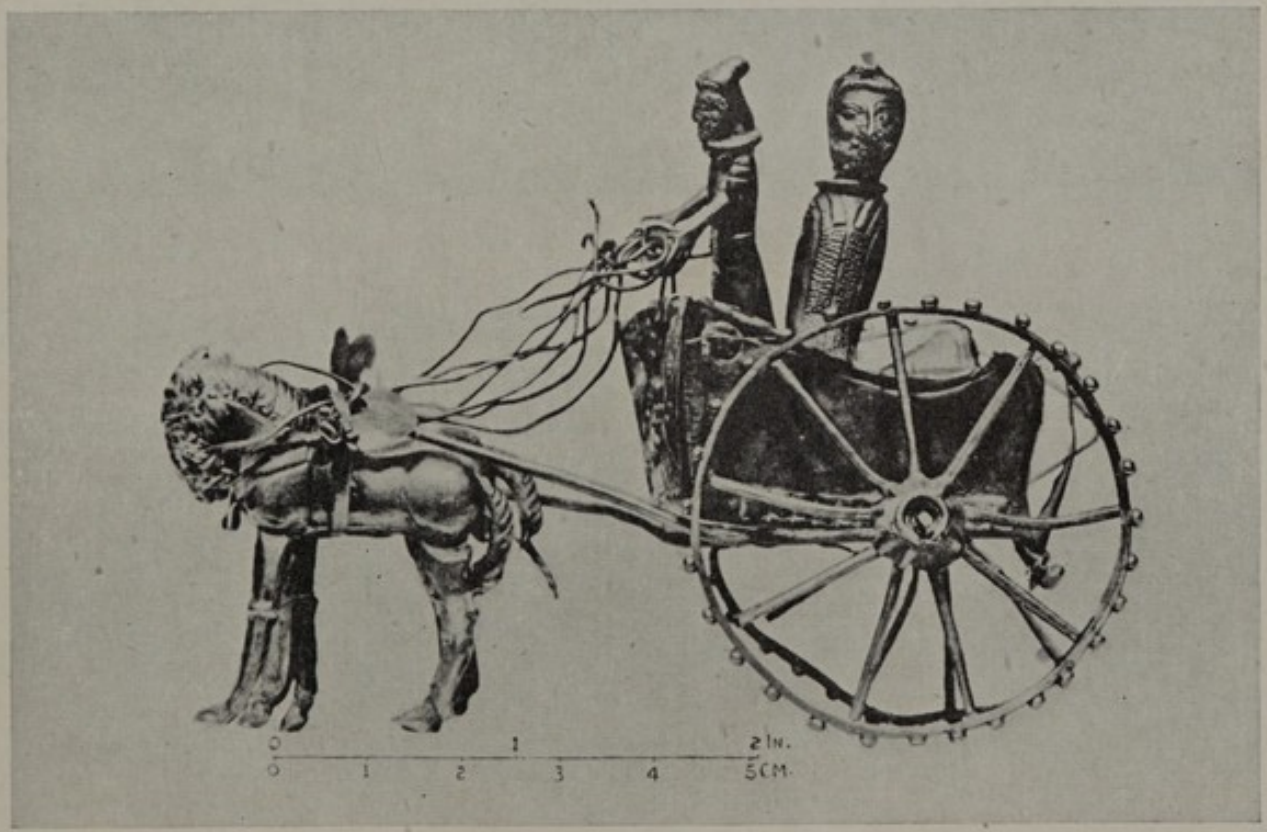
Alexander had regarded the Persian provinces as the mainstay of his empire, but the Seleucids lost control of the east because they were distracted by continual wars with their western neighbours, the other Successor dynasties, such as the Ptolemies of Egypt and the Antigonids of Macedonia. After 200 B.C. these were reinforced or replaced by a more formidable enemy, the Roman Empire expanding eastwards from Italy, and the Seleucids were unable to prevent the rise of two new kingdoms in eastern Persia, the Greek kingdom of Bactria and the Iranian dynasty of Parthia. Antiochus IV, the last Seleucid monarch to make his power felt in these regions (*c.* 165 B.C.), accepted the Bactrian kingdom as a more efficient bulwark against the nomads of the trans-Caspian steppes than he could maintain from Babylon or Syrian Antioch. But with the Parthians there could be no agreement because they represented the reaction of Iran against Greek domination.

Bactria. The Bactrian kingdom, which was founded by the Seleucid satrap Diodotus (*c.* 246–230 B.C.), though he never assumed the diadem, included at its greatest extent the satrapies of Aria, Arachosia, and Paropamisadae in the south, and Sogdiana in the north (fig. 42). Euthydemus (*c.* 225–*c.* 189 B.C.), who may have acknowledged Seleucid suzerainty, extended his authority beyond Sogdiana to the fringes of Chinese Turkistan; his son, Demetrius, crossed the Hindu Kush (*c.* 184) and made himself a kingdom, first of a line of Indo-Greek principalities, out of the remnants of the Maurya Empire in the Punjab. Between 141 and 128 the Bactrian dynasty was overwhelmed by the Yue Chi horde of Sacas, who had been displaced earlier from Chinese Turkistan by the movement of peoples farther east. The Yue Chi did not greatly disturb the economy of the country, but drove the Greek kings and their armed forces into India, where they reinforced the Indo-Greek dynasties.

Parthia. About 247 B.C. a new Iranian tribe, the Parni, which had entered Parthia from east of the Caspian, established an independent dynasty called Arsacid from a legendary king Arsaces. Its first powerful king was Mithridates I, who about 160 B.C. wrested Media and Persis from the Seleucids and Aria from the Graeco-Bactrian dynasty. By 140 he had established himself in Mesopotamia and taken the Achaemenid title King of Kings. His successor Mithridates II (124–87 B.C.) dealt with the Sacas, who were now attacking Parthia. He drove them out of Iran into north-western India, where they put an



169. *Head of man in gold from Achaemenid treasure of Oxus*



170. *Model of Achaemenid chariot in gold*



171. *Gold fish from Oxus hoard*



172. *Achaemenid warrior from Oxus hoard*



173. *Parthian warrior, in bronze*

end in turn to the Indo-Greek kingdoms. He also extended Parthian suzerainty to the Oxus, but these conquests were not permanent. Many Sacas remained in Drangiana and gave it the new name of Sacastene or Seistan, and about A.D. 60 the Saca-Kushan monarchy of north-west India extended its power westwards into the Hindu Kush and secured even Bactria from the Parthian Empire.

The Parthian Empire, 140 B.C.–A.D. 224

The Seleucid dynasty, which had been excluded from Anatolia in 189 B.C. by the Romans, lingered on gravely weakened in Syria, whence one vigorous monarch, Antiochus Sidetes, vainly attempted in 130 B.C. to recover the provinces east of the Euphrates. In 83 B.C. the Seleucid power was destroyed, from an unexpected quarter, by an Arsacid dynasty recently established in Armenia. But in 64 the Roman armies of Pompeius Magnus reduced Armenia to impotence and permanently incorporated Syria in the Roman Empire. A new world order had arisen which persisted until the Moslem conquest. The Euphrates became the boundary between the western Graeco-Roman (later Byzantine) Empire of the Mediterranean world and the oriental Parthian (later Sassanid) Empire of Armenia, Mesopotamia, and Persia. For seven centuries the energies of the dynasties which ruled Persia were distracted at irregular intervals by frontier warfare with the Roman Empire, but Persia itself was little affected by these events. No Roman or Byzantine army ever occupied territory east of the Zagros, and the worst threat to Parthian and Sassanid rule was the continual pressure of central Asiatic hordes against the Caucasian and Caspian frontiers of the empire.

Graeco-Parthian Persia (figs. 43, 44)

The strength of the Seleucid monarchy depended, apart from its armies, on the garrison towns and cities of Greeks and Macedonians which were established at key points throughout the empire. This bold colonial policy, initiated by Alexander, suited the peculiar conditions of geography and human settlement in Persia. The loyalty of the Greeks to their kings and the strength of their walled towns alone enabled the foreign domination to be maintained against Persian nationalism and the pressure of nomad peoples from the Caspian steppes. The Greek towns were far more numerous than the Achaemenid palace-cities from which civilization had hitherto radiated, and they contributed a new element to the formation of Persian

civilization. The Greeks brought with them their own notions of local self-government, philosophy, and literature, and this Hellenic influence was a healthy corrective of the orientalism that would otherwise have swamped Persia from India and Babylonia. The essence of Hellenism lies in free intellectual inquiry, based on the assumption that man (not nature or deity) is the measure of all things, and in a fine sense of form and proportion in artistic, architectural, and literary activity.



FIG. 44. *The divisions of the Parthian Empire*

Except at Susa no extensive excavations of Greek cities in Persia have been undertaken, but the coins of the Greek kingdom of Bactria rank among the finest works of Greek engravers. Greek influence, following the Bactrian kings into north-western India, produced the remarkable Indo-Greek sculptures of Gandhara, and in Parthia the fine statue of a warrior found at Malamir (photo. 173). Greek men of letters, like Apollodorus of Artemita who wrote a Parthian history, were still writing under the Parthian Empire, and many Greek cities survived until the end of the first century A.D. The Arsacid dynasty came to terms with the Greek cities, and adopted much of the administrative system and something of the Greek civilization of the Seleucid Empire. Thus Greek was still in use as an official language at the village of Avroman in Kurdistan in 24 B.C.

The prosperity of Bactria under Greek rule was remarkable. The

waters of the Oxus were distributed by irrigation canals and the fertile lands were intensively cultivated, particularly with the vine. The population was gathered into walled towns and villages, traditionally numbering 1,000 and having a population of one million according to a Chinese visitor, and they learned the art of self-government from the Greek settlements. The oasis of Merv (Margiana) was a Garden of Eden protected by a wall 187 miles long, as at a later date were those of Bokhara and Samarkand. Regions of Margiana and Sogdiana which are now occupied by the Qizil Qum desert were rendered cultivable and habitable by irrigation. In western Persia there is less evidence, but the use of the *qanat* for irrigation was widespread, and it was royal policy to encourage the agricultural settlement of semi-nomadic hill tribes such as the wild pre-Iranian Uxii of the Bakhtiari country.

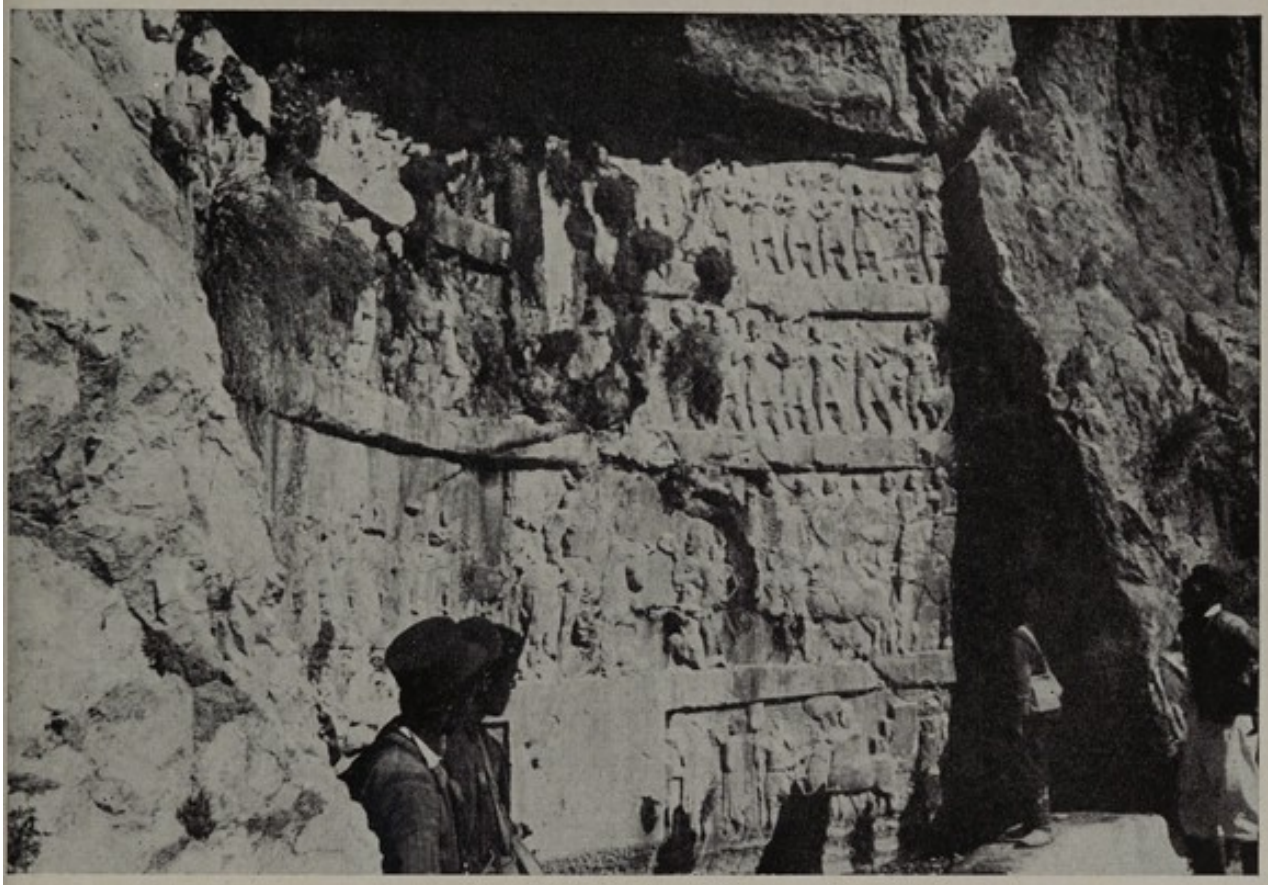
Through Persia there passed trade routes which brought transit goods from the Far East to Mesopotamia and the Mediterranean. In early Achaemenid times gold from Siberia was carried by caravan through Chinese Turkistan to centres such as Samarkand and Bactra (Balkh), whence it reached Babylon by the royal road. But in the third century B.C. nomad movements interrupted the routes, and it was to reopen them that Euthydemus of Bactria led an expedition to western Chinese Turkistan, and that a Chinese emissary reached Bactria in 128 B.C., where he was delighted to find a civilized people. In the Parthian period the routes were open and silk goods from China reached the west in quantity. The Arsacids were much concerned to protect these routes within Persia, and also to exclude the traders of the Roman Empire from exploiting them to the detriment of Parthian subjects; Chinese annalists also complained of the exclusiveness of the Parthian trading policy. Despite this, trade flowed along these routes from the Roman provinces through Persia and to the Far East throughout the first three centuries A.D. The trade-routes through the Hindu Kush to the Indus were also open (fig. 43).

Administration. The Seleucids had increased the efficiency of administration by subdividing the huge Achaemenid satrapies into 'eparchies' or sub-provinces, which corresponded more closely to geographical units, and the eparchies were divided into districts (hyparchies), each with its set of administrative officials. A land registry was based on the hyparchies, and the towns housed the regional archives. The king was represented in each satrapy by a 'general' (strategos) and in the self-governing cities by his 'overseer' (epistates).

This system was feudalized by the Arsacids. Great feudatory families were responsible for large areas of the old satrapies and for the provision of military contingents raised from their estates. In other regions the eparchies were retained and became small satrapies, the rule of which also tended to become hereditary. For this the Arsacids were later known as the Kings of the Sub-kings. Within Persia western Media (*class.* Atropatene, fig. 44), Susiana, and Persis, where priest-kings ruled at Istakhr, were thus withdrawn from direct administration. In the east the Suren family had a hereditary fief in Sacastene and sometimes held the suzerainty of Arachosia, Paropamisadae, and adjacent areas. The greatest of the Surens was Gondophares, who between A.D. 19 and 58 united these regions and took the royal title; later these provinces fell away to Kushan dynasts from India (p. 235). In the north the Caspian region of Hyrcania (east Mazanderan) also tended to detach itself from Arsacid control. The core of their power was in central Media, with the summer capital of Ecbatana, and in Parthia (fig. 44), but the winter capital was Ctesiphon in Mesopotamia.

The loosening of the central administration strengthened rather than weakened Parthia, because the change was dictated by physical factors. Despite frequent civil war within the Arsacid family, the dynasty lasted long and lost little of its lands; for they owed much to their peculiar army, well suited to Iranian conditions. The Arsacids introduced a variation of the Achaemenid military tradition by replacing the infantryman with the heavily armed and armoured mounted 'cataphract', who with his huge spear resembled a medieval knight, though his armour was chain mail, not plate. Their heavy horses were a special breed of the Nisean steeds of Media, with a 'shape of their own' (photo. 175). They also used light mounted bowmen, shooting the 'Parthian shot' backwards over the crupper, with great effect against the inexperienced Roman legions of Crassus at Carrhae in 53 B.C. But the heavier cataphract eventually prevailed as the arm of Asia. The royal army was small, with a total levy of 40,000 and a normal strength in cataphracts of 6,000, but it was hard to destroy. The Parthian Empire, being strong and unaggressive despite its weak administration, lived long and fell finally from within.

Religion and Arts. In religion as in politics the Arsacids championed a revival of Iranian civilization. They were official but not strict Mazdaeans, though under Vologases I (A.D. 51–77) the first attempt was made to codify the Mazdaean traditions and an early form of the Avesta, the 'Bible' of the Mazdaeans, was compiled. There was a



174. *Triumph of Shapur I*



175. *Investment of Sassanid king Ardashir*

revival of the influence of the Magi, who formed one of the Royal Councils, and this revival led to the organization of the Mazdaean Church under the Sassanids. But the true guardians of the Mazdaean faith in this period were the priest-kings of Persis. The Arsacids were tolerant of other religions, such as Judaism and Christianity, which spread in the Mesopotamian provinces, where an anthropomorphic version of Mazdaeism, the cult of Mithras, also gained much ground and percolated into the Roman Empire.

The Parthians spoke a Middle Persian language, written in an Aramaic ideographic system called Pahlevi, but they have left few documents and no literature behind them, though writing was common for practical affairs, and parchment was in general use, ousting papyrus. In architecture and relief sculpture, of which the remains are few, new designs and styles appear in the Parthian period, reflecting a break with Hellenistic traditions and the revival of the Iranian outlook. Sculpture becomes less realistic and more abstract and oriental. In architecture the royal palaces show the invention of the great central arched hall or *liwan* as the main element, a principle developed in the Sassanid period. Of Greek influence, which is superficial and often merely ornamental, Parthian art, like the later Sassanid, retained only the unessential.

II. SASSANID PERSIA

Summary, A.D. *224–640*

In 208 Ardashir, sub-king of a new dynasty in Persis and grandson of a high priest, Sassan, of the temple of Anahita at Istakhr, rose in revolt against the Arsacids, won over the adjoining provinces, and in 224 defeated and killed Artabanus V at the battle of Hormizdeghan, an unidentified site. In a few years he won by arms all the Parthian provinces from the Hindu Kush, where the Kushan dynasties recognized him as suzerain, to the Euphrates, except for Media Atropatene. Thus a south Persian dynasty again replaced a northern, as in the sixth century B.C. Though the Sassanids proclaimed themselves the heirs of the Achaemenids and repudiated the Arsacid tradition, there was no violent reversal of the Arsacid system of government, and the capital remained at Ctesiphon in Mesopotamia. The difference between the two regimes lies in the greater efficiency of Sassanid administration and in the creation of a national Mazdaean Church with a

regular clergy. In war the Sassanids were more aggressive than the Parthian Arsacids, because their resources were somewhat better organized, but no more formidable, although their army was rated as the finest fighting force of the time. Their achievements against the Byzantine Empire seldom surpassed those of the Parthians against Rome, and the general extent of the Sassanid Empire was somewhat less than that of the Parthian, though what they had was perhaps more firmly held. The Sassanids never ruled all northern Mesopotamia and all Armenia in the west, and in the east their power seldom extended beyond Merv and Herat.

For the internal history of Persia the Sassanid period is the time when a distinctive Persian way of life in politics, religion, arts, and crafts was first consolidated. The Sassanid monarchy was of the same type as the Parthian and Achaemenid, and showed most vigour in the first and the last centuries of the era, the greatest kings being Ardashir I and Shapur I in the third century and the two Chosroes in the sixth and seventh centuries.

Relations with Byzantine Empire

In the west the Sassanids succeeded to the Parthian inheritance of border warfare with the Roman or Byzantine Empire,[1] but this warfare was waged with greater energy than formerly because the Sassanids as heirs of the Achaemenids claimed the west Asiatic provinces now held by Rome, and also because the religious differences between the two empires often disturbed peaceful settlements. The borderlands—northern Mesopotamia, Armenia, and the territories between Armenia and the Caucasus (Iberia and Lazica, modern Georgia)—were in perpetual dispute. The predominance of either empire in these regions varied from generation to generation according as its opponent was distracted by civil strife or barbarian invasions on more vital frontiers. But at irregular intervals major wars were waged, with Romans taking Ctesiphon and Persians taking Antioch, the Syrian capital of the eastern Byzantine provinces.

Thus in 252–261 Shapur I after seizing Media Atropatene and Armenia, hitherto held by Arsacid princes, invaded the provinces of Syria, Cilicia, and Cappadocia, sacked Antioch, captured the Emperor Valerian and put him to death. Shapur was checked unexpectedly by the resistance of the powerful Syrian Arab principality of Palmyra,

[1] The eastern Roman Empire is not usually called Byzantine, after its capital Byzantium or Constantinople, until after the division of the empire in the age of Valentinian (A.D. 363–375) and Theodosius (375–395).

which lay athwart his lines of communication. Later in the century the armies of two strong Roman emperors, Carus in 283 and Diocletian in 296, invaded Mesopotamia and captured Ctesiphon, in the reigns of Bahram II and Narses. A peace was made which left Armenia and all northern Mesopotamia in Roman hands. In the long reign of Shapur II (310–379) the advantage gradually swung in favour of Persia. The Emperor Julian's disastrous invasion of Mesopotamia in 363 was ended by his death, and a peace-treaty restored Armenia and half of northern Mesopotamia to Persian control. In 387, after Shapur II's death, Armenia was partitioned between the two empires. By this arrangement, which persisted till the end of the Sassanid period, the lion's share fell to Persia, though the frontiers drawn up appear to have been strategic. The Roman frontier fortresses at Theodosiopolis (Erzurum) and Amida (Diyarbekir) left the whole basin of the Araxes, the upper valley of the Murat Su, and the Van region to Persia. This was the most westerly extension of the Sassanid Empire. Armenia, however, was Christian and of uncertain loyalty.

In the fifth century there was a long period of peace with the Byzantines. The 100 years' peace signed in 422 was seldom interrupted by hostilities till the reign of Kavad (488–531), who stirred up the Byzantines by his intervention in Iberia and Lazica, where he sought to establish a Persian base on the Black Sea. His wars with Anastasius (502–507) and Justinian (527–531) ended with the restoration of the *status quo*, but his successor Chosroes I between 540 and 557 broke through the deep ring of fortresses which defended the Byzantine frontier provinces, invaded Syria, where he sacked Antioch and reached the Mediterranean, and in the far north conquered Lazica and reached the Black Sea. But the strong Byzantine resistance in Armenia led to a 50 years' peace in 562 and an attempt at a general settlement of differences; the Byzantines agreed to make a large annual contribution in gold, while the Persians accepted the responsibility of preventing barbarian hordes from entering Mediterranean Asia through the Caucasus passes. Also the two empires accepted the principle of reciprocal religious toleration provided that there was no proselytism.

The peace lasted barely 10 years, and warfare reached its climax in the reign of Chosroes II. He had been restored to his throne after a palace revolution by the Byzantine Emperor Maurice in 590, after whose death he overran (611–619) Syria, Palestine, and Egypt, and invaded Anatolia, where his expeditionary force reached Chalcedon opposite Byzantium (Constantinople). The Byzantines, shocked by

the sack of Jerusalem (614), rose to the occasion. The counter-offensive of Heraclius (622–623) cleared Anatolia and swept down the Aras through Persian Armenia into Azerbaijan. Nakhichevan was taken and the great fire-temple at Ganzaca was destroyed. In 627 a bold thrust west of Lake Van brought Heraclius by a new route into northern Mesopotamia, and, though he failed to take Ctesiphon, a favourable peace was secured in 628.

The Northern Frontier

The Byzantine wars did not affect the Iranian provinces, and their peace was disturbed only by the pressure of nomad peoples from beyond the Oxus in the north-east and the Caucasus in the north-west. The former were the more dangerous, but they were held in check until the irruption of the Ephthalites or White Huns, who entered Sogdiana and Bactria about 425 and put an end to the Kushan dynasties. The Ephthalite capital was at Balkh, and they built up a powerful state which stretched through the Hindu Kush into India and included the northern fringe of Khurasan, where the Gurgan river was their southern limit. For 130 years there were hostilities until a new people from central Asia, the first of the Turks, moved into the Oxus region and destroyed the Ephthalites about 557 in conjunction with Chosroes I. Thus the tendency, first noted in the Seleucid and Arsacid period, for the Oxus provinces and those which form modern Afghanistan to be withdrawn from the Persian orbit, recurs in the Sassanid Empire. Kings ruling from western Persia and Mesopotamia had difficulty in making their will felt in the extreme east.

It was apparently the Ephthalite pressure which enabled the last of the Iranian peoples to enter Persia from the north-west through the Caucasus in the sixth century. These were the folk from whom the modern Baluchis are descended. It may be added here that by the thirteenth century they were established in Kirman province, whence they moved eastward into their present habitat, submerging other elements some of which were also of Iranian origin.

End of the Dynasty

The last century of Sassanid rule saw its greatest king, Chosroes I, who was both a great soldier and a great statesman. His Byzantine and Ephthalite wars showed his military ability (p. 241), and his constitutional reforms rescued the Persian monarchy from the domination of the nobles (p. 243), while his reform of taxation (p. 245) satisfied

the common people and gained him the surname of Dadgar 'the Just'.

These reforms were, however, too late to save the dynasty. The violent campaigns of Heraclius and Chosroes II weakened Sassanid control of the State, and for the first time in Sassanid history generals who were not members of the royal house began to aim at the throne. Chosroes II was murdered in 628, and no less than twelve persons wore the tiara before the crowning of Yezdigird III in 632; he had to face the Moslem invasion, which in four years so completely destroyed the Sassanid armies that the Sassanid dynasty collapsed as rapidly as the Achaemenid, its greater archetype.

Constitution and Administration

The powers and the majesty of the monarch, the Shahan Shah or King of Kings, were absolute, being derived in the political philosophy of the times from Ahura Mazda whose 'light divine' (*Hvareno*) descended upon the crowned king. The court ceremonial was impressive, and the separation of the ruler from the ruled and even from his attendant ministers and nobles was strict. None might address him except by royal invitation, and he appeared in public only on rare and formal occasions. But loyalty, as in the Parthian period, was rather to the family than to the particular monarch. Palace revolutions were fairly common, though their object was only to substitute one Sassanid for another. The strongest kings chose their own successors, but generally the succession was determined by a council of the leading nobles, and sometimes of the clergy.

The feudal system of government was brought under central control. Details are obscure, but apparently the large provinces such as Kirman or Armenia had military governors. They bore the title of Shah if they were members of the Sassanid family, and of Bidhaksh or Marzban if they were not; but their appointments were neither hereditary nor permanent. There were civil governors of smaller districts such as the natural regions around large towns, with the old title of Satrap, and for civil affairs generally the basic unit was the canton or *shahr*. Minor administrative officials varied in importance from the directors of accounts of provinces and satrapies down to the *shahrigs*, who collected the taxes in the cantons. The empire was also divided generally into four great quarters, north, south, east (which survives in the term Khurasan), and west, under the general supervision of *Marzbans*, marshals with civil and military powers. The Mazdaean Church also had a similarly centralized pattern (p. 247).

The central government was in the hands of ministers: the First Minister (*Hazarobadh* or *Wazurg Framadhar*), the Chief of the Husbandmen (*Vasroshan Sirdar*) who was the minister of finance, the Generalissimo of the army (*Iran Spahbadh*), the Head of the Church (*Mobadhan Mobadh*), and the Chancellor (*Dibherobadh*), whose numerous secretaries (*dibher*), organized in various bureaux (*divan*), drafted royal edicts and handled diplomatic affairs. The extreme formality of official language rendered the secretaries indispensable. Separate divans existed for the Secrets, for the dispatch of royal letters, for criminal justice, for awards of honour and preferment, for finance, and probably also for the army and lesser branches such as the royal domains, the mint, and the royal post. Much of this system was inherited from the past, but the administration was no longer semi-Greek in form.

The army was no longer formed on feudal principles from the retainers of the nobles. Though the levy of tenants was occasionally used to provide a mass of infantry, the all-important cavalry were recruited directly from the landowning classes and were largely maintained by the crown. The effective army was a force of knights who owed their loyalty to the king. The great nobles compensated themselves for this loss of power by securing control of the highest offices in the administration. Thus there eventually arose a crisis in the State, until the two kings Kavad and Chosroes I rescued the power of the monarchy from the domination of the nobles and clergy. Kavad (488–531) strengthened himself by supporting the equalitarian sect of Mazdakites (p. 249) against his enemies, though when he had carried his reforms he repressed the sect. The office of First Minister, which had been absorbing the royal authority, was reduced to titular importance, and Chosroes (531–579) broke the power of the Generalissimo or *Iran Spahbadh* by dividing the control of the army between four Spahbadhs, and by transferring the pay of the army completely to the royal treasury. His victory over the nobles is shown by the fact that he was the first monarch since Shapur II to nominate his successor.

Social and Economic Organization

The four centuries of Sassanid rule, like the lengthy Arsacid period which preceded, were an age of remarkable internal stability, but also an age in which travel and exchange of ideas were more strictly controlled than formerly. The frontier with the Byzantine Empire was carefully policed not only for military security but also for commercial

and religious reasons. Great care was taken to prevent foreign embassies from spying out the land on their way to the capital and to shepherd them back again. Thus Persia, though still including the non-Iranian peoples of Mesopotamia, turned her back upon the more enlightened West.

The Aristocracy. Persian society was nominally divided by function into four classes, clergy, warriors, bureaucrats or secretaries, and commoners. The three former classes, which in practice overlapped and were often drawn from the same families, formed the nobility. Within the nobility there were four grades, which were of greater importance than the classification by function. Each grade had its special titles, clothing, head-dress, jewellery, and caparisons for its horses. The highest class were the *Shahrdars*, comprising the provincial governors belonging to the Sassanid family. The nobility proper was led by six principal families including the Parthian Surens and Karans, which all owned vast estates scattered through the empire and had hereditary rights to certain posts in the government. The heads of these families were entitled *Vaspuhr*. The principal ministers formed the third grade as *Vuzurgan* or Great Ones. The fourth grade consisted of a great number of lesser nobility called *Azadhan*, Free Men or Barons, differing in wealth and importance. Below them, and hardly ranking as nobles, were the small squires (*Dehqans*) who ruled their own villages and provided the cantonal tax collectors. It was from the four classes of nobility, and particularly from the Azadhan, that the Sassanid army was recruited. The love of titles and outward marks of distinction was thus established as a Persian custom. But the stratification of society never solidified into a pure caste system, though it was hard to pass from one grade to another.

The Peasantry. The commoners consisted of the peasantry and the artisans and traders of the towns. The peasantry were tied to the soil like serfs and bound to perform statutory labour for the State and for their landlords, who were the greater and the lesser nobles. They could be called up for war as an infantry levy, but their fighting value was small in the specialized warfare of the age because they were neither trained nor paid. Their proper function was to provide the sinews of war in taxation. They paid both a land tax and a personal capitation tax to the royal treasury. Until the reforms of Kavad and Chosroes I these were inequitably assessed and were always subject to gross exactions.

A land survey begun by Kavad (488–531) was completed by Chosroes (531–579). A fixed unit of taxation, the *garib* of about 0·6 acre,

was adopted for the land tax, and a rate of tax was fixed by a sliding scale in accordance with the quality and situation of the land and the nature of the crop. Fruit-trees were taxed by numbers in a similar way. The capitation tax or *gezit* was graded according to wealth and limited to men between 20 and 50. The townsfolk were better off than the peasants because they paid only the personal tax and were not liable to military service, although they made more money in their crafts and trades.

Regular and intensive cultivation of the soil was characteristic of the Sassanid Empire and the basis of its wealth. The Avesta has special praise for the life of the landholder, and the Sassanid governors were attentive to irrigation. One of the principal Sassanid antiquities is the Band-i-Kaisar, a great dam built on the Karun by Roman prisoners of war for Shapur I. Less, however, is known of Sassanid irrigation in Persia than in Iraq, where the skeleton of the Moslem irrigation system was Sassanid.[1]

Trade. In international trade this was a period of state controls. Despite the movement of nomad hordes in central Asia the Silk Route continued to be used and Persian merchants were enriched by this trade, which was strictly regulated at the western end. Byzantine and Persian traders exchanged wares only at the marts of Nisibis, Dubios (Dovin), and Callinicum in north-western Mesopotamia; smuggling by Arab nomads across the Syrian desert was officially forbidden; Persian merchants also controlled the silk trade by sea from Ceylon and had a monopoly of silk in the Ceylonese markets, which the Byzantine emperor Justinian vainly sought to break by encouraging Abyssinian carriers to bring the silk to the Red Sea ports of Egypt. Justinian also schemed with the Turks recently arrived in the Caspian region to evade the Persian middlemen, by trading directly with Byzantine establishments on the Black Sea coast of Lazica (*mod.* Georgia). This international trade encouraged the establishment of great emporia at the extremities of the empire, in Mesopotamia and Khurasan, but internal trade through the long centuries of peace had also built up a system of local market towns inside the empire.

Law and Custom. Justice was associated with religion, being provided by provincial and cantonal judges drawn from the Magian priesthood, who alone knew the traditions. Final authority rested with the king, and the earlier Sassanids appeared in public twice a year that the oppressed might appeal to them for justice; but there seems to have been no organization of appeal courts to check local injustices.

[1] See B.R. 524, *Iraq and the Persian Gulf*, p. 433.

Already justice appears in an arbitrary guise tempered only by the intervention of the sovereign. Frightful tortures were used for the examination of suspects, though the Persians were no worse in this than other civilized contemporaries.

The law relating to marriage and family contained several peculiar provisions reminiscent of a tribal stage of society, and intended to prevent the extinction of the aristocratic families by maintaining the patrilineal class on which Iranian society was based. Thus if a man died without male issue his widow or daughter or even a stranger might be married to his nearest relative, and their first son was considered the offspring of the dead man. If a man died unmarried the family might sponsor the marriage of a stranger to the nearest relation and receive half their offspring as the dead man's heirs. The Persians were nominally polygamous and had both wives and concubines. Marriage was a dignified status and required the consent of parents, but it was possible for even a woman to marry legally without consent, though she was severed from her own family until her eldest adult son gave his retrospective approval to the match. Thus women, though in the power of their husbands, had a position well above that to which they were reduced in the Moslem period.

Religion

In these centuries, both in the Byzantine and the Sassanid empires, men's minds were preoccupied with questions of faith. The organization of the Mazdaean Church, inspired by the Magian clergy, was the most notable product of the Sassanid Empire. The nucleus was the local sacred fire, and fire-temples were established throughout the empire. Each clan and each village had its own shrine, and each canton had a special 'Vahram' fire, and there were great national fire-temples such as the royal Warriors' Fire or Gushnasp at Ganzaca in Azerbaijan, the Priests' Fire in Fars, and the Farmers' Fire near Nishapur in Khurasan. The fire-temples were square domed buildings, and the fire was on either a tripod or a columnar altar within a darkened shrine. Each village had two magi as priests, and the provincial temples were tended by a numerous body of magi (*Mogh*) under a *Mobadh* or 'commander of Moghs'. The general control of ceremonies was in the hands of clergy called *Ehrbadh* or Instructor, supervised by the *Ehrbadhan Ehrbadh*. The head of the whole church was the *Mobadhan Mobadh*. Ranks and titles were thus as rife in Church as in State.

This organization, comparable to that of the contemporary Christian Church, enabled Mazdaeism to reach the remote corners of the

empire and encouraged some kings to attempt the forcible conversion of their non-Mazdaean subjects. Generally, however, the Sassanids were tolerant of other religions, though apostasy was always a crime. The persecution of Christians occurred only when a weak king was controlled by the clergy, or as a counterblast to the oppression of Mazdaeans in Anatolia by the far more intolerant Byzantine Empire. Thus Shapur I ordained that 'the Magian, the Manichean, the Jew, and the Christian . . . shall live in peace according to their religion'. Most kings, like Yezdigird I, would protect the Christians from the Magi as long as they did not proselytize. Chosroes I, who had a Christian wife and son, endeavoured to enforce Mazdaeism in Christian Armenia in order to strengthen its attachment to Persia.

Sassanid Mazdaeism was affected by the ferment of religious speculation then common to the whole Middle East. A monotheistic element is notable in the addition to the old dualism of a primordial principle, Zervan or 'time', from which both Ahura Mazda and Ahriman were sprung. This Zervanist faith was pessimistic and held that evil (Ahriman) would rule for 12,000 years before the triumph of Ahura Mazda, and that Woman was the ally of Ahriman. Greater importance was assigned to those spirits such as Mithras (sun) and Adhur (fire) hitherto regarded only as Helpers of Ahura Mazda. Now with a personification of Mazdaean faith they were ranked with Ahura Mazda as creative powers, a tetrad which has some likeness to the Christian Trinity. Zervanism, however, was fast declining by the end of the Sassanid period.

Manicheism. The teaching of Mani, a product of the religious atmosphere of Persian Mesopotamia, was a remarkable attempt to fuse together the two great rival religions, Christianity and Mazdaeism. Mani preached first under the patronage of Shapur I in 242 at Ctesiphon, gained the hatred of the Magi, and was put to death by Bahram I in about 273. His central doctrine, which was expressed in a complicated mythology and cosmogony, was that Evil was produced by the Dark invading the Light, and that out of Evil was produced the world. The Light was imprisoned in man, and Mani's system, completing the revelation of Jesus, explained how the Light (not man as such) was to be set free. When the Light has all been recovered the world ends.

There were two grades of Manichees, the Elect and the Hearers. The Elect, few in number, lived a strict life like that of an Indian holy man, abstaining from wine, animal food, marriage, and property; disciples, drawn from the Hearers, prepared bread for the Elect to

save them from the guilt of reaping and cooking it. The Elect were moved not by a sense of unworthiness, like the Christian ascetic, but from a belief in their righteousness: in them the Light was redeemed from the contamination of evil: the notion recurs in some forms of Shia Moslem sainthood. But the Hearers were akin to the normal sinful followers of other salvationist religions, and their emotional beliefs were formulated in creeds and litanies with the characteristic response: *Manastar hirza*, 'cleanse our spots'. This strange faith, which had little sympathy for men as human beings but great reverence for the structure of things and of the universe, spread through the Persian Empire, despite persecution, and beyond into Turkistan. It greatly influenced the development of Moslem mysticism in later days.

Mazdakites. This sect originated during the reign of Kavad in the preaching of a Khurasani called Mazdak, and contained many Manichean elements. It explained the ordering of the universe by a system of principalities and powers based on mental forces such as Judgement, Intelligence, Memory, and Joy. The man whose nature unites these spiritual forces was a divine being, like the Manichean Elect. Evil originated in the desire for women and money; to prevent evil Mazdak preached a primitive and communal ownership of its sources. The sect survived into Moslem times, when it existed in varying forms in both the western and the eastern provinces and in Turkistan.

Buddhism. In the eastern border provinces Mazdaeism lost much ground to Buddhism, which was established at Balkh in Bactria (Khurasan), where there were Buddhist monasteries at the time of the Moslem conquest; in Afghanistan preliminary exploration has revealed many Buddhist monuments of these times. Buddhist influence may also be detected in the Manichean and Mazdakite sects.

Christianity, however, was probably a more formidable rival of the Mazdaean faith than Manicheism or Buddhism. Its permanent achievement in the East was the conversion of Armenia by St. Gregory the Illuminator in the late third century A.D.; despite the efforts of such kings as Chosroes I the Armenians never abandoned their faith. In the sixth century the Armenian Church, which had become the focus of Armenian nationalism, separated from the Byzantine Greek Orthodox Church in support of the Monophysite doctrine concerning the unity of the nature of Christ, much debated in that age. The final division in 553 decreased the political attachment of the Armenians to Byzantium.

In the rest of the Persian Empire, 'Nestorian' Christianity was the dominant form. This originated in northern Mesopotamia from the

teaching of the patriarch Nestorius and differed alike from the Orthodox Church of Byzantine Anatolia and from the Monophysite Church of Byzantine Syria. Hence the Nestorians were trusted by the Persian Government, particularly after their expulsion from the Byzantine Empire in 489, though they were occasionally repressed when their proselytizing was too successful. Later they spread Christianity through southern Asia, but in the Sassanid period their main strength was in Mesopotamia, where the seat of their patriarch or Catholicos was at Ctesiphon. The catacombs on Kharg island in the Persian Gulf are their principal archaeological memorial.

Arts and Crafts

In the Sassanid period the Hellenic element disappeared from Persian civilization except in the Christian communities, which maintained Greek libraries and in particular kept alive the Greek school of medicine. Shapur I ordered the translation of some scientific Greek works into Middle Persian; but the Mazdaean clergy, who were the learned class of society, neglected and disliked the Hellenic tradition, although they had little to put into its place. Once more civilization, as in the Achaemenid period, depended mainly on the palaces of kings and nobles, whose tastes were very limited. The crafts of clothing, jewellery, and metalwork were skilful and luxurious, but in sculpture the few royal reliefs at present known, which mostly show scenes of battle, triumph, and hunting, are poor and heavy compared to those of the Achaemenid period (photos. 174, 175). In architecture alone the Sassanids standardized a new style, magnificent in conception but generally executed in poor materials so that very little has survived. The ground plan of their palaces remained the same as in the Achaemenid period, but the flat roofs over pillared halls were transformed into domes and vaults. These were superimposed on the square or rectangular halls by the use of supporting pendentives or angle brackets in the four corners. The style is seen at its best in the mosques of the early Moslem period; weather has transformed the shoddy concretes used by the Sassanids for their palaces at Firuzabad, Shahpur, and Qasr-i-Shirin into ruin mounds. Some of them, like the huge palace at Ctesiphon in Iraq, of which a wing still stands, were spoiled by the misapplication of external decoration in the Graeco-Roman style. The palaces with their annexes were laid out like those of the Achaemenids within great hunting-parks, called *Paradises*, and surrounded by walls.

Literature. In the Sassanid as in the early Byzantine Empire the

religious passions of the age absorbed the intellectual interests of men to the detriment of most forms of literature. The codification of the Avesta, the Mazdaean scriptures or book of law and tradition, apparently done by the high priest Tansar for Ardashir I (226–241), its revision for Shapur II (310–379), and the compilation of a new commentary in the reign of Chosroes I (531–579) were characteristic of the times. There were, however, some writers who compiled or revised in Middle Persian the history, myths, and family traditions of the Persians, in such works as the lost Book of Kings and the extant Book of Great Deeds. Later Arabic and New Persian writers found much epic material available on which to base works such as the *Shahnama* of Firdausi. But the lost Middle Persian literature, still written in the awkward Pahlevi script, seems to have been outstanding neither in form nor in content.

III. THE ARAB CALIPHATES

The Moslem Conquest, A.D. *637–652*

The invasion and conquest of Syria and Iraq have been described in the Handbooks for Western Arabia, Syria, Palestine, and Iraq, where accounts will be found of the growth of Arab nationalism and the Islamic religion together with the later development of Moslem Arab civilization. The following account is concerned solely with the impact of Islam upon Persia.

The rapid success of the Arabs was due to the exhaustion of the two empires and the unexpected nature, moment, and direction of the attack. The Byzantine Empire survived the first shock and lost no more than Syria and Egypt to the Arabs. The Sassanids were completely overthrown because of the extreme dependence of the State upon a particular dynasty, whereby the army and civil service had no separate loyalty to the Persian people that might have tided over the crisis. In 637, five years after Mohammed's death, Moslem armies having conquered Syria invaded Mesopotamia, defeated the Persian general Rustam at Qadisiya, and took Ctesiphon. The king, Yezdigird III, retreated eastward into Media, where the last royal armies were defeated at Nihavend in A.D. 641. The first stage in the conquest of Persia was completed by 651–652, when Yezdigird was assassinated in Merv. The Arab hold on Persia was gradually consolidated in the following 50 years, and between 705 and 715 was extended to the regions between the Oxus and Jaxartes from Khwarizm (Khiva) to Ferghana.

The Omayyad Caliphate, A.D. *661–750*

The Persian provinces were ruled by Arab generals in command of Arab armies of occupation under the supervision of the Caliphs or 'successors' of Mohammed, who ruled the Arab Empire first from Medina and after 660 from Damascus. The conquered peoples provided the Moslems with revenue, for the collection of which the Persian administration was retained in Persian hands; otherwise they were left alone to pursue their despised religions. At first converts to Islam among non-Arab peoples were neither numerous nor very welcome, but Islamic influence percolated steadily among the conquered from the permanent camps of the Moslem army. Non-Arab converts were regarded as clients, *Mawali*, and continued to pay the land tax, from which Arab Moslems were at first exempt. But measures such as the introduction of Arabic as the universal official language, the institution of a Moslem coinage by Caliph Abdul Malik (685–705), and the freeing of *Mawali* from their disabilities proposed by Caliph Omar II (717–720), were all part of a general assimilation of Arab and non-Arab which steadily increased the number of converts to Islam. This was most extensive in Khurasan, where the general Nasr (*c.* 736) introduced the sensible principle, later on adopted universally, that Arab and Persian Moslem and non-Moslem alike should pay land tax, but that all Moslems, as formerly, should be free of the head tax. Thus encouraged, whole peoples, such as the Sogdian Persians of Transoxiana, adopted Islam. Large sections, however, long retained the Mazdaean faith, which still exists in Persia, and two centuries after the Moslem conquest the descendants of the Mazdakites (p. 249) were numerous enough in Azerbaijan to make a dangerous insurrection.

Persia became a Moslem but never an Arab country, although Arab script was adopted for writing the Persian language. Except in Khuzistan, which is only an extension of southern Mesopotamia (Iraq), Arab settlement was never numerous enough to form solid Arab zones. But Islam brought Persia far more fully than before into the orbit of the civilization which had its focus in southern Mesopotamia, and Islam also had the special effect of acting as a solvent upon the aristocratic structure of Iranian society through its equalitarian doctrines.

Shiism. Within Islam there was a minority movement represented by the Shia sects, which centred in Iraq and sent missionaries to many parts of Persia, particularly Gilan, which was converted by Shias. In the time of the Arab caliphates Shiism was never predominant in Persia, but it was always a disturbing factor.

The Shia sects bitterly opposed the Omayyad Caliphate which ruled the Moslem world from Damascus between 661 and 750. The distinctive mark of Shiism was both political and religious and might be described as a matter of church government. The Shias held that the Caliphate, which the orthodox regarded as nominally an elective office, should be confined to the direct descendants of the Prophet represented by the family of Ali, the fourth Caliph, who was first cousin and son-in-law of Mohammed, whereas the Omayyad family, not directly connected to Mohammed, had monopolized the Caliphate since 661 and turned it into an hereditary dynasty. In opposition to the Caliphs the Shias set up the descendants of Ali as their religious leaders with the title of Imam, and claimed that these Imams inherited in some degree the prophetic and creative powers of Mohammed. The murder of certain Imams by the Caliphs provided the Shias with a series of saints and martyrs, of whom Husain, Ali's second son, tended to supplant the Prophet himself in the devotion of the faithful Shia. Later, with the development of Moslem theology, other religious distinctions arose between Shias and traditional or Sunni Moslems, but devotion to the house of Ali was their principal characteristic. During the early period they were split into numerous sects, which recognized different Imams, and it was only at a relatively late date that the *Ithna Asharia* or 'Twelfth Imam' sect became predominant (p. 328).

The Abbasid Caliphate, A.D. 750–1258

The Shias played some part in organizing the resistance of the Persian Moslems and of Arab malcontents to the Omayyad dynasty. After several unsuccessful attempts (720–724) a great revolt broke out at Merv in Khurasan in 747 under the leadership of Abu Muslim, a Persian Moslem in the confidence of Ibrahim, the Imam of a dissident Shia sect, who was descended from an uncle of the Prophet. With the black flag of the Prophet as their emblem the armies of Khurasan defeated the forces loyal to the Omayyads and invaded Iraq. At Kufa in 749 they proclaimed as Caliph Abu al Abbas, the brother and successor of Ibrahim. The last Omayyad was defeated at the battle of the Great Zab in 750 and the family was exterminated except for Abdar Rahman, who fled to Moslem Spain and founded a dynasty.

The Abbasid Caliphate, which lasted until 1258, moved its capital from Syria to Iraq, the true centre of these oriental empires, and a new capital was built at Baghdad (fig. 45). But it was only for the first

century that the Abbasid Caliphs directly controlled the Persian provinces. Thereafter these passed into the hands of a number of hereditary governors and independent dynasties. Thus the Caliphs failed, despite the spread of Islam, to replace the Sassanid kingship as the focus of Persian loyalties, although they adopted the external forms of the Sassanid monarchy in all its formality and pomp, and revived the Persian administrative system in its essentials. The reappearance



FIG. 45. *Central and Eastern Provinces of the Abbasid Caliphate*

of the First Minister or Vizier, of the governmental bureaux under the old name of *divans*, and of the royal post as an intelligence service were part of a general revival of Persian traditions. Within the provinces Persians began to dominate the intrusive Arab element, and the revival of Persian thought and literature increased its strength in each generation. At Baghdad, the centre of Moslem life, Persian scholars contributed to the new Arabic literature, philosophy, and science which was the glory of the Abbasid Caliphate,[1] though the direct influence of Persian civilization was perhaps greatest on the material side, as in architecture. In politics Persian influences were strong. The early Abbasids depended largely upon the levies of Khurasan, and under the two greatest Caliphs, Mansur (754–775) and

[1] See B.R. 524, *Iraq and the Persian Gulf*, pp. 248 ff.

Harun ar Rashid (786–809), the most powerful family in the State was that of the Barmacids from Balkh, themselves recent converts from Buddhism.

The Abbasid Caliphs soon abandoned their alliance with the Shias and became the champions of strict orthodoxy. But in the reign of Mamun (813–833), who had been Governor of Khurasan, Shia influence was strong. In 817 he designated as his successor the son of the Shia Imam Musa al Kadhim, though this direct bid for Shia support could not be maintained in the face of orthodox opposition. After Mamun's Caliphate the eastern empire broke up gradually into separate dynasties very like the break-up of the Seleucid Empire. The first sign was that the family of Tahir, right-hand man of Mamun, succeeded in retaining the governorship of Khurasan from 820 to 873, while the Dolafid family had a similar position in these years in south-eastern Media (Jibal). Between 861 and 878 Yakub ibn Lais, grandson of Saffar 'the coppersmith', put an end to the Tahirids of Khurasan and temporarily occupied Herat, Balkh, and even Fars, but the Saffarid glory was short-lived. Soon they were displaced by the far more important Samanids, though the Saffarid family persisted as local rulers till the thirteenth century.

Persian Dynasties (figs. 45, 46)

The Samanids (874–999), descendants of a Persian noble of Balkh who was converted to Islam in the Caliphate of Mamun, were the first great native dynasty to arise in eastern Persia, where with caliphal recognition they ruled the Oxus provinces from their capital Bokhara, took Herat and Balkh from the Saffarids, and farther west gained the Caspian province of Tabaristan (Mazanderan). There a Sassanid family still provided the local nobility and Islam had only recently displaced the Mazdaean faith. It was at the Samanid court that the first great outburst of Persian literature took place and that native Persian feeling first revived. The Samanids, true to Persian tradition, were noted for their coinage, which penetrated in Russian caravans to Pomerania, Sweden, and Norway. They did good service to the empire by controlling the Turkish tribes beyond the Oxus and Jaxartes rivers, amongst whom Islam was spreading, and may be compared in their political and cultural importance to the Greek kings of Bactria in Seleucid times. Eventually, weakened by internal divisions and Turkish pressure, the last Samanid king was deposed in 999 by Mahmud, ruler of the principality of Ghazni in eastern Sijistan (modern Afghanistan).

Meanwhile in south-western Persia, where the Arabs had never been very strong, the native dynasty of the Buwayhids arose (932–1055). This family claimed Sassanid descent and by origin were local rulers in Dailam, the mountainous region backing the Caspian province of Gilan, where as in Tabaristan Sassanid traditions lingered long. They expanded the governorship of the Karaj district (Malayer-Iraq) into the control of Kirman, Fars, and Khuzistan, and set the fashion of occupying Baghdad, though their own capital was at Shiraz.

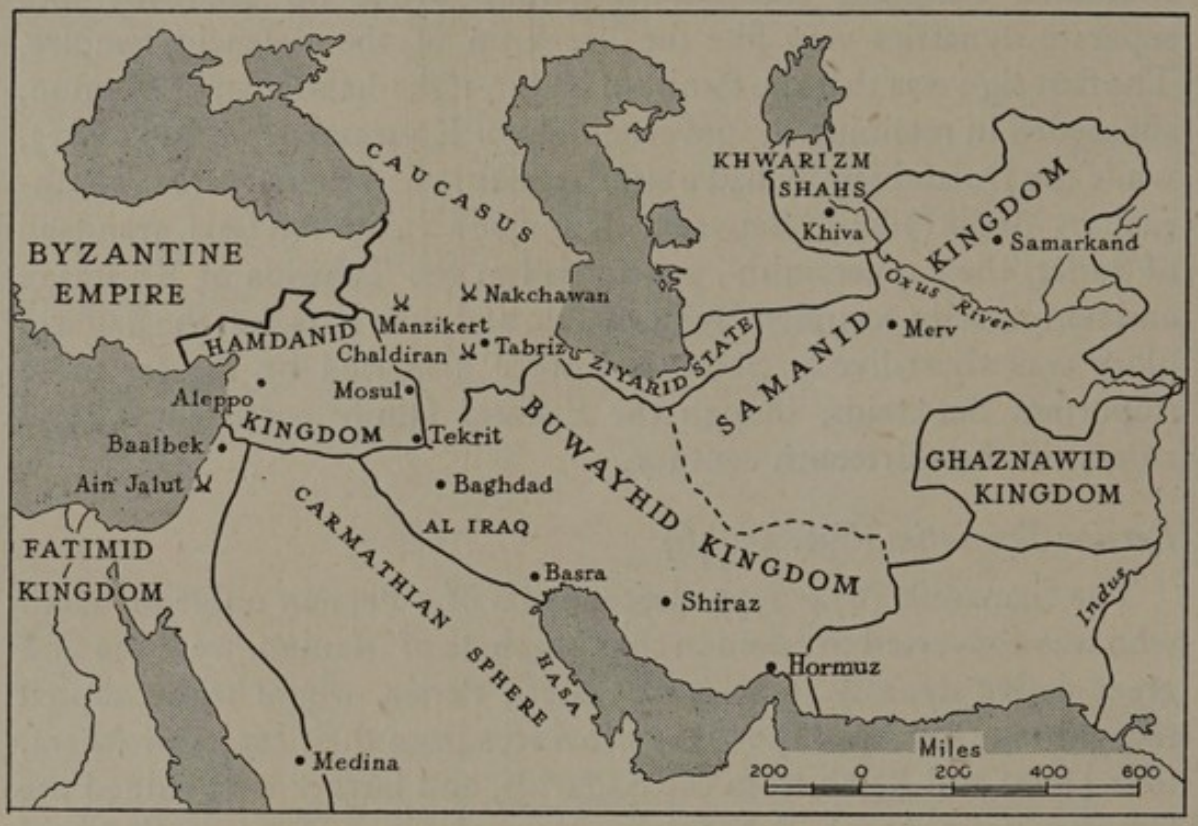


FIG. 46. *Divisions of the Abbasid Caliphate in the tenth and eleventh centuries* A.D.

The Caliph legalized their authority with the title of Amir al Umara, and the greatest Buwayhid, Adud-ud-Daulah (949–983), extended his sway from the Caspian to the Persian Gulf and from the Euphrates to Khurasan, where he encroached on the Samanids. The Buwayhids, who were Shias like many of their subjects in Gilan, were great builders of mosques and libraries, and encouraged the Persian revival. Their vizier Sabur ibn Ardashir founded a library of 10,000 books at Shiraz, thereby offsetting the cultural influence of Baghdad. The Buwayhids like the Samanids were weakened by dynastic quarrels, but though they lost their eastern provinces to Mahmud of Ghazni, in the west they lasted till the arrival of the Seljuk Turks.

Contemporary with the Buwayhids was a local dynasty in Tabaristan known as the Ziyarid, most of whose rulers were, like the Buwayhids, famous patrons of poetry and learning. But the Ziyarids after helping the Buwayhids to power played no great part in politics.

Ghazni. This principality, named after its capital in eastern Afghanistan on the headwaters of a tributary of the Helmand river, was originally a subdivision of the Samanid realm, but its rulers were Turks, the predecessors of Mahmud being ex-slaves by origin. The power of Turkish soldiers of fortune was increasing throughout the empire. At Baghdad the Caliphs had made the fatal mistake of replacing their praetorian bodyguard of Khurasanis by a Turkish force, and, since the Caliphate of Mutasim (833–842), had been increasingly under their control, whereby the respect of the Persian provinces was diminished. The career of Mahmud shows the culmination of the power of Turkish adventurers prior to the Seljuk invasion. The ex-slave Sabuktagin (977–996), nominally a Samanid vassal, had already mastered most of Afghanistan and part of the Punjab when he was succeeded by his son Mahmud (996–1030). In Persia Mahmud checked the threatened Turkish invasion of Khurasan from beyond the Oxus and added the Samanid realm and western Sijistan (modern Seistan) to his dominion, taking the independent title of Sultan and receiving caliphal recognition. His reign was mainly occupied with seventeen campaigns into north-western India, which were aimed at plunder and the conversion of the Hindus; the establishment of Islam in the Punjab mainly dates from this time. Mahmud's successors lost their Persian domains to the Seljuk Turks and were distracted in Afghanistan by the increasing rivalry of the hill tribes of Ghor, the district of the Hazarajat mountains, who sacked Ghazni in 1152. The later history of Ghor and Ghazni is related mainly to India and illustrates the natural tendency of dynasties in Afghanistan to face eastwards rather than west.

Turkish Dynasties, 1055–1220

Seljuks. After Mahmud's death there was no power to stop the Turkish tribes from crossing the Oxus, and the long-deferred invasion of Persia took place. In 1037 Turkish forces of Ghuzz tribesmen, who were Sunni Moslems, under the leadership of Tughril Beg, head of the Seljuk family, beat the Ghaznawid army and later secured all the Persian provinces from the Oxus to Baghdad; there they were welcomed by the Caliph Qaim in 1055 and ruled as Sultans. Alp Arslan (1063–1072) carried the Turkish conquest into Anatolia by his great

victory over the Byzantines at Manzikert in 1071, and thereby extended the sphere of Islam at the expense of Christianity. His successor Malik Shah (1072–1092) ruled from Iraq an empire almost as great as that of Darius the Great.

The Seljuk conquerors caused no serious devastation. They were strict Sunnis who spread the faith and protected the existing order, but in intellectual life they were a deadening influence and their dominance initiated the decay of Abbasid civilization. Politically they were unable to maintain the unity of their empire except by the force of personality, and they owed their administrative system to the ability of their Persian vizier, the scholar Abu Ali ibn Ishaq, surnamed Nizam al Mulk, 'the organizer of the kingdom'. But his system of hereditary military governors or *Atabegs* only quickened the tendency of provincial rulers to establish independent dynasties. After the death of Malik Shah the empire broke up into the Sultanates of Rum—the kernel of the future Ottoman Empire in Anatolia—Syria, Kirman, and Iraq with Kurdistan. Other Turkish dynasties were formed in Azerbaijan, Laristan, Fars, and Khwarizm (Khiva). The Salgharids in Fars held out from 1148 to 1287, but of greater importance were the Khwarizm Shahs.

The Khwarizm Shahs (1138–1220) broke the power of their Seljuk overlord, Sultan Sanjar (1099–1157), whose authority beyond Khurasan was mostly nominal, by encouraging a Mongolian people to invade Khurasan. These were the Buddhist tribes called Kara Kitai, who had established an empire in central Asia which extended to Ferghana. The Seljuk armies were heavily defeated in a great battle (1141), but the Kara Kitai were later driven back by the Khwarizm Shahs. A second effect of this movement was that the Ghuzz Turkish tribes still in Transoxiana were pressed across the Oxus and moved through Persia, where they caused much devastation until they were crushed by the Salgharid Atabeg of Fars in 1204. This foretaste of the Mongolian invasion of the thirteenth century showed the weakness of the defences of Persia. It was Sultan Takash (1172–1199) who expanded the authority of Khwarizm westward through Khurasan to Jibal and Iraq, where he overthrew the last Seljuk at Baghdad in 1194 on the invitation of the scheming Caliph Nasir. The son of Takash, Ala-ud-Din Mohammed (1199–1220), who favoured the Shias against Nasir, gained Ghazni in the east and was extending his power in Ferghana, when a new and heathen people from central Asia appeared on the Jaxartes, the hordes of Jenghiz Khan, who had already established a vast empire extending eastwards to the borders of China.

Assassins. The weakness of the central government in this period is shown by the history of the secret society established by the Khurasani Hasan-i-Sabbah in the mountain fortress of Alamut in 1090 (p. 37). The society derived its organization and its free-thinking doctrines from the Ismailis, an irregular Shia sect who succeeded in establishing the Fatimid Caliphate in Egypt in 969 at the expense of the Abbasids. The Assassins, so called from the drug hashish with which they obtained a foretaste of paradise, were far more extreme than the Ismailis and the religion revealed to the initiates had little direct resemblance to Islam. They were organized, under a chief and three 'grand priors', into grades of fully initiated emissaries, associates, executives (*fidais*), and novices. Their object seems to have been the control of high politics by the terrorization of caliphs, sultans, and ministers, political murders being carried out by the *fidais*. The society had a number of fortresses in Persia, and formed a powerful enclave responsible to none, until Hulagu Khan stormed their strongholds, of which Alamut was the most formidable, and extirpated most of their followers in 1256.

Non-Moslems under the Caliphate

The Moslem conquerors did not persecute their non-Moslem subjects (*dhimmis*). From the beginning they distinguished between heathens and Peoples of the Book, i.e. Jews, Christians, and allied sects. The Peoples of the Book were free to retain their faith subject to poll tax and land tax, and the term was extended to cover Mazdaeans. Caliph Omar II (717–720) imposed fresh disabilities upon dhimmis which regulated their dress, excluded them from the service of the State, and disallowed their testimony against Moslems. These regulations, though revived from time to time by the more zealous Caliphs, tended to be neglected. The Nestorian Church of Asia in fact reached its maximum extent during this period. Its privileges were confirmed by charter, and its Patriarch or Catholicos moved his seat in 762 from Ctesiphon to Baghdad. The great Persian cities had their archbishops and bishops and about A.D. 1000 it was reckoned that Christians preponderated in Khurasan. From Persia a great missionary enterprise was directed towards Turkistan, India, and China, not without success; from their work among the Mongolian tribes originated one version of the myth of Prester John. The whole edifice was, however, swept away by the invasions of the Mongols, who despite their initial protection of the Christians ended by becoming at the time of Tamerlane their most fanatical, because their most barbarous,

enemies. Only in northern Kurdistan and the Urmia region of Persia, and in the Indian district of Malabar, has a remnant survived of this once great community.

The principal centres of Judaism were outside Persia in Iraq, where Jews played a great part under the leadership of the so-called Prince of the Captivity,[1] but there were large communities in the principal cities of Persia, particularly at Isfahan, where the separate town of Yahudiya housed a large group of Jews descended from a settlement of exiles made in Babylonian times.

The Mazdaean religion lost ground continually to Islam, particularly among the aristocracy, who had most to gain by conversion, but its reduction to the tiny minority of Parsis in Yezd and Kirman who now represent the old faith was the work of later centuries. Occasional persecutions caused the emigration of large groups of Mazdaean Persians to India, where they still survive.

IV. THE FORMATION OF MODERN PERSIA

In general the Mongol conquest marks the beginning of a new era. It destroyed the standard form of life in Abbasid Persia, introduced a large Turkoman or Turanian element into the Iranian population, particularly in Azerbaijan in the west and on the northern fringe of Khurasan in the east, obliterating old political boundaries and loyalties. Hitherto the Oxus had marked the nominal boundary between Iran and Turan. Now for over two centuries Persia was part of a political system which stretched through central Asia to include China and had friendly diplomatic relations with kings of western Europe. Persian civilization was greatly changed by a strong infusion of Chinese influence, transmitted more directly than hitherto, and there also grew up a tradition whereby Persia alone of the Moslem lands of the Middle East was readily accessible to European missions. All these new factors characterized the great Persian State that emerged in the sixteenth century and which in many essentials is the Persia of to-day.

The Mongol-Turkoman Domination, 1220–1500

The invasion of Jenghiz Khan was unlike any of the previous barbarian incursions. This was no mass movement of peoples looking for pasture and driven forward by the pressure of others behind. His

[1] See B.R. 524, *Iraq and the Persian Gulf*, p. 247.

'hordes' (*urdu*, properly encampments) were well-organized armies directed to the political object of conquest. But they were (with the exception of the Christian tribe of Karait) heathen and barbarian peoples, hitherto held in check by the Chinese Empire and by other more civilized neighbours in Turkistan, such as the Buddhist Kara Kitai. Having neither respect for Islam nor desire for the luxuries of urban civilization, they wreaked the most intense destruction when they were opposed. After the defeat of the field armies of the Khwarizm Sultan (1219–1220) resistance was concentrated in the cities, which suffered accordingly. In 1220–1221 the great metropolitan cities of eastern Persia, such as Bokhara, Balkh, Merv, and Nishapur, were sacked and sometimes utterly destroyed, and their populations massacred in whole or part. By 1227 many of the finest cities of western Persia had suffered the same fate. Only the south, Luristan, Fars, and Kirman, escaped the worst excesses of Mongol devastation at this time by immediate submission, though they too suffered later at the hands of the successors of Jenghiz. After his death (1227) Persia was ruled, like other divisions of his empire, by his descendants as Il Khans who owed nominal loyalty to the Great Khan of China. The Il Khan Hulagu (1251–1265) completed the destruction of the Abbasid Empire by the invasion of Iraq, the sack of Baghdad, where a vast multitude perished, and the extinction of the Caliphate in 1258.

The complete destruction of Moslem civilization in Persia was prevented by the seductive influence which it inevitably had upon the later generations of Mongol rulers, by the self-interest which compelled them to adopt a rational system of administration when they permanently occupied the country, and finally by the conversion of the last Il Khans to Islam. Another conservative influence was their patronage of their Christian subjects and their diplomatic connexions with the Christian monarchs of Anatolia and Europe, whom they hoped to secure as allies against their common Moslem enemies. This led to the journeys of various papal and secular emissaries to the courts of the Khans, including the famous Marco Polo who travelled in Persia and the Far East between 1271 and 1295 and John de Monte Corvino who founded a church in China. The Mongols included a tribe of Nestorian Christians, and Rome had high hopes of their conversion. But inevitably the Il Khans adopted the religion of the vast majority of their subjects, without, however, abandoning their Christian friendships.

These civilizing influences were at their height in the Khanate of

Ghazan (1295–1304), who proclaimed himself a Moslem, established a new system of taxation on Persian lines, controlled abuses of the government postal system still in use, and adorned his capital Tabriz with splendid buildings, including a hospital, library, observatory, and two colleges with a foundation for professors and students. Ghazan also received the emissary of Edward I of England, Geoffrey de Langley, who travelled by Trebizond to Tabriz. Khan Uljaitu (1304–1316), who was a devout Shia, built a new capital city at Sultaniyeh. But just when Persia was on the road to recovery, the Il Khan dynasty like all its Moslem predecessors broke up into a number of provincial kingdoms, and dynastic warfare became rife. Thus in the fourteenth century the Jalair ruled in Iraq and Azerbaijan, the Muzaffarids in Fars and Kirman, the Bani Kart in Herat, and the Sar-Ba-Dar or Head-to-the-Gibbet family in Khurasan. The Oxus provinces were never part of the Persian Khanate, being ruled with other central Asian provinces by the Chagatai or Jaghatai branch of the family of Jenghiz.

It was from this Chagatai Khanate, itself in dissolution, that there came the second Mongolian invasion led by the 'world conqueror' Tamerlane, who put an end to the provincial dynasties. Tamerlane or Timur Lang ('the lame'), after establishing his power in the Oxus provinces (1363–1380), mastered all Persia and Iraq between 1380 and 1393. Thereafter he was much occupied with his remarkable expeditions into Russia, India, and Anatolia, until his death in 1405. But his son Shahrukh (1408–1446) continued the process of rebuilding, restoration, and encouragement of arts, crafts, and learning, initiated by the later Il Khans. Thus he mitigated the damage done by Tamerlane's ruthless campaigns, which was lessened somewhat by the fact that Tamerlane was a good Moslem. But a new blow had been struck at the society of Asia by Tamerlane's destruction of the Nestorian Christian communities, the repositories of much learning and particularly of medical knowledge. The Mongol talent for destruction erased this great organization from all Persia except a few remote valleys in the region of Urmia.

Timurid princes such as Shah Husain Mirza of Herat (1487–1506) continued to rule in Khurasan in the fifteenth century. But the Oxus provinces were finally sundered from Persia by the establishment of the Turkoman dynasty of Uzbegs founded by Mohammed Shaybani, a direct descendant of Jenghiz, at the close of the century. Western Persia also fell away from the Timurids and passed under the dominion of two Turkoman tribes, the Kara Koyun or Black Sheep, so called

from their standard, who had long been established in the Van region of Armenia, and the Ak Koyun or White Sheep, whose headquarters were at Diyarbekir in the Taurus foothills. The greatest leader of the White Sheep, Uzun Hasan the Long, overthrew the Black Sheep in 1469 and ruled most of western Persia till 1478. Uzun married a Christian princess of Trebizond and in alliance with the Venetians, whose fleet was on the Black Sea, attacked the new Ottoman Empire of Anatolia. This initiated the great struggle between the rulers of Persia and those of Turkey for the control of the territories lying between them, which was a permanent feature of the next three centuries. But after the death of Uzun's son Yakub (1485) the authority of the White Sheep decayed, and the way was prepared for the restoration of the Persian monarchy by Shah Ismail.

The Safawid Dynasty, A.D. 1500–1722

The reconstitution of the Persian monarchy after the lapse of eight centuries was the work of peculiar forces. Ismail, the founder of the Safawid dynasty, came to power as the leader of seven Turkoman tribes of Azerbaijan. These, which included the well-known Qajar and Afshar tribes, provided an army of some 70,000 cavalry armed principally with swords and lances. But Ismail was not himself a Turkoman chief. The tribes gave him their allegiance because he was the descendant of a line of religious leaders and hereditary head of a great religious order of dervishes which was powerful in north-western Persia and in Anatolia. This order sprang from the followers of Ismail's ancestor Safi-ud-Din of Ardebil (1252–1334), a notable Moslem saint, preacher, and worker of miracles. Though Safi claimed descent from the Shia Imam Musa al Kadhim, his sympathies seem to have been partly with orthodox Sunnism and partly with Sufi mysticism (p. 329). His heirs added temporal to spiritual power, and as is also the habit of religious orders, tended away from the teaching of their founder towards the contrary tenets of the Shia sect. It was from the Sufism of his followers that Ismail and his successors became known in Europe as the 'Sophies'. Ismail's grandfather Junayd had an army of 10,000 devoted warriors drawn from his Sufi community and fell in battle with the Black Sheep. His father Haydar, who invented for his followers the scarlet cap from which they gained the name of Kizilbashis or Redheads (Persian *Sar-i-Surkh*), married a daughter of the White Sheep sultan Uzun Hasan, but fell fighting Sultan Yakub in 1488.

Shah Ismail, A.D. *1500–1524*

The Kizilbashis rallied to Ismail, eldest surviving son of Haydar, when at the age of 13 he emerged from Lahijan, his retreat in Gilan, and set about avenging his father's death. The White Sheep dynasty rent by civil war was in full decline, and in 1500 Ismail defeated their principal army at the battle of Nakchawan (fig. 46). Ismail was crowned Shah of all Persia at Tabriz, and by 1510 had made good this claim in the west by overthrowing the numerous minor dynasties of Fars, Kirman, and Hamadan, and also by conquering Mesopotamia, where his power reached Diyarbekir. In the extreme north-west the Christian princedoms of Georgia between the Aras and the Caucasus recognized Persian suzerainty. Eastern Persia had fallen under the sway of the formidable Shaybani, Khan of the Uzbegs, and though he was defeated and killed near Merv in 1510 and Khurasan[1] and Herat were secured, the Uzbegs remained in firm control of the Oxus provinces; Kandahar too was detached from Persia, being under the suzerainty of Babar, the 'Timurid' prince of Kabul who founded the Moghul dynasty of northern India.

The religious policy of Ismail, who elevated the Shia sect to the state religion, created bitter enmity between Persia and two Sunni Moslem neighbours who were sufficiently formidable on military grounds alone. These were the just-mentioned Uzbegs and in the west the yet more dangerous empire of the Ottoman Turks, which in the sixteenth century reached the zenith of its power in Europe and western Asia under the sultans Selim I the Grim (1512–1520) and Suleiman I the Magnificent (1520–1566). The Ottoman sultans were strict and enthusiastic Sunnis who regarded Ismail and his Kizilbashi confraternity as detestable heretics. The confraternity had numerous converts in Anatolia, and Selim had good reason to fear that these would aid Ismail in the westward expansion of Persia. In 1514, after massacring 40,000 Kizilbashis in Anatolia, Selim invaded Azerbaijan and defeated Ismail in the great battle of Chaldiran near Khoi (photo. 178). This was the first of the campaigns which gradually established the north-western frontier of modern Persia.

In 1517 Selim reinforced his position in Moslem Asia by annexing the Mamluk kingdom of Egypt and its dependencies of Syria and the Hejaz. Over against this attempt to re-establish a world empire of Islam stood the Shia state of Ismail. From his entry into Tabriz Ismail had set about replacing the Sunni by the Shia faith as the

[1] Henceforth this term is used to include only the physical region of Northern Khurasan and the Birjand–Qain highlands.

official religion of his domain. Force was used mercilessly to compel the priests and religious teachers everywhere to conform to the Shia system, of which the special test was the public cursing of the first three Caliphs, whom alone the Sunni Ottomans recognized, and the pronouncing of the Shia addition to the Sunni creed: 'and Ali is the vicegerent of God'. The conversion of the greater part of the Persian people to the Shia profession was the work of the Safawid dynasty as a whole, and was carried out undeviatingly. Ismail was undismayed at the size of the task. When warned that at Tabriz two-thirds of its 250,000 inhabitants were Sunnis, he replied: 'By God's help, if the people utter one word of protest I will draw the sword and leave not one of them alive.' The tradition of extreme brutality, reintroduced by the Mongols after its disuse in the relatively humane Abbasid period, carried the work through. Initial difficulties were caused by the dearth of text-books suitable for the re-education of the Sunni Moslems, but this was made good by the labours of several generations of Shia theologians under royal patronage.

The result was the creation of a Shia block separating the Sunni Moslems of central Asia, Afghanistan, and India from the predominantly Sunni population of the Arab and Turkish provinces of the Ottoman Empire. The unity of eastern Islam was shattered for ever. A secondary consequence was that Persia gained a special interest in the southern provinces of what is now called Iraq, where the most ancient shrines of Shia Islam are found: Karbala, Najaf, Samarra, and Kadhimain. Southern Iraq with its Shia population remained a source of contention between Persia and Turkey long after the general definition of their common frontier.

Shah Ismail is less accurately regarded as the father of Persian nationalism than as the father of the Persian nation. The Safawid period, culminating in the reign of Shah Abbas I (p. 268), saw a great revival of Persian power and civilization, both material and intellectual, originating in the activity of Ismail. But Ismail's power was based on his Turkoman tribes and his peculiar religious position. The driving force of the dynasty was derived from the clash of religions rather than of patriotisms, and the Sunni faith of the Ottomans was more traditionally Persian than the Shiism imposed by Ismail. The very language of Ismail's court was Turkish rather than Persian. Racially the 'Aryan' unity of Persia had long ago been obliterated by the invading flood of Turkomans and other Turanian peoples. The consolidation of the Persian nation out of these elements is to be ascribed partly to the gradual identification of the Shia with

the Persian cause, partly to the continuous pressure exerted in east and west by foreign peoples and the counteraction of the subjects of the Shahs. Much was also due to Ismail's revival of the monarchic principle backed by religious sanctions. The Safawid monarchy, like the Sassanid dynasty eight centuries previously, was able to secure the whole-hearted devotion of its subjects, and could never be successfully challenged from within.

The Turkish Wars, 1524–1639 (figs. 47, 48)

Turkish aggression continued to afflict Persia after Ismail's death. Selim I had gained only the Kurdish provinces of northern Iraq from Ismail. Suleiman the Magnificent (1520–1566) expelled Ismail's successor Shah Tahmasp (1524–1576) from southern Iraq in 1534, and four times invaded western Persia, reaching Tabriz and Isfahan; though in the north Tahmasp strengthened Persian control of Georgia by a series of minor campaigns, he found it prudent to transfer the capital from Tabriz to Kazvin. A peace treaty which in 1555 ended this long period of hostilities left Persia itself intact but perpetuated the loss of Iraq and western Kurdistan. The dynastic conflicts which marked the reign of the Shahs Ismail II (1576–1577) and Khudabanda (1577–1587) enabled the Turks to occupy Tabriz, many of the Zagros provinces, and most of Georgia. Shah Abbas, faced on his accession (1587) by Turkish invasions on the west and Uzbeg inroads on the east, ceded Georgia, western Azerbaijan, and part of Luristan in order to deal first with the Uzbegs.

The success of the Turks in the sixteenth century was mainly due to their predominance in artillery, which the Persians completely lacked. It is remarkable that, at a time when the Turkish advance in Europe was barely held at the gates of Vienna by the well-equipped Austrian armies, the Persian cavalry was successful in the defence of Persia so long as it was well led. In 1598 the tables were turned by the arrival at the Persian court of two English knights, Anthony and Robert Shirley, with twenty-six retainers including a gunsmith. They helped to establish a cannon foundry which equipped Shah Abbas's army with 500 cannon and 60,000 muskets, and also helped in the general reorganization of the army (p. 268), of which Robert Shirley was Master-General. Abbas took the offensive in 1602–1603, recovered Tabriz and Shirvan (the Caspian coastlands of Georgia), and took the Aras fortresses of Erivan and Kars. Finally at the battle of Urmia the Persians killed 20,000 Turks. In 1612 a peace treaty reestablished the frontiers of Selim I in Armenia, and in 1623 Abbas

took Baghdad and southern Iraq. Thus Purchas in his *Pilgrimes* optimistically wrote that 'the mighty Ottoman, terror of the Christian world, quaketh of a Shirley fever and gives hope of approaching fates'. But Turkey remained on balance the weightier power. In the last Ottoman campaigns against the Safawids, Sultan Murad IV destroyed the greater part of Hamadan (1630) and Tabriz (1635) and in 1638 recaptured Baghdad and southern Iraq.[1] After the Treaty of

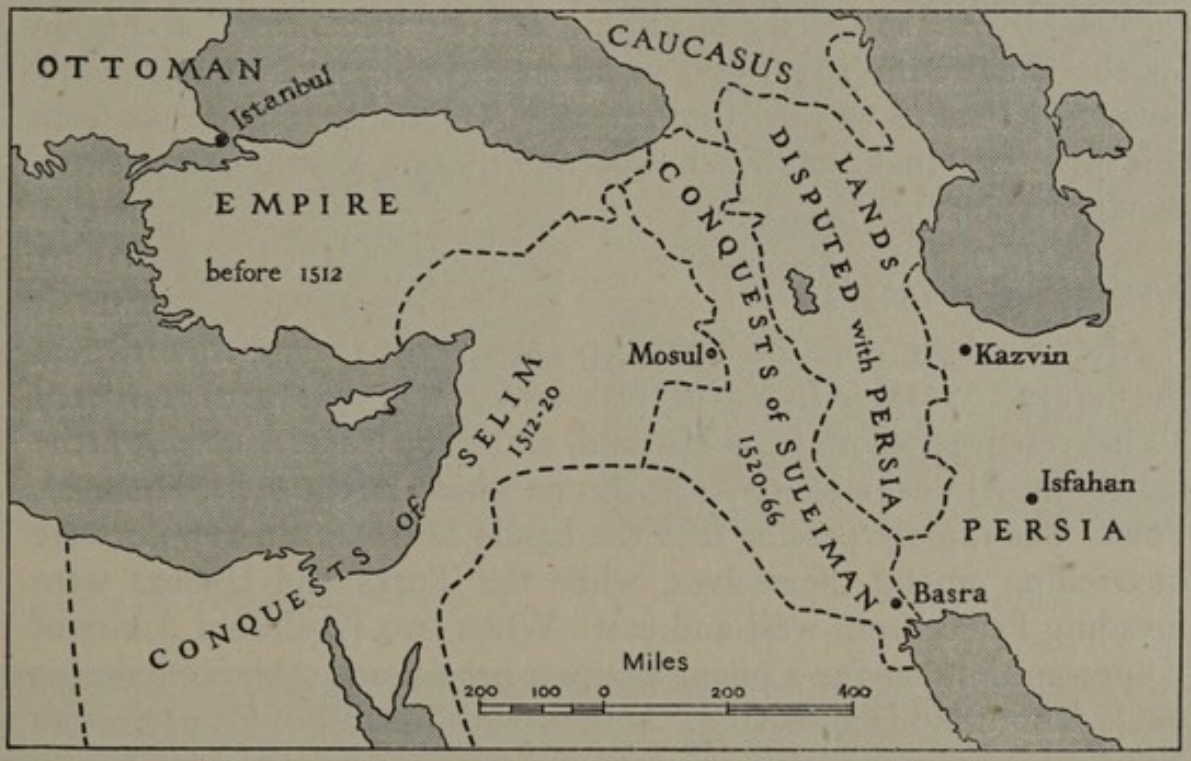


FIG. 47. *Eastern Expansion of the Ottoman Empire*

Zuhab (1639), which remained the basis of frontier relations until the nineteenth century, there was peace between Turkey and Persia for 89 years, the dynasties in both countries having exhausted their martial vigour.

Though the frontier was not exactly defined, the boundary on the upper Aras lay between Kars and Erivan. Farther south the Urmia region, Kermanshah, Luristan, and Khuzistan were reckoned as Persian zones, and the Shatt al Arab and the outer edge of the foothills became the boundary in the south.

The Northern and Eastern Frontiers. The perpetual pressure of Uzbeg raids tended to confine Persian authority within the mountains which border Khurasan on the north, though Shah Ismail's victories had given him the suzerainty of Merv and even of Balkh.

[1] For further details of the Ottoman-Persian campaigns in Iraq see B.R. 524, *Iraq and the Persian Gulf*, pp. 256–8.

The Moghul rulers of Kabul, however, eventually secured Balkh, and it was as much as even Abbas the Great could do to clear the Uzbegs out of Khurasan and Herat. Kandahar became a bone of contention between Persia and the Moghuls when it was realized that the Helmand valley was the western key to India. Kandahar first passed into Safawid hands in the reign of Tahmasp, who in 1558 took it as his reward for assisting the refugee Moghul emperor Humayun, successor of Babar, to recover his throne. Thereafter it was lost and regained by Abbas I at the beginning and end of his reign, and again lost by Shah Safi (1637) and regained by Abbas II (1649). Thus Safawid influence was brief and weak in Kandahar, and it was from this province that the tribal movement came that overthrew the dynasty (p. 271).

Shah Abbas I, 1587–1629

After the long reign of Tahmasp (1524–1576) anarchy weakened the Safawid dynasty. In fear of rivals Ismail II (1576–1577) murdered all his relatives whom he could find, and after his sudden death the half-blind Khudabanda took the throne which earlier he had refused. Power was rapidly passing into the hands of tribal chiefs who were quarrelling among themselves, while the Turks and Uzbegs were invading Persia from west and east. When two Kizilbashi Amirs of Khurasan, hoping for a pliant puppet, proclaimed Abbas Shah, his uncle Khudabanda abdicated. Abbas soon disposed of his protectors and by his reorganization of army and State secured for his family another century of unchallenged rule.

First he came to terms with the Turks (p. 266) and set about the Uzbegs, who had sacked Herat, Meshed, Nishapur, and other cities of Khurasan, finally driving them out in 1598. Next came internal reorganization. Hitherto the army had consisted of tribal forces under tribal chiefs. He reduced these contingents by half and as a counterweight created a tribe of his own, the Shah Savan or Friends of the Shah, which supplied a cavalry division 10,000 strong, and he also formed an infantry force of 20,000 men paid and officered by the Crown. When his troops had been equipped with modern weapons under the instructions of the Shirley brothers, who had taken service with the Shah in 1598, he was able to drive out the Turks (p. 266), and at the end of his reign to recover Kandahar from the Moghul Empire.

The reign of Abbas was the most brilliant period of the dynasty. Material prosperity was increased by the building of bridges and



176. *Shah Abbas I*



177. *Nadir Shah*



178. *Shah Ismail at the battle of Chaldiran*



179. *The Portuguese fort on Hormuz*



180. *Gombrun or Bandar Abbas in Safawid times*

improvement of roads, the most notable being the 'stone carpet' of Mazanderan (p. 145). Many cities were beautified with mosques and public buildings, while Isfahan, whither the capital was transferred from Kazvin, became the glory of Persia. Abbas gave a great impetus to the national spirit of Persian Shiism by enhancing the importance of Meshed, the shrine of the eighth Imam, and encouraging its growth as a pilgrim centre; he himself made the journey of 800 miles from Isfahan on foot. To increase the security of Meshed from Uzbeg inroads he transferred a number of warlike Kurdish tribes from the west to the Atrek valley, where they still exist. Likewise he moved the Abdali Afghans from Kandahar to Herat.

The transfer of a large number of Armenians from the Aras town of Julfa to Isfahan was intended to promote the trade and industry of the capital, and was part of Abbas's general interest in commerce. In the Persian Gulf he joined with the English to destroy the Portuguese fortress of Hormuz (1622), which for a century had controlled shipping in the Gulf, and he encouraged British and Dutch merchants to trade at Bandar Abbas. This became the export centre of silk, which at this time was produced in Persia and provided a considerable part of the royal revenue. Abbas also took the initiative in reviving the Mongolian tradition of alliance with the Christian states of Europe against the Turks. Sir Anthony Shirley was sent first to Russia and thence on a general visit to the courts of Europe to gain help against the Turks. Despite Anthony's failure to return, Sir Robert was later dispatched twice on missions to Poland, Germany, Rome, and England. In return an official mission was sent out to Persia by Charles I of England.

Condition of Persia. The Christian convert Don Juan of Persia, an officer of Abbas I who accompanied Sir Robert Shirley to Europe, describes in his *Relaçiones*, with some exaggeration, the flourishing state of most of Persia about 1600, though Khurasan was still recovering from the Uzbeg raids. Each province had a fine capital city, surrounded by orchards and gardens, with a population varying between 50,000 and 100,000 persons, and numerous minor market towns. Thus Kazvin province was reckoned to hold 20 walled towns and 1,000 open villages, and the yearly revenue of Gilan was said to be fixed at a million gold pieces. Isfahan, the new capital, with a population of 100,000 households, contained 100 private palaces, 600 public caravanserais, and 300 public baths, and there were said to be 10,000 stalls in its bazaars. Agricultural prosperity was great, corn was cheap, and the sheep of Azerbaijan were 'as big as calves';

horse-breeding on a large scale provided for the excellent Persian cavalry, now at its best and having a total muster of 200,000 mounted men. The merchants of Isfahan, Herat, and Kandahar grew rich from the Indian commerce, and from the trade in silk, which was produced in Gilan and from Isfahan to Kazvin. Silk, velvet, muslin, and linen were in common use. Hunting was the pastime of court and nobility, and a numerous educated class in the towns took pride in the national literature; though the literary merit of the Safawid period is not reckoned high in the Persian scale, yet according to Don Juan verse-making and the illumination of manuscripts were widespread.

The Later Safawids

One grave fault in the system of Shah Abbas was the jealousy with which he and his successor and grandson Shah Safi (1629–1642) regarded their sons and relatives. Those who were not executed on charges of treason were excluded from public affairs and confined to the harem, with the result that the last Safawid kings understood little of the arts of government and war, while power passed increasingly into the hands of the upper clergy, who weakened the State by perpetual persecution of the unorthodox. Thus Safi soon lost southern Iraq to the last inroad of the Turks (p. 267) and Kandahar to the Moghul emperor Shahjahan. Abbas II (1642–1666), who had more of his father Abbas's virtues, cared for justice and also recovered Kandahar. But Sulaiman (1666–1694) was a voluptuary who cared only for his court and capital, saying that the Turks might have the rest if they spared him Isfahan, which was 'half the world'. The last independent Safawid, Shah Husain (1694–1722), known as Mulla or Parson Husain, was completely in the hands of women and clergy.

Within Persia security and prosperity marked the long freedom from external aggression after 1638, to which the continuance of the dynasty was largely due. The court itself was marked by gorgeous display and luxury, and a variety of artists was patronized: physicians, calligraphers, painters, illuminators, poets, and minstrels. A Persian chronicler remarked of this period that 'many ages have now elapsed since civilization, tranquillity, and the accomplishment of all worldly blessings attained a state of perfection in the beautiful provinces of Iran . . . the indolent king and the princes and the army that sought nothing but repose for near a hundred years had not drawn the sword from the scabbard'. The tradition of friendship with Christian States was maintained and many religious and secular missions were enter-

tained and protected at Isfahan. Travellers, missionaries, and merchants such as Sir John Chardin (1664–1677), the Jesuit Father Krusinski (*c.* 1702–1722), and later Jonas Hanway (1743–1744) have left long and often fascinating accounts of the Persia of the 'Sophies', and the period is perhaps better known from European than from Persian sources.

The Safawid dynasty was swept away by a sudden invasion of Afghan tribes which Shah Husain was incompetent to meet. But a far greater danger to Persia was arising elsewhere which at this time was little regarded. West of the Caspian the Russian Empire had absorbed the Khanate of Astrakhan before 1600. Abbas II had received the first Russian embassy at Isfahan in 1664 and later evicted a raiding Cossack force from the coast of eastern Mazanderan. But it was the imperialist ambitions of Peter the Great (1689–1725) which created a permanent danger for Persia on her northern frontiers, and his two embassies to the court of Shah Husain (1708, 1715) were intended to spy out the land.

Throughout there was a persistent resemblance between the Safawid and the pre-Moslem Sassanid dynasty. Both were markedly successful in defending the Persian plateau from invaders despite relative military weakness. Both enjoyed great material prosperity. Both depended for their stability upon the preference of their subjects for the monarchic rather than the feudal principle of government, and both fell very quickly to a sudden blow from an unexpected quarter when internally they seemed absolutely secure.

The Eighteenth Century

The Afghan Invasion

Safawid Persia included the Afghan provinces of Herat and Kandahar, though Kabul was under the suzerainty of the Moghul emperors of Delhi. The most powerful tribal forces were the Ghilzais of Kandahar and the Abdalis of Herat (later called Durranis). Both played a great part in the eighteenth century, but it was a Ghilzai invasion which overthrew the Safawid dynasty. In 1709 the Ghilzai chief Mir Wais led an insurrection which Shah Husain's generals failed to subdue. Mir Wais secured the independence of Kandahar, and the Abdalis of Herat followed his example in 1719. He was eventually succeeded by his son Mahmud, who skirted the Lut south to Bam and invaded Kirman in 1720, only to be driven out by the one capable general in the Safawid service. But court intrigues led to

the general's dismissal and the dispersal of his well-trained army. In 1722 Mahmud returned with 20,000 tribesmen, took Kirman city, and continued his march to Isfahan. At the battle of Gulnabad the Ghilzai force, despite great inferiority in artillery, overthrew the main Persian army 50,000 strong, which suffered from bad leadership and divided counsels. Isfahan was invested and after a long siege the Shah capitulated, abdicated, and crowned Mahmud as Shah of Persia, though previously he had dispatched his third son Tahmasp Mirza, with the title of Crown Prince, through the Ghilzai lines to Mazanderan in an attempt to rally the supporters of the Safawids.

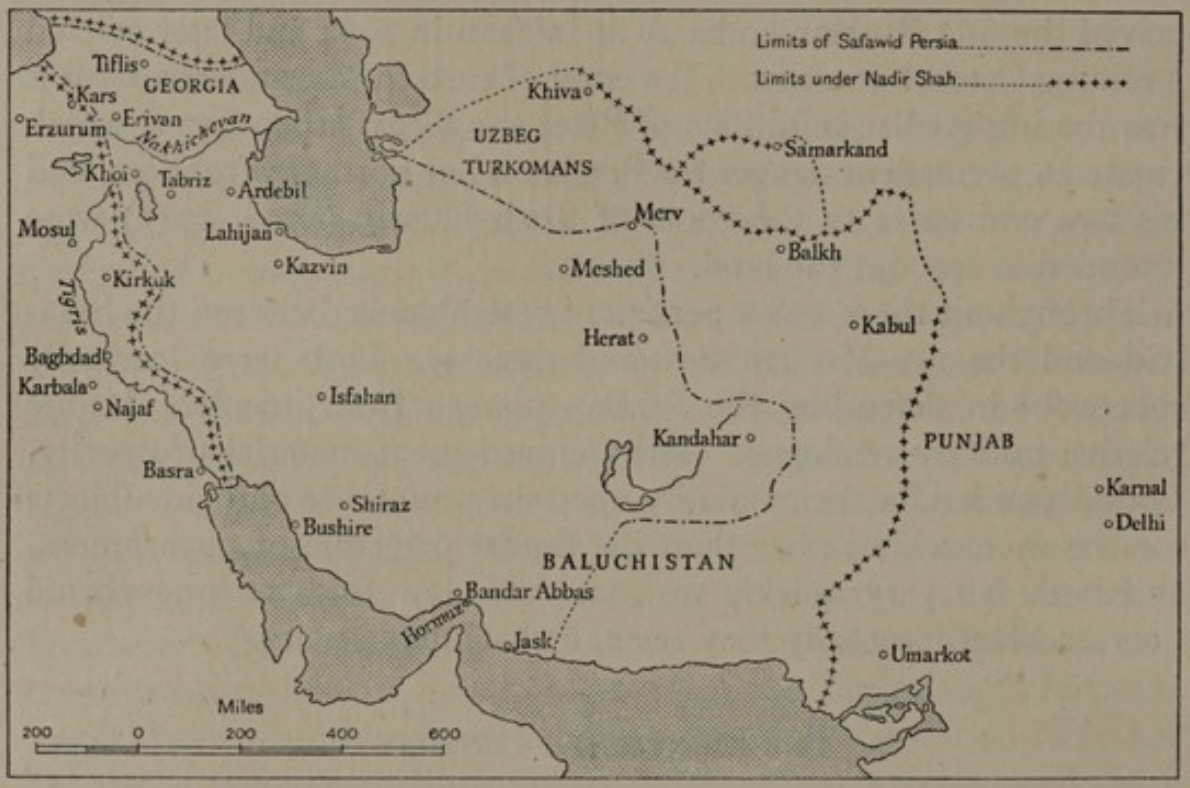


FIG. 48. *Limits of Persia in the seventeenth and eighteenth centuries* A.D.

Persia, as was usual at the end of a dynasty, now broke up into its component regions. Mahmud and his successor Ashraf (1725–1730) ruled only over Isfahan, Fars, and Kirman. They were weakened by the failure of Mahmud's brother Husain, who ruled at Kandahar, to supply reinforcements. The Russians made a compact with the Turks for the partition of Persia, though the death of Peter the Great in 1725 reduced the danger from Russia. The Russians took the Caspian ports of Derbend and Baku, and Gilan province, while the Turks occupied Georgia and all the north-western provinces as far as Tabriz and Hamadan, though they were checked by Ashraf when they invaded Isfahan province (1728). In the east the Abdalis held

Herat, and a Seistani chieftain, Malik Mahmud, occupied Meshed and most of Khurasan. Only Mazanderan remained nominally subject to Tahmasp Mirza, who ruled at Farahabad with the support of some Turkoman tribal leaders.

Rise of Nadir Quli

One of Tahmasp's supporters was the Afshar tribesman Nadir Quli, who, though only the son of a shepherd, rose in the service of Malik Mahmud by his skill and energy as a soldier. After quarrelling with Malik Mahmud he collected a following of Afshars and Khurasani Kurds and set up as a robber baron in the fortress of Kalat-i-Nadiri (p. 42) on the route between Meshed and Merv. In 1722 Nadir, who never in his career underestimated the popularity of the Safawids, rallied to Tahmasp Mirza, who had taken the title of Shah. After eliminating various rival advisers Nadir became his Master of Ordnance with the honorary title of Tahmasp Quli, 'slave of Tahmasp'. In a series of local campaigns (1726–1729) he disposed of Malik Mahmud, captured Meshed, reduced the Abdalis to quiescence, and took Herat. He then set about the expulsion of the Ghilzais from south-west Persia. In 1729 Ashraf was defeated at the battle of Mehmandust near Damghan and pursued to Isfahan, which he vacated after murdering the ex-Shah Husain. In 1730 his last forces were dispersed and destroyed in Fars, and Ashraf himself perished as a fugitive.

The last stage in the recovery of Persia was the expulsion of the Turks. Nadir turned westward after the defeat of Ashraf and drove the Turks out of the provinces which they had occupied, but was recalled to the east to deal with a serious Abdali rising in Herat, where he again besieged and took Herat city. In his absence (1731) Shah Tahmasp took up arms on his own account against the Turks, who defeated him and enforced a peace treaty which left the provinces north of the Aras in Turkish hands. Meanwhile the Russians, who were now seeking the friendship of Persia because of their hostility to Turkey, made a treaty with Tahmasp which provided for the evacuation of Gilan.

Tahmasp's folly had, however, played into Nadir's hands, who had already secured a position of great power, including the right to levy taxes and the hereditary government of Mazanderan, Khurasan, and Kirman. Nadir now gave the army a large bribe and issued a manifesto to all 'headmen, peoples, and nobles' in which he protested against the Turkish treaty. After a strange scene in which Tahmasp

was shown dead drunk to the people of Isfahan, the Shah was deposed, his infant son Abbas was set in his place, and Nadir took the title of Wakil-ud-Daulah or Regent (1732).

From this moment the wars of Nadir took on an ever more aggressive colour. The regions still to be recovered, Georgia and Kandahar, had never been strongly held by the Safawids, and Nadir's ambitions ranged far beyond them. As the last great warrior king of Persia, his campaigns, which have strategic and tactical interest of their own, deserve more than passing notice. There were two major Turkish campaigns, separated by the expedition to India and the conquest of the Oxus oases. The Turkish wars were aimed at the recovery of Iraq in the south and of all the northern territory between the Aras and the Caucasus, though it is possible that Nadir once had some hopes of a successful campaign in western Anatolia. He was proud of his Turkoman blood, and much of his policy was aimed at removing obstacles which prevented the coalition of the Turkish and Persian empires.

The Turkish Campaigns, 1733–1736

In January 1733 Nadir invaded Iraq by the Qasr-i-Shirin route. The Tak-i-Girreh pass was held against him, and he worked round it by devious mountain tracks and blockaded Baghdad. The Ottoman general Topal Osman marched south from Mosul and near Kirkuk inflicted the only defeat in a major pitched battle which Nadir ever suffered. Having lost 33,000 out of 50,000 men he retired precipitately to Hamadan, where in two months he reconstituted his army, and then again invaded Iraq. The tables were turned on Osman at the battle of Lailan near Kirkuk. Though no formal agreement was ratified at Constantinople, Nadir by this victory regained the frontiers of 1639 (p. 267). Iraq remained Turkish, but the Turks withdrew from Persian Armenia and Georgia, where Nadir set about establishing his own authority amongst the unruly and independent tribesmen. The Russian government of Empress Elizabeth, greatly impressed, made an anti-Turkish alliance with Nadir, and surrendered Baku and Derbend. In 1735 Nadir defeated the Turks in the Aras valley at Aq Su near Baghavand, and recovered the fortresses of Ganja in the Kura valley and Erivan in the Aras valley. The latter was the Persian counterpart of the Turkish fortress of Kars, and Turko-Persian campaigns generally raged round these two strong places. After this Nadir occupied Tiflis, the capital of Georgia. Only the mountainous district of Avaria, the heart of the Caucasian tribes, remained unsubdued.

In 1736 Nadir greatly shocked his Russian allies by sending proposals for a separate peace to Constantinople. Agreement about frontiers was easily reached, but the Turks could not accept the settlement of the Sunni-Shia schism which Nadir made a condition of peace, and negotiations continued for seven years, during which Nadir carried out his successful eastern campaigns.

The Eastern Campaigns, 1736–1740 (fig. 48)

India. At the end of 1736 Nadir with 80,000 men set about the recovery of Kandahar province, still held by the Ghilzai prince Husain (p. 272). The province was retaken without great difficulty, but Husain held out for over a year in the strongly fortified capital, which Nadir invested with a 28-mile circuit of towers. In 1738 Kandahar was stormed, sacked, and razed to the ground, and a new capital was built near by and called Nadirabad. Nadir continued his advance to Ghazni and Kabul, the territory of the Moghul, which he invaded with the excuse that Afghan refugees were being allowed to escape across the frontier. The Moghul dynasty had declined since the days of Aurangzeb and was now represented by the ineffective Shah Mohammed. Kabul, however, offered a stout resistance before surrendering and a strong force held the western end of the Khyber pass. Nadir circumvented this by working across country through the Tsatsobi pass and turning the whole position. Resistance declined, and it was not till Nadir was approaching Delhi that Mohammed's main forces took the field. They were singularly ill led, and only a part of them were engaged in the disastrous battle of Karnal which decided the war. Nadir entered Delhi, where a street riot precipitated a massacre of many thousand Indians.

Nadir's object was not to add vast Indian territories to his empire, though he annexed the Moghul domains west of the Indus, the boundary of Darius and Alexander. After stripping Mohammed and his nobles of the treasures of centuries, which included the Peacock Throne and the Koh-i-Nor diamond, and were conservatively estimated at £28,000,000, he reinstated Mohammed as emperor and retired to Kabul. Thence he led an expedition into Sind to Larnaka and the desert fortress of Umarkot, returning by the Bolan pass to Kandahar and Herat early in 1740.

The Oxus. In 1737 Nadir's son Riza Quli, who was left in Persia as viceroy, recovered the Amirate of Balkh on his father's instructions, which he also exceeded by crossing the Oxus and endangering his forces among the remoter Uzbegs. In 1739 Nadir dispatched

carpenters and boat-builders from India to build a fleet of transports at Kilif on the Oxus, where some 1,100 vessels of 6–9 tons burden were built. Thus Nadir was able, in the summer of 1740, to move down the Oxus with a large army fed from water-borne supplies, and to overwhelm the hitherto formidable Uzbeg hosts, which fought well though unaccustomed to artillery fire. Bokhara was occupied and Bokharan territory south of the Oxus was annexed, but Nadir reinstated the Bokharan Amir in the rest of his principality and took one of his daughters as a wife.

From Bokhara he advanced against Khiva and skilfully drew its Amir Ilbars out of his five fortresses to a defeat in the open field. Ilbars was taken prisoner and executed for his past treachery towards ambassadors, and a rival was set in his place. By crushing the Uzbeg Amirs and restoring the Oxus frontier Nadir effected a temporary solution of the Uzbeg problem and secured the protection of Khurasan.

The Last Turkish Campaigns, 1743–1745

After a protracted and unfortunate campaign against the Caucasian mountaineers (1741–1742) which greatly exhausted his army, Nadir resumed the Turkish war in 1743. Iraq was invaded by the unusual route through Penjwin into the Sulaimaniya district, and Mosul was invested. In the extreme south another force besieged Basra. Though master of the open country, Nadir was, as often, unfortunate in the sieges, not on this occasion because of the lack of heavy artillery but through the inexperience of his engineers. Before either city fell he was recalled from Iraq by revolts within Persia, but in 1744 he resumed hostilities in the Aras valley, where he gained his last Turkish victory on his old battlefield of Baghavand in 1745. After this he abandoned the disputable clauses of the 1736 negotiations and made peace on the basis of the 1639 frontiers. Thus, unlike the Safawid Shahs Ismail and Abbas I, Nadir never ruled in Iraq.

Naval Operations in the Gulf and Caspian

Perhaps the most remarkable of Nadir's schemes was his attempt to build up a fleet in the Persian Gulf with a base at Bushire. Nadir was the only Persian ruler since the Achaemenids who understood the importance of sea-power. He acquired his vessels by purchase, partly from the unwilling agents of the East India Company and more commonly from the ship-builders of Surat in India. In 1741 he attempted to build his own ships at Bushire, whither timber was

hauled from Mazanderan across the breadth of Persia at immense cost in lives and money, but he chose as director of construction an unfortunate Fleming who had no knowledge of ship-building and died of anxiety. This scheme failed, but by purchase Nadir built up a force of thirty small vessels, which were manned by Arab sailors, who had no special loyalty to Persia. Nadir's first admiral Latif was capable. Bahrein island was annexed (1738) and a series of expeditions to Oman, nominally in support of its Imam against rebels, secured the town of Muscat for Nadir (1737–1740). But Latif was murdered by his colleague Taki Khan, and later operations in Oman, while costing many lives, led to nothing except the establishment of the strong and hostile Busaid dynasty which still rules Oman.

Nadir's naval sense was also shown by his attempts to secure his own maritime service in the Caspian for the supply of his forces during the difficult Georgian campaigns. Here he had the help of an Englishman, Elton, who traded in his own ships between Russian ports and Resht. Elton built a ship mounting twenty 3-pounders at Langarud, creating all the accessories with local labour. But neither the Caspian nor the Gulf scheme survived Nadir.

Internal Policy

In 1736, after his first Turkish campaigns, Nadir convened a general assembly of notables and clergy in the plain of Moghan, at which with feigned reluctance he set aside the claims of the Safawids and took the title of Shah. The *Mulla Bashi* or high-priest was strangled for whispering that 'everyone was for the Safawids', but Nadir with his usual political sense kept the surviving princes safe in close custody, knowing their popularity. Next he forced through the assembly a remarkable programme of religious reforms. The Shia 'heresy' was officially abjured, and the recitation of its creeds and the cursing of the first three Caliphs forbidden. The Persians were declared to be orthodox Sunnis of a new school or 'rite', called the Jafari after the fifth Imam Jafar, who was regarded as persona grata both to Sunnis and to Shias. This rite was to rank with the normal four rites of Sunni Islam.

Nadir's interest in this scheme was political. He apparently wished to remove the causes which divided the Shia Persians from the Sunni Turks, Afghans, and Uzbegs, and which rendered his conquests precarious. In his peace negotiations with the Turks he made the recognition of the Jafari rite, and the concession of certain formal Sunni privileges, such as the dedication of a Jafari pillar in the

Kaaba of Mecca, conditions of peace. This policy was reaffirmed from time to time, particularly during negotiations with Turkey, and seems to have been a genuine attempt to undo the work of the Safawids. Yet to the national saints and sanctuaries Nadir, who by birth was certainly a Shia, was always respectful and generous. Not only Meshed, but Karbala and Najaf in Iraq, benefited from his gifts. Apparently Nadir cared not what the Persians believed if they would conform outwardly to orthodox Islam. The policy, which might well have succeeded some generations earlier, was perhaps based on the Shia tradition of dissimulation, whereby a Shia may feign orthodoxy to escape persecution. It only alienated Nadir's Persian subjects, but it is noteworthy that Nadir's army, on which all depended, was increasingly recruited from conquered peoples of Sunni faith such as Uzbegs and Afghans.

Administration. Nadir governed Persia mainly by members of his own family, who held large provinces as Beglarbegs, such as his son Riza Quli in Khurasan, his brother Ibrahim in Georgia and Azerbaijan, and his nephew Ali Quli at Herat. A few close friends were added to this number, of whom Tahmasp Jalayr was unreasonably loyal to the end, even when Nadir turned against him, and only Taki Khan, Governor of Fars, betrayed him without good cause, by rebelling for his own aggrandizement in 1743. Taki was punished by the massacre of his family and by mutilation, but was forgiven and restored to power. Nadir's general principle of government was given in his advice to the Moghul Shah: 'to keep a standing army of 60,000 men and to prevent the nobles from becoming feudal lords with hereditary fiefs and private armies'. Evidently Nadir well understood the weaknesses of former Persian monarchies.

During Nadir's absence in India his eldest son Riza Quli was made Viceroy of Persia with full administrative powers, but with the experienced soldier Tahmasp Jalayr to guide him in war. Nadir advised Riza to 'extirpate thieves and ruffians, and to treat well merchants and caravans from abroad'. Riza unwisely recruited himself a bodyguard of 12,000 men in special uniform, and on a rumour of Nadir's death ordered the massacre of all the surviving Safawid princes and assumed the title of Shah. Nadir, who was principally annoyed at the Safawid massacre, dismissed him from his viceregency and set his second son Nasrullah in his place (1740). Later an attempt at assassination (1741) was put to Riza's charge and in 1742 he was blinded, a punishment which generally disqualified Persian princes from the throne. The blinding of Riza was bitterly regretted by

Nadir and initiated a deterioration in his rule; his bitterness was increased by the revolt of his trusted friend Taki Khan.

The general administration of Nadir was firm. Violent punishments and justice without mercy were the rule for great and small officials alike. The discipline which he enforced on his army and throughout Persia was remarkable. The ancient Persian policy of transferring rebellious tribes and peoples was pursued with vigour so that the tribal map of Persia was greatly altered. Some 12,000 families of Afshars and 38,000 of other Turkoman tribes were moved from Azerbaijan to Khurasan. Six thousand Abdalis were transferred from Afghanistan to the Meshed–Damghan zone, and 13,000 families of Bakhtiaris also took the road to Khurasan, though they later returned. By such measures, as by his Oxus expeditions, he did his best for the security of Khurasan. His capital was at Meshed, which greatly prospered as a caravan centre; it had 90 caravansarais, some 60,000 houses and up to 250,000 inhabitants. But a contemporary remarked that Nadir's true capital was the 'seat of a saddle and the back of a horse'. However he was at times a vigorous builder, responsible for new cities at Kandahar, Shemaka in Georgia, and in Khurasan. Like the Safawids he was tolerant of Christian missions, and he even ordered the translation of the Koran, the Bible, and the Talmud into Persian.

Oppression and Decline. The series of provincial revolts and the consequent repression which marked the last years of Nadir's reign (1743–1747) were mostly caused by the grinding taxation and forced contributions, amounting to a capital levy, which Nadir imposed to pay for his campaigns. For 25 years he kept an army of 50,000–120,000 fighting men with a host of camp-followers on active service, and often living on the land of Persia as they passed from east to west. The burden was too great, though all might have been well if Nadir had devoted the vast spoils of India to the upkeep of the army or to the enrichment of the towns. But the greater part of this treasure in jewels and jewelled objects was hoarded in a treasure house at Kalat-i-Nadiri, to build which Nadir characteristically ordered the costly transport of huge blocks of stone across Persia from Maragheh.

War was Nadir's hobby, and his restoration of the Persian military tradition after the decadence of the late Safawid period was a great feat. But he failed to see the necessity for peace. The Russian ambassador said of him in 1741: 'the new Nebuchadnezzar has been rendered quite mad by his triumphs'. Nadir was proud of his Turkoman descent and saw himself as a second Tamerlane. His first grandson

was named Shahrukh after Tamerlane's son, and Nadir had the great tomb of Tamerlane moved from Samarkand to Meshed, though later he returned it. Yet his conduct of war and diplomacy was not megalomaniac. It was only within Persia, and mainly in the matter of taxation, that his judgement was at fault. His worst error was in cancelling a three years' remission of taxation promised on his return from India. Many revolts broke out after 1743 because his governors could not find the sums demanded, which in 1746–1747, when Nadir's mind seems to have been deranged, reached impossible figures. The revolts were crushed, and the last years of Nadir's life were marked by terrible cruelty; thirty men were strangled daily at the palace on suspicion of disloyalty. Finally, when his nephew Ali Quli had been driven to join a revolt in Seistan and Baluchistan, some conspirators of the royal household assassinated Nadir in his tent.

Zends and Qajars, 1747–1797

The second half of the eighteenth century was a troubled time, marked by much internal warfare and the interruption of settled rule. Nadir's death was followed by a period of dismal anarchy and dynastic wars. Two principal figures emerged from the strife which swept away most of Nadir's family: Karim Khan, of the Zend Kurds, and the Afghan Ahmad Khan Durrani. Karim Khan (1750–1779) ruled all western and northern Persia except Georgia as regent of a puppet Safawid Shah. His capital was Shiraz, and his wise government gave some 25 years of peace in which his provinces recovered from the oppressions of Nadir's reign. North of the Aras, Georgia fell away under the dynast Heraclius, who made himself independent and in 1783 accepted Russian protection.

In the east Ahmad Khan (1747–1773), head of the Abdali tribe, led back the Afghan mercenaries of Nadir to Kandahar and founded an independent kingdom of all Afghanistan. Ahmad also made himself suzerain of Khurasan and Baluchistan. The government of Khurasan was left in the hands of Nadir's only surviving relative and grandson Shahrukh (1747–1796), but a number of local rulers divided Shahrukh's authority and his real power even in Meshed was usurped by others, including his own sons. After Ahmad's death the Afghan suzerainty was maintained by his son Timur Shah (1773–1793).

Agha Mohammed, 1779–1797. On the death of the excellent Karim Khan dynastic warfare was resumed in western Persia. The nephews of Karim sought to maintain the Zend rule against a new pretender,

Agha Mohammed Khan, a Qajar noble. Mohammed re-established the unity of the Qajars of Asterabad, who had been split into two hostile sections, and gained control of Mazanderan. Thence he extended his power into Azerbaijan and Isfahan provinces at the expense of the Zends, who were gradually confined to Fars and Kirman. The last Zend ruler, the chivalrous Lutf Ali (1789–1794), fought hard, but Shiraz was yielded to Agha Mohammed by his chief minister, the so-called 'king-maker' Haji Ibrahim, and finally Lutf Ali lost Kirman (photo. 182) and after a period of guerrilla warfare was also betrayed to the Qajar. The independent Vali of Kermanshah had already rallied to Mohammed, who in 1795 recovered Georgia and took the title of Shah. In 1796 he marched into Khurasan, deposed Shahrukh, and tortured him till he revealed the hiding-place of his jewels, the remnant of Nadir's spoils. The unfortunate taste for precious stones was thus perpetuated to be the curse of the Persian monarchy in the nineteenth and twentieth centuries.

An invasion of Georgia by the Russian armies was checked by the death of the Empress Catherine after the occupation of Derbend and Baku, and thus by the time of his assassination in 1797 Shah Mohammed had re-united all the provinces of Persia except Herat, Seistan, and Baluchistan. His firm rule, which owed much to the turncoat minister Haji Ibrahim, was notorious for treachery and cruelty. The worst instance was the frightful sack of Kirman city in 1794 when 20,000 men were blinded and 900 executed to provide a pyramid of skulls as a suitable war memorial. But Mohammed gave Persia a period of much needed internal quiet and security. It was equally useful that the establishment of the authority of the Qajar tribe enabled him to pass on his power to a selected successor, his nephew Fath Ali. He, by the support of Haji Ibrahim and of the Qajars, easily disposed of the usual crop of pretenders, and was the first monarch of Persia for a hundred years to gain the throne by the ordinary course of succession. Thus the Qajar dynasty was established which ruled Persia from 1795 till 1925.

The European Traders in Persia, 1500–1800

The Gulf Trade

Before the discovery of the Cape route to India and the Far East, the extremely valuable trade in spices and silks for the European market passed up the Gulf to the Tigris and then overland from Baghdad across the Syrian desert to the Levantine ports of Syria,

whence Genoese and Venetian middle-men carried the cargoes to Europe. After the voyages of the Portuguese explorers Diaz (1486) and Vasco da Gama (1497–1498) that trade was intercepted at its source and Portuguese trading stations were established in India. But there remained the trade in silks produced in Persia itself (p. 270). To complete their monopoly the Portuguese Admiral and Indian Viceroy Albuquerque, after a preliminary occupation in 1507, finally in 1514 seized Hormuz island (p. 135), the market of the Gulf trade, and built a fortress there (photos. 180, 266). The Portuguese gained complete control of vessels sailing up the Gulf and exacted dues from those which they allowed to pass. Albuquerque came to terms with Shah Ismail I, who claimed the suzerainty of Hormuz, and the local ruler nominally retained his position for a generation, until the Portuguese claimed absolute ownership.

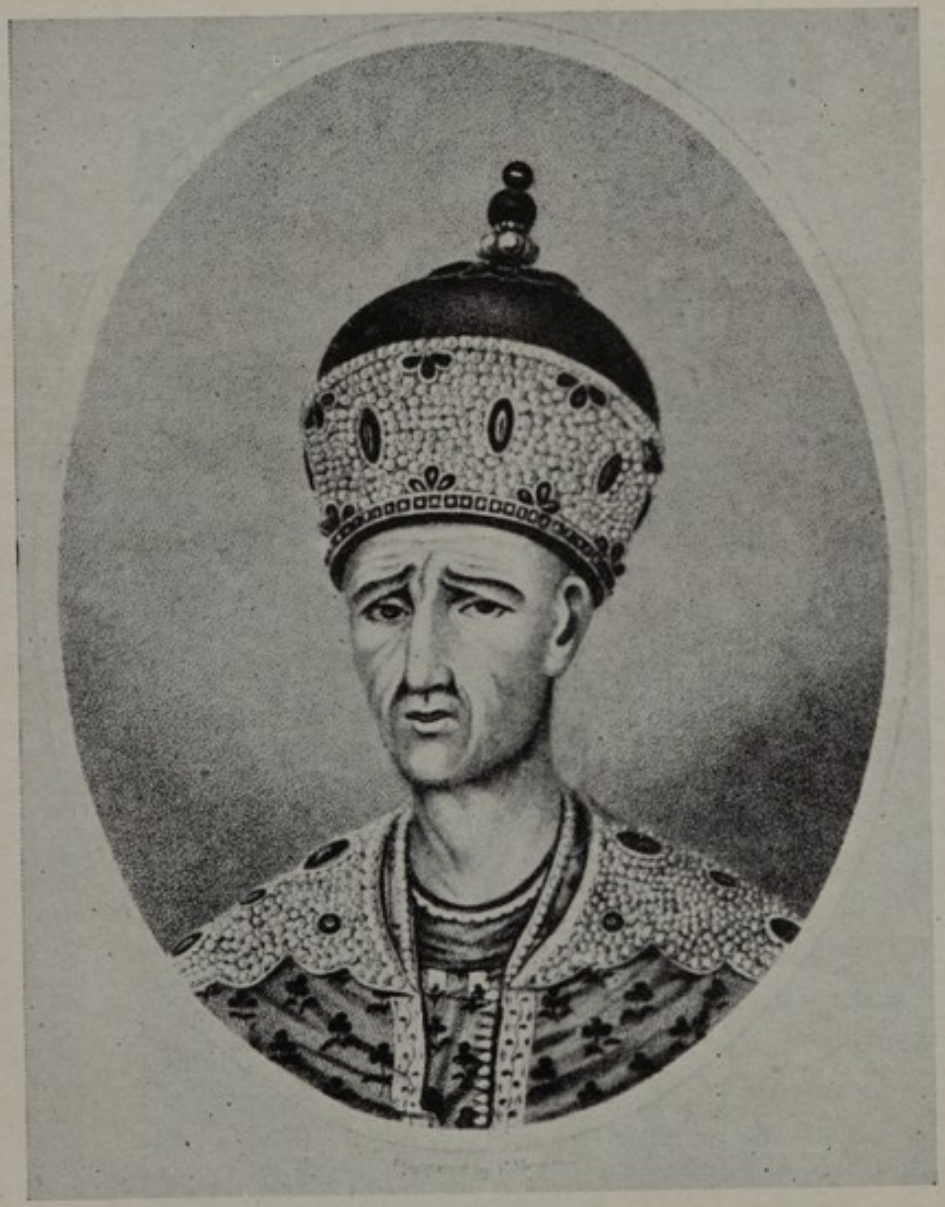
Portuguese and English. Portuguese monopoly was unchallenged for a century during which Hormuz was said to exceed Amsterdam and Antwerp in the value of its trade. But after the weakening of Spain, which then included Portugal, by the defeat of the Spanish Armada (1588), English and Dutch merchants began to arrive in Indian waters. The exploratory voyages of Lindschoten (1583) and Lancaster (1591) led to the founding of the Dutch and English East India Companies in 1600–1602. Finding no sale for their heavy woollen cloth in India the English company's representative at Surat sent two factors, Steele and Crowther, on a mission to Shah Abbas I at Isfahan. A better market was expected in Persia owing to the cold winters, and there was known to be a surplus of silk for export because the Turkish wars had closed the overland route. Meanwhile Shah Abbas at the instigation of his protégé Sir Anthony Shirley (p. 266) had already made a general grant of trading rights to Christian merchants, promising freedom from customs and from the jurisdiction of Persian governors. In 1614–1615 a particular *farman* was issued to Steele and Crowther for the English company, and Jask, sufficiently remote from the interference of the Portuguese at Hormuz, was chosen as a landing-place. The first English wares arrived in the *James* in 1616. Factories were opened at Shiraz and Isfahan in 1617. Finally in 1618 Shah Abbas granted the English company a monopoly for the export of silk from Persia. The English traders were soon involved in hostilities with the Portuguese, and many minor naval engagements took place between 1612 and 1620, when four English trading-vessels defeated a Portuguese flotilla off Jask. Then in 1622 the English made an agreement with Shah Abbas for a 'combined



181. *The fortress and ruins of Bam*



182. *The Gabri Gate, Kirman*



183. *Agha Mohammed Shah*



184. *Riza Shah Pahlevi*

operation' against Hormuz and also Qishm. The English vessels dealt with the Portuguese ships, and Persian troops, transported in small craft, stormed the forts. Both places were taken and the Portuguese were expelled.

Dutch Rivalry. Hormuz, which remained in Persian hands, never recovered its rank as a trading station. Its place was taken by Bandar Abbas or Gombrun on the mainland, which Shah Abbas made the port of Persia (photos. 180, 266). The English moved thither from Jask, and to their privilege of freedom from customs was added the right of retaining half the dues collected at the port. Then in 1623 the merchants of the Dutch East India Company arrived, first as inconvenient allies against the Portuguese, who remained at Muscat until 1650, and soon as dangerous rivals. In 1627 they secured by intrigue and gifts a share in the silk trade from Shah Abbas I, and in 1645 by a show of naval force in the Gulf they frightened Shah Abbas II into granting them the same rights as the English in the export of silk. Though they never secured absolute equality in trading rights with the English, they became the preponderant trading company in the Gulf and the volume of their trade swamped the competition of the English, whose fortunes were reduced very low. This was largely because the Dutch had the monopoly of the spice trade from the Far East, thanks to their conquests in the East Indies, whereas the principal English imports continued to be English woollens and the less valuable products of India. Also the English company suffered from the growth of rival English companies and 'interlopers', whereas the Dutch company was united and strongly backed by the Dutch Government. Anglo-Dutch hostilities in Europe had repercussions in the Gulf when in 1654 a Dutch fleet swept British vessels off its waters. Yet the English factors remained and the later Safawid Shahs preferred them, because the Dutch turned arrogant in their prosperity.

English Supremacy. After 1708, when the rival companies and interlopers were united into a new East India Company, the English began to gain ground at the expense of the Dutch, and their rights were confirmed by Nadir Shah. But the disturbed generation which followed his death caused a general decline of trade, their factory at Isfahan was closed, and matters worsened with the advent of French fleets to Indian waters. In 1759 a French squadron stormed and sacked the factory at Bandar Abbas, whence the English agents moved temporarily to Basra on the Shatt al Arab. In 1763 Bushire was chosen as their Persian station, and a new *farman* was granted

by Karim Khan under whose firm rule the trade of south-west Persia revived. This *farman* showed how completely the English had turned the tables on the Dutch. It renewed the right to export and import goods free of customs, gave a monopoly in the woollen trade, forbade the settlement of other European traders at Bushire while the English were there, and reaffirmed the freedom of themselves and their servants from Persian jurisdiction. The Dutch had moved most of their trade to Bushire in 1747, but withdrew both from Bushire and Basra, where they had been long established, in 1752. In 1753 they seized and fortified Kharg island as a new base, but in 1759 they finally withdrew from Bandar Abbas, and in 1763 were expelled from Kharg. The English were left supreme in the Gulf ports, though a quarrel with Karim Khan, whose galliots managed to capture an English vessel, led to a temporary withdrawal to Basra (1769–1778). It was to teach Karim Khan a lesson that H.M.S. *Seahorse*, on which Nelson was serving as a midshipman, visited the Gulf in 1775, the first British royal ship to enter these waters.

Since 1778 Bushire has been the British headquarters in the Gulf. But in fact the days of monopolistic trading companies were near their end. Between 1784 and 1833 the East India Company was gradually turned into an organ of the State, its political officers were forbidden to have private trade, and in 1835 the Gulf was opened to the commerce of other nations.

In 1783 the Persians lost the valuable isle of Bahrein to the Utub Arabs, and about 1793–1798 the control of most Persian ports except Bushire passed into the hands of the Sultan of Muscat, who leased the right of collecting customs at Bandar Abbas and retained it until 1868 (p. 292).

The Caspian Route

An early English attempt to circumvent the foreign monopoly of the Levantine and Gulf routes to Persia was made by Anthony Jenkinson, an agent of the Muscovy or Russia company, which in the reign of Queen Elizabeth began to trade between England and Russia. In 1559 Jenkinson was sent by Czar Ivan the Terrible on a mission to Bokhara and Khiva, and on his return to England urged the opening of trade with Persia by the Volga–Caspian route. In 1561 he travelled by this route, again on a mission for the Czar, landed near Baku after storms, and reached the court of Shah Tahmasp at Kazvin by land. After much persuasion the Shah agreed to the proposed trade with England, but after six voyages the storms

and pirates of the Caspian caused such losses that in 1581 the company abandoned the enterprise.

In 1637 a Hamburg merchant was dispatched by the Duke of Holstein in the interest of the German silk manufacturers to Russia and Persia on a similar mission, but the costs proved too heavy, and the leader lost his life because he intrigued with the Turks for the opening of an alternative route.

Again, in the eighteenth century, in 1739, the Englishman John Elton in the service of Peter the Great explored the Volga–Caspian route, made a trading voyage to Resht, and secured a favourable *farman* for the Russia company from Riza Quli, then regent for the absent Nadir Shah. The capital was now at Meshed, and Elton hoped to reach regions of northern Persia which were beyond the reach of the English factories at Bandar Abbas and Isfahan. With Russian permission he built two fine ships at Kazan in 1742 and traded to Resht, but unwisely quarrelled with the Russians and transferred his allegiance to Nadir Shah (p. 277); to mend the situation the company dispatched Jonas Hanway, who sailed with a cargo from Astrakhan to Asterabad bay, but in 1746 the Russians prohibited British trade across the Caspian.

The Qajar Dynasty from A.D. 1797 to the Revolution

Summary

In the nineteenth century Persia had the good fortune to be ruled by only three Shahs between 1800 and 1896, and consequently suffered relatively little from dynastic warfare and rebellion. In the first three-quarters of the century there was only the slightest modification of the traditional economic and political system, but in foreign affairs Persia suffered a disastrous decline in relation to its most powerful neighbours, Russia in the north and the British Government of India in the east operating through the newly created State of Afghanistan. The result was the loss of great regions in the north-west and east which had hitherto been within the Persian sphere of influence, and finally Persia was only saved by external events from becoming a Russian protectorate. After 1870 Persia was drawn into the orbit of European high finance, and its economic life tended to pass into the control of European concessionaries, mainly Russian and British, though on the whole Persia both suffered and benefited less from European exploitation and development than did other countries of the Middle East. This was due to a national reaction against foreign

control, partly under the inspiration of European liberalism. This seeped into Persia and led to the revolutionary movement and the establishment of a constitution in 1906–1907, whereby Persia entered an entirely new phase of political history.

Foreign Affairs (fig. 49)

French and British Intervention. In 1798 Napoleon appeared in Egypt and Syria and formulated an ambitious plan for the conquest of Turkey and the invasion of India through Turkey and Persia. This plan was changed in 1801, after his defeat at Acre and return to Europe, to a joint Franco-Russian expedition, which was to start from a base on the Caspian and pass through Persia. Napoleon again changed his ground on the death of his ally Czar Paul in 1804 and the outbreak of war with his successor Alexander. He now offered to help the Persian Shah Fath Ali to recover Georgia, recently lost to Russia, in return for Persian assistance in an invasion of India which was planned to follow the expected defeat of Russia. The Shah accepted and the scheme was embodied in the Treaty of Finkenstein (1807). But the Franco-Russian war ended in the same year at Tilsit, and the only result of the Finkenstein treaty was the arrival of a French military mission in Persia under General Gardanne, the first of a series of European military missions which endeavoured to modernize the Persian army.

These missions had disastrous results because they sought to create an infantry army at the expense of the cavalry, which had hitherto effectively defended Persia against more powerful neighbours. The Persians lacked the organizing ability to manage an efficient infantry army with its cumbrous machinery of supplies, and in the Russian wars of 1804–1813 and 1825–1828 they suffered disastrous defeats from which their military tradition has never recovered.

The French menace was soon over, but it caused the British to enter into close relations with Persia, although they had not yet realized that Russian expansion in southern Asia was a more real threat to India than the schemes of Napoleon. The first British mission of Captain Malcolm in 1800 was mainly concerned to check the then expanding power of the Durrani ruler of Afghanistan, Zaman Shah, but the agreement reached included an article for the 'extermination' of French agents in Persia. After the Franco-Russian convention of Tilsit negotiations were renewed, and a treaty was made in 1814. This established a defensive alliance between Great Britain and Persia and provided for the payment of a large subsidy while Persia was waging any defensive war against a European Power. The

Shah was also expected to induce the rulers of the Oxus oases to prevent the passage of armies hostile to India, and was even to devastate supplies on the route through Afghanistan in the event of any such invasion. Great Britain in return was not to intervene in wars between

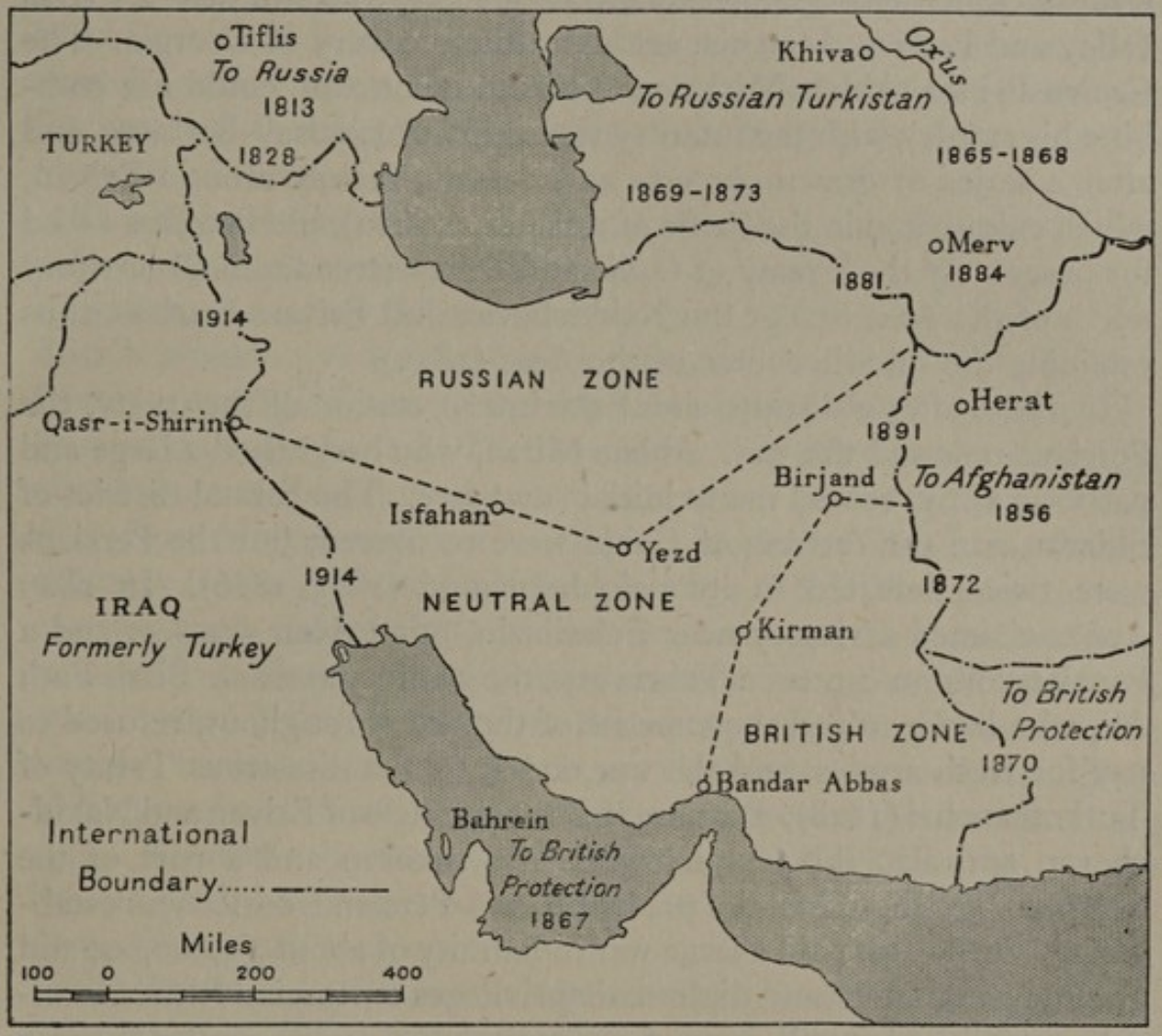


FIG. 49. *Delimitation of Persian frontiers in the nineteenth century and the partition of zones of influence in 1907*

Persia and Afghanistan. The defensive clauses proved an embarrassment later when the British realized that Persia's chief enemy was Russia, and in 1828 they were cancelled in return for British assistance in paying the Persian war indemnity to Russia. The treaty, however, successfully involved Great Britain in Persian affairs. A Persian emissary was sent to London, in the company of the British diplomatist James Morier, author of the satirical *Adventures of Hajji Baba*, and in 1810 the Shah replaced the French by a British military mission. One officer of this, Lindsay-Bethune, a giant 6 ft. 8 in. tall, greatly impressed the Shah and became commander of the new infantry regiments.

Russian Wars. Of far greater importance than these diplomatic exchanges were the Russian wars. In 1800 the ruler of Georgia, who had previously acknowledged the suzerainty of Shah Agha Mohammed, surrendered his crown under pressure to Czar Paul, and a Russian army occupied Georgia. In 1804 the Persians, who still held the Aras valley and Persian Armenia, set about the recovery of Georgia. The Crown Prince, Abbas Mirza, who was in command, could not combine his cavalry with the infantry regiments of Lindsay-Bethune, and after a series of drawn contests and defeats, mainly around Erivan, which culminated in the battle of Aslanduz (1812), the Persians asked for peace. By the Treaty of Gulistan Persia surrendered all territory north of the Aras except the Nakhichevan and Erivan districts, thus retaining the middle course of the Aras (1813).

In 1825, after a dispute about the interpretation of the treaty, the Persians renewed the war. Abbas Mirza, who had raised a large and patriotic army, scored many initial successes. The coastal district of Shirvan and the fortress of Ganja were recovered, but the Persians were twice defeated in its neighbourhood (1825–1826). In 1827 Abbas claimed a victory near Echmiazin, but Erivan was lost and a Russian column captured Tabriz and the artillery arsenal. Shah Fath Ali, who had grudged the expense of the war throughout, refused to pay for fresh armies, and the war ended by the disastrous Treaty of Turkomanchai (1828). Persia ceded the districts of Erivan and Nakhichevan and also the Caspian area of Lenkoran and a part of the northern Talish. Thus the present Russo-Persian frontier was established. Persia also paid a large war indemnity of about £3,000,000 and granted commercial and diplomatic privileges to Russia. Russian consuls, established at will, were given capitulatory rights similar to those granted to the English traders in the seventeenth century. This was the origin of the modern form of capitulations, later extended to other European Powers by virtue of 'most favoured nation' agreements.

Herat. Persia never again faced Russia as an equal in war or diplomacy after the Turkomanchai treaty, and the foreign policy of the Shahs Mohammed (1834–1848) and Nasir-ud-Din (1848–1896) was a matter of balancing Russian against British influence. Their principal object between 1830 and 1857 was the recovery of the lost provinces of Herat and Seistan to counterbalance the surrender of territory to the Russians. Herat had become part of the Afghan kingdom founded by Ahmad Khan Durrani on the death of Nadir Shah (p. 280), and had remained under local rulers who recognized the suzerainty of Ahmad's successors. But the Durrani dynasty de-

clined after Timur Shah and there was no strong ruler at Kabul until the rise of a new man, Dost Mohammed, who by 1826 had gained control of Kabul, while his brother ruled at Kandahar. Russia encouraged the Persians to take Herat, after which the Persian conquest of Kandahar would be probable, but the British were determined to keep Herat and Kandahar out of the zone of Russian influence. If these became Persian, the Russians could choose their own moment for entering Persia and concentrate with little resistance upon the frontiers of India.

The Russian bogy was henceforth in the forefront of British-Indian policy, although there is little certain evidence that the invasion of India was ever seriously intended by the Russian Government. The British scheme was to interpose between the zones of the two great Powers a strong Afghan state, which was expected to be at least anti-Russian if not Anglophil. The Persians in turn tried to take advantage of moments of British weakness to assert their power in Herat. Thus after Dost Mohammed had successfully repulsed Shuja, the British claimant to the Afghan dominion, in 1834, Shah Mohammed, who was extremely unfriendly to the British, dismissed the British military mission from Persia, came to an agreement with Dost Mohammed, and invaded Herat in 1837. A British agent inside Herat city, the notable traveller Eldred Pottinger, inspired its defence. Shah Mohammed was unable to take the city and became involved in a long siege. Belatedly he followed the advice of a British envoy, after a British force had seized Kharg island in the Persian Gulf, and withdrew without effecting anything.

The British then became involved in their first Afghan expedition, the object of which was originally to send columns to Kandahar, Kabul, and Herat. But after the withdrawal of Shah Mohammed from Herat the expedition was limited to the occupation of Kandahar, the expulsion of Dost Mohammed from Kabul, and the establishment of Shuja in his place. This was accomplished in 1839, and despite the disasters that overtook the British garrisons left in Afghanistan in 1841 at the hands of a general Afghan rising, British control was reasserted in 1842, and by a change of policy Dost Mohammed was restored as Amir of Afghanistan. Herat, however, remained under an independent ruler, Yar Mohammed, who was persistently pro-Persian in his sympathies.

On the death of Yar Mohammed in 1851 Shah Nasir-ud-Din declared the annexation of Herat, but strong British pressure enforced the maintenance of the *status quo*. Finally in 1856, when the British

and Russians were still occupied with the conclusion of the Crimean War (1853–1856), a Persian army occupied Herat. Great Britain reluctantly declared war and sent a small expedition to the Persian Gulf and the Karun delta, where Bushire and Kharg, Mohammerah, and Ahwaz were occupied. The Shah sued for peace, withdrew from Afghanistan, and recognized its independence by the Treaty of Paris (1857). A new ruler was set up in Herat who, though a nephew of Dost Mohammed, was a protégé of the Shah. This nephew foolishly attacked Dost Mohammed's territory in 1863, whereupon Dost incorporated Herat finally in the state of Afghanistan.

Seistan. All that was left to Persia of the more fertile zones of the eastern frontier was Seistan. This region had recently been under the suzerainty of Herat, but on the death of Yar Mohammed the Persians secured the allegiance of the local ruler. The energetic occupation of Seistan nearly caused a clash of arms with Dost Mohammed's successor Shere Ali in 1865, but Great Britain agreed to provide an arbitrator to settle the Seistan frontier. In 1872 a commissioner, General Goldsmid, visited Seistan and awarded the fertile area of Seistan proper on the left bank of the lower Helmand river to Persia, and the barren area of 'outer' Seistan on the right bank to Afghanistan. In 1903–1905 the McMahon Commission delimited the frontier anew after a change in the course of the river.

Russian Conquest of Turkistan. Persia, unlucky in Herat, was also unlucky in her sphere of influence north of the Kopet Dagh. The establishment of a Russian naval base on Ashuradeh island at the entrance to Asterabad bay (1834), ostensibly established at the invitation of the Shah for prevention of Turkoman piracy, led to no further aggression here. But from 1840 onwards Russian expeditions began to penetrate along the Oxus and Jaxartes and to gain influence in the Turkoman and Uzbeg Khanates. In 1842 the Russians made a treaty with Khiva, and by 1849 they had a military post at the mouth of the Oxus. In 1865–1868 a war with Bokhara left Samarkand in Russian hands and Bokhara a protectorate, and in 1873 Khiva finally lost its independence. On the Jaxartes Tashkent was taken in 1864 and Khokand in 1876.

Closer to Khurasan the Persians had been successful in asserting themselves at Merv in 1857, only to be turned out by the Turkomans in 1860. The Russians soon intervened, establishing themselves on the eastern side of the Caspian at Krasnovodsk and at Chikishliar close to the Atrek mouth in 1869. In 1879 they advanced eastwards against the Turkomans, and after some preliminary defeats took the

great stronghold of Gök Tepe on the north flank of the Kopet Dagh in 1881. The Persians were helpless, and in 1881 and 1893 the Russo-Persian frontier was fixed by treaties unfavourable to the Persians. They gave up all claim to Merv, which the Russians occupied in 1884, and the frontier was drawn along the lower Atrek and thence along the outer flanks of the Kopet Dagh to the Tejend river, in such a way as to exclude the fertile lower slopes or *atek* from Persia.

The Eastern Boundary Commissions. The envelopment of Persia was thus completed and the work of the armies was finished by boundary commissions. The first of these in the east was in Makran, where Persian authority had been restored by Shah Nasir-ud-Din after the anarchy in Baluchistan that followed the death of Ahmad Khan Durrani. In 1870–1871 General Goldsmid defined the frontier from Gwatar on the coast to Jalk in the interior between Persian Makran and the British protectorates in Baluchistan. In 1872 Goldsmid delimited the Seistan frontier (p. 290) from the northern end of the Helmand marshes to Kuh-i-Malik Siah, and in 1896 the rest of the Baluchi frontier between the latter point and Jalk was defined by Colonel Holdich, who included the oasis of Kuhak in Persia but could not finish demarcation. The frontier between Khurasan and Herat was the Hari Rud in the north, but there was a dispute about the Hashtadan or Bakharz plain south of the Hari Rud, which was settled by a British commissioner in 1891. This dispute was revived in 1930 and a Turkish commissioner demarcated the whole boundary from the Hari Rud to Seistan in 1934–1935.

The Turkish Frontier. The northern frontiers having been fixed by Russian and the eastern by British decisions, there remained the Turkish boundary. There was a war with Turkey in 1821–1823 which originated in the Turkish protection of Persian nomad tribes that had refused allegiance to the Shah. The Persians invaded Turkish Kurdistan and Iraq with some success, but were stayed by an outbreak of cholera. The subsequent treaty reaffirmed the 'frontiers of 1639', and thereafter Persia and Turkey, the weakened victims of Russian aggression, were at peace though not in amity. But the 'frontiers of 1639' were very indefinite (p. 267) and several attempts at more exact definition were made, between 1843 and 1874, by mixed commissions, which inevitably consisted of Russian and British representatives apart from the Turkish and Persian members.[1] A map was produced

[1] By the 1847 Treaty of Erzurum Turkey expressly recognized that the anchorage of Mohammerah and the lands east of the Shatt al Arab belonging to Persian tribes were Persian territory.

of a zone 700 miles long and 20–40 miles wide, from Ararat to the Gulf, within which the frontier was said to be. Since the Persians and Turks still could not agree about the exact location, another Anglo-Russian commission made a fresh survey in 1914 and demarcated the boundary on the ground. On this frontier alone Persia lost no territory in the nineteenth century, and even gained by the establishment of effective Persian control in Khuzistan after the opening of the Karun to navigation (p. 297). But a new cause of dispute arose by the fixing of the boundary on the left bank of the Shatt al Arab instead of along the centre of the fairway; also an area of 674 square miles near Khanaqin now containing the Naft Khaneh oil field was transferred to Turkey.

The Gulf. Persia was successful in recovering some ports and islands of the Gulf which had been acquired on various conditions at the end of the previous century by the Sultan of Muscat (p. 284). These included Qishm, Hormuz, and Bandar Abbas, where Persian authority was restored in 1856, though until 1868 the Sultan of Muscat continued to farm the customs. Bahrein, however, with its valuable pearl fisheries and at that time unknown oil resources was never recovered. Chahbar was gained forcibly in 1871.

In the nineteenth century the British made continuous efforts to suppress piracy and the slave-trade. Both of these originated in the principalities of Arabia. The slave-trade was from east Africa, though there was also an export trade in Baluchis from the Makran coast to Oman. Small vessels of the Indian Navy (till 1867) and of the Royal Navy were continually at work, and various political agreements, which did not concern Persia, were made with the Arab states. British garrisons and naval stations were maintained on Qishm island from 1820 to 1879, and at Jask from 1879 to 1886.

About 1883 slaving was replaced by gun-running as the principal abuse. Bushire and Muscat were the centres of this trade, which reached great proportions. By 1897 it was reckoned at £100,000 a year at Bushire, where it was conducted openly. The Persian Government finding that the tribesmen were better armed than the Persian army, which reckoned that 'Martini Khan' was its master, acted vigorously with British support in 1898 to suppress the trade at Bushire. The source of supply passed from British to foreign firms, and gun-running continued, though in modest proportions, from Muscat to small harbours on the Makran coast, mainly for the supply of Afghanistan.

In 1887 the expanding power of Russia began to look gulf-wards. Russian officers in the Persian service visited Bushire and Russian

engineers visited Bandar Abbas and Hormuz, where a Russian coaling-station was said to be projected. Russian schemes for a 'warm-water port' were vigorously opposed by the British Government, which declared in 1899 that it would resist the attempts of any other nation to establish itself in force on the shores of the Gulf, and in 1903 the Viceroy of India, Lord Curzon, made a state visit to the Gulf with an escort of four cruisers. The Anglo-Russian agreement of 1907, however, put an end to the Russian schemes at this time.

It should be added that since 1772 officers of the Indian and Royal Navy have carried out the hydrographic surveys of the Gulf and the Makran coast. The foundation of the present Admiralty charts of the Persian coast of the Gulf was the exhaustive and voluntary work of Lieutenant J. M. McCluer in 1785–1788. The exploration of the Karun river, which was opened up as a waterway in 1888 (p. 297), was the work of Lieutenant Selby, who forced the Ahwaz rapids in a paddle steamer in 1842.

Anglo-Russian Agreement of 1907. The military envelopment of Persia by Russia was succeeded after 1880 by economic penetration (p. 298), often at the expense of British interests, until it seemed likely that Persia would pass into Russian hands. But the tension between Great Britain and Russia was eased by the defeat of Russia in the Russo-Japanese war and by the emergence of the German danger in Europe. In 1907 the two Powers made a private arrangement for the division of Persia into three zones of influence (fig. 49). The Russian zone, from which British concessionaries were excluded, contained all the wealthy and fertile provinces of northern and north-western Persia north of a line which included Qasr-i-Shirin, Isfahan, Yezd, and ran thence to the junction of the Russian, Persian, and Afghan frontiers. The British zone, from which Russian concessionaries were excluded, was limited to the generally barren corner of south-eastern Persia, east of a line through Bandar Abbas, Kirman, and Birjand. In the intermediate zone, which included the south-western provinces, both Powers were free to acquire concessions. Clearly Britain limited herself to securing the defence of the Indian frontier, and the lion's share was to be Russian; Persia could no longer hope to offset Russian by British influence, while other countries, though not excluded by the agreement, were certainly not encouraged to intervene. The Persians felt they had been thrown to the wolves, and there was general expectation of direct Russian aggression. The balance between Russia and Great Britain was, however, restored when the British oil concession in the neutral zone (p. 490) proved to

be of such exceptional value that the British Government acquired a considerable share in the company concerned. The protection of south-western Persia thus became a major British interest, and the neutral zone was virtually added to the British zone. Yet this change did not take effect immediately, and until 1914 Persia gained little help from Great Britain in restraining the violent Russian intervention in Persian affairs which followed the Constitutionalist revolution of 1906–1909 (p. 299 ff).

Internal Affairs, 1797–1909

Reigns of Fath Ali and Mohammed

Persia enjoyed considerable stability and freedom from dynastic warfare in the nineteenth century owing to the long reigns of the monarchs. Fath Ali (1797–1834) was more troubled by revolts than his successors because the Qajar dynasty was new. Twice, after the disastrous Russian wars, there were risings in Khurasan, where Qajar authority was not fully established till 1830, but they were put down by the energetic Crown Prince Abbas Mirza. The defect of Fath Ali was his avarice, which largely prevented the continuance of resistance to the Russians after the defeat of Aslanduz in 1812, but he was reckoned an able monarch. Yet it was in his reign that the commercial agents of Russia gained free access to Persia, and the enjoyment of capitulatory rights (p. 288), and that foreign military missions were introduced to remodel and ruin the Persian army (p. 286).

The unfortunate death of Abbas Mirza left the throne to Mohammed, another of Fath Ali's 103 legitimate children. His succession was hailed by the usual revolt in Khurasan and a brief dynastic war with a rival brother, the Governor of Fars. British and Russian support secured the throne for Mohammed, and the rebels were put down by armies led by the Englishmen Lindsay-Bethune and Rawlinson, though later under Russian influence he expelled the British mission (p. 289). In 1840 the Ismaili sectaries, descendants of the Abbasid Assassins, rebelled under their leader the Aga Khan, for objects that are obscure. At first successful in defeating the Governor of Yezd, the Aga Khan retired to Bam fortress (photo. 181) and thence fled to India and Bombay, which is still the nominal home of this notoriously rich family.

Reign of Nasir-ud-Din, 1848–1896

The accession of Nasir-ud-Din was unopposed except for the rebellion of a Qajar chief in Khurasan, who for a time held Meshed and

gained a considerable following of tribal chiefs. Finally the citizens betrayed him to the Shah's army besieging Meshed. This was the last of the risings in Khurasan.

Babism. The most important internal event in the first half of the nineteenth century was the remarkable Babi religious movement. This arose from the preaching of Sayyid Ali Mohammed, first at Shiraz and Isfahan and later from his various prisons (1844–1850). His religious system was formulated out of many ancient schools of Moslem thought and particularly the doctrine of the Mahdi or Second Coming. The cardinal point was that he declared himself to be the Bab or Gateway to communication with Allah; later he was regarded by his followers as a direct manifestation of God. His influence was immense and his doctrines were inevitably pronounced unorthodox. Shah Mohammed ordered his arrest and imprisonment, and he was executed by the orders of Nasir-ud-Din's vizier Taki Khan in 1850. The severe repression of his followers caused a revolt in which the Babis displayed remarkable fortitude both in the field and under torture. A few hundred men in the ill-fortified town of Zenjan defied for many months a large Persian army, and in 1852 three Babis publicly attempted to assassinate the Shah. The example of the martyrs, who showed a bravery unusual among urban Persians, gained them many followers. There was a split between the adherents of the successor appointed by the Bab, the saintly Mirza Yahia or Subh-i-Ezel, 'Morning of Eternity', and those of his elder and more practical brother Baha-Ulla, who eventually prevailed. These leaders withdrew to Turkish territory, but Babism and Bahaism continued to flourish in Persia, though discretion and concealment were generally practised. It was reckoned that there were half a million adherents in Persia by 1900, and this unorthodox movement, which took on a decidedly liberal tone, played a great part in unsettling the religious and political system of Persia, and in preparing the ground for more secular changes.

Tribal Policy. All the Qajar Shahs in the nineteenth century sought to increase their power and revenues inside Persia at the expense of the feudal leaders of the great tribal confederations. But the methods used weakened the tribes without strengthening the Shah. The Persian army seldom succeeded in tribal campaigns; hence inter-tribal feuds were encouraged and chief was set against chief by intrigue. Flagrant treachery was used to gain possession of over-influential tribal leaders, who were imprisoned at Tehran and either executed or restored to their tribes as the tools of the Shah. Thus in 1840

Shah Mohammed forced into rebellion and broke the great Bakhtiari leader Mohammed Taki Khan, who had united all the Bakhtiari groups and was influential also in Luristan proper (p. 340) and among the Kuh Galu tribes (p. 374). In 1882 the Il Khan of the Haft Lang Bakhtiaris was strangled, with the connivance of Shah Nasir-ud-Din, while being entertained by a Persian governor. Nasir-ud-Din also reduced the power of the Khan of the Kurds of Quchan in Khurasan by a series of fines and imprisonments. Two great tribal insurrections, of north-western Kurds in 1880 and of the Yamut Turkomans of Khurasan in 1889, were largely produced by Persian misgovernment. The Kurds, after taking several towns in Azerbaijan, proved incapable of serious combination and broke up of their own accord, but the Turkoman revolt was only mastered by Persian intrigue and the treacherous seizure of the principal leader. Only two feudal rulers, the Vali of Pusht-i-Kuh and the Amir of Qain, survived the nineteenth century with their powers and territories intact, and as a whole the tribes of Persia declined both in man power and in the numbers of their horses; thus the twin pillars of Persian military strength were weakened yet again.

Modern Influences. The introduction of European liberalism and commercial and mechanical techniques was gradual and slow, and was complicated by the rivalries of the Russians and British who were the principal agents. The printing of books by modern presses became common after 1823, and in 1864 the first telegraph line was laid in Persia at the instance of the British Government, which was anxious for rapid communication with India after the Indian Mutiny. The first route was circuitous; linking with the new Turkish Constantinople–Baghdad line at Baghdad, it went by Kermanshah, Hamadan, Tehran, and Bushire to Jask, and thence by submarine line to Karachi. Later the system was amplified and proved of great value to the Persian Government in providing rapid intelligence of provincial disorders, enabling them to be checked at the outset. The British employers of the 'Indo-European Telegraph Company' also acted unintentionally as peaceful agents for the propagation of European notions. The establishment of a regular postal service in 1875 also assisted the interchange of information and ideas.

The all-too-short vizirate of the liberal-minded Taki Khan (1848–1851) was the starting-point of many progressive tendencies. For a brief period standards of honesty in government were enforced from above, and the fruits of his policy were seen in the establishment of an Imperial College, the Dar al Fonun, at Tehran in 1852, where mili-

tary science and engineering, physical sciences and European languages were taught to about 100 students drawn from the ruling classes. In 1855 a so-called Ministry of Education was established and a few students were sent annually to European universities. A *Court Gazette* was published regularly after 1851, but no popular newspapers were printed in Persia until 1907.

The next steps in development were partly the result of Shah Nasir-ud-Din's three visits to Europe (1873, 1878, 1889), themselves a great innovation, where he met the concession-hunting financiers of the day, and partly due to the vizier Husain Khan (1871), who preferred to entrust the modernization of Persia to British rather than to Russian hands. In 1872 Baron Julius de Reuter, the Anglo-German news-agent, received a concession for the monopoly of banking, mining, and railway enterprises in Persia, the resources of the Customs being pledged as security of his profits. But there was some Persian opposition, and the Shah, after discovering the indignation of the Russians and the indifference of the British to the project during his travels, cancelled the concession. Later in 1889 the baron was allowed to found the Imperial Bank of Persia with the sole right of issuing bank-notes and the control of mining enterprises. As a counterpoise the Russian Government gained the right to open a bank (p. 479).

In 1888 the Karun river was opened to navigation in a peculiarly Persian fashion. Europeans might navigate below Ahwaz, but they might not build wharves and warehouses, whereas navigation above Ahwaz to Shushtar was reserved for Persians. In fact navigation throughout was carried on by the British firm of Lynch Brothers (the Tigris and Euphrates Navigation Company) below Ahwaz in their own right, above Ahwaz in the name of the Shah. The same firm opened a carriage-road from Shushtar by Isfahan to Tehran, which was later linked by a Russian carriage-way from Julfa on the Aras by Tabriz to Tehran (p. 546). Otherwise little was done to improve communications. The Russians in 1889 received an option on railway construction but changed it in 1890 to a general veto on the building of railways for 10 years. The lack of modern communications led to the failure of the mining operations undertaken by a subsidiary company of the Imperial Bank.

In 1889 a concession was granted for a tobacco monopoly to a British company, which was to control production, preparation, and sale. Thereby the multitude of artisans and vendors, and possibly also the cultivators, concerned with the trade were likely to be ruined. As tobacco smoking was the national habit of both men and women,

this concession caused a great outcry and led to the first national demonstration against an act of government. The principal Mulla placed a ban on smoking, which was strictly observed until the monopoly was cancelled in 1892. The Shah, who had bargained for a handsome income, had instead to pay £500,000 in compensation to the company. This debt was the origin of the financial difficulties which Shah Muzaffar found on his accession in 1896.

Shah Muzaffar, 1896–1907

In 1896 Nasir-ud-Din was assassinated by an admirer of the political agitators who were beginning to preach reform in Persia. His successor Muzaffar was quietly established on the throne, but found himself faced with the general indebtedness of his treasury both on public and private accounts. He raised two loans in 1900–1902 on most unfavourable terms from the Russian Banque de Prêts for a total sum of over £3,400,000, or more than double the national income. These loans, of which the balance was spent on the Shah's expensive visit to Europe, gave no material benefit to Persia, and hence increased what was becoming a national agitation against the corruption of the Government. Grievous conditions were attached to the loans, including provision for the revision of the Customs tariff to the advantage of Russia. The Russians at this time were gaining control over much of Persian commercial life by the over-liberal lending policy of their bank, which was backed by the Russian Ministry of Finance. In 1903 the new Customs tariff greatly reduced charges on the principal Russian imports, sugar and petrol, from 5 to $1\frac{1}{2}$–$2\frac{1}{2}$ per cent., and increased those on tea, the principal British import, to 100 per cent. In the administration of the Customs, however, a great improvement was made by the gradual abolition of the traditional method of tax-farming, and the establishment of a Customs service efficiently run by Belgian officials, who were at least preferable to Russians.

The French Government had secured in 1894 the exclusive right of exploring ancient sites in Persia, and the French scientist de Morgan, leader of a French scientific and archaeological mission to Persia, which explored Susa, had drawn attention to the petroliferous zone of south-west Persia in 1895. What proved to be the most valuable of all the concessions caused little stir at the time. It was an Englishman, W. K. D'Arcy, who gained in 1901 a general 60-years concession for the exploitation of oil resources in most of Persia including this area, and in 1908 oil was struck at Masjid-i-Sulaiman. In 1909 the Anglo-Persian Oil Company was formed, and by 1912 a

pipe-line had been built to Abadan and a refinery constructed there. This event greatly increased the interest of Great Britain in the stability of Persian government and modified the effect of the 1907 agreement with Russia (p. 294).

The Persian Revolution, 1905–1909

Meanwhile a general political agitation had been spreading through the country which gained its main strength from the support of the clergy and of tribal leaders, though at first the movement was urban. The agitation owed much to two remarkable Persians who had had some measure of European education. These were Jamal-ud-Din, once a councillor of Shah Nasir-ud-Din, and Malkom Khan, an ex-conjuror who founded a Masonic Lodge at Tehran in the sixties; though this Faramush Khaneh or 'House of Forgetfulness' was broken up by the Government, it was the first of a series of political clubs and secret societies. The two men met in London and edited a Persian newspaper in Arabic called the *Qanun*, which was smuggled into Persia and gained great influence. The general corruption of the Government, which being extremely short of money allowed officials to practise every form of extortion, daily added minor complaints to the long list of financial scandals which were causing general unrest.

As early as 1892 the *Qanun* complained that 'the control of State affairs is in the hands of ignorant and base-born men . . . the rights of the State are bartered to please legation dragomans (i.e. the Capitulations). Our army is the laughing-stock of the world . . . our priests and learned clergy crave the justice of the infidels . . . our princes deserve the pity of beggars . . . our towns are each a metropolis of dirt . . . our roads are worse than the tracks of animals.' Thus the complaint was not against the monarchical system but against its abuses, and was oddly mixed with a desire for European 'progress'. The popular outcry was at first limited to the demand for a fixed system of law and law courts, but after promised reforms were not effected it extended to general constitutional reform and the adoption of parliamentary monarchy.

Persia at this date was still governed by the methods of the Safawids. The Shah held two courts daily, at which he nominally handled all public business. Though the monarchy no longer possessed a religious sanction, the Shah was absolute ruler in legislation, executive, and jurisdiction. A heavy burden of work was borne by the Grand Viziers, who were chosen among men of low birth in order to keep the

nobles from great power. There was no official council, and the Shah chose his advisers among his courtiers and servants. There was no distinction between the private and national income of the monarch. The governorships of provinces and administrative districts were farmed out to the highest bidder, or even forcibly sold to reluctant candidates who could scarcely recover their expenditure by the harshest exactions. The law courts consisted of the generally venal religious courts of the Mullas, and the system of blood-money prevailed instead of punishment for any but the most notorious offenders. The report of two British commercial missions to western and southern Persia in 1903–1904 had shown that governmental authority hardly existed outside the towns, a grievous decline from the reign of Nasir-ud-Din, when unprotected travellers moved safely through those regions.

In 1905 an incident at Tehran caused a rising which took the peculiar form known as *bast*. This is a development of the ordinary right of sanctuary, and consists in the withdrawal of wronged persons to some place of sanctuary until their complaints have been satisfied. Since the *bast* of the merchants and artisans of Tehran paralysed the economic life of the capital, the Shah promised to dismiss an odious minister, Ayn-ud-Daulah, and to establish courts of justice. But the promises were broken, and in 1906 all the clergy of Tehran withdrew to Qum in *bast*, and later 12,000 Tehranis took *bast* in the grounds of the British Legation. This put a stop to both economic and public life. The demand was now formulated for a Constitution. The Shah yielded again and signed a proclamation which authorized the formation of a National Assembly or *Majlis*, and later he accepted a formal Constitution.

Unfortunately Muzaffar died in 1907. His successor Mohammed II tried to undo his work and to replace the National Assembly with a council appointed by himself. Methods of violence were now adopted, and a nationalist or Constitutionalist and a Royalist party emerged. In 1908 bombs were thrown at the Shah's automobile, and the Russian-trained royal guards, known as the Cossack Brigade, bombarded the buildings of the Majlis. It seemed that the Russians were backing the Shah, while the British ambassador advised him to yield to the Constitutionalists. In 1909 civil war broke out in the provinces. The Bakhtiari tribe, under the leadership of an ambitious chief who had some hopes of founding a new dynasty, mustered its forces and marched on Tehran, which they occupied after a mild battle. The Shah retired to the Russian legation and abdicated. The Constitu-

tionalists had won, and the youthful Sultan Ahmad was crowned Shah with the head of the Qajar tribe as regent. A new Majlis was elected and the machinery of the Constitution, differing little from that of to-day, was set up (see Ch. IX).

Meanwhile Russian forces had appeared at Meshed, Enzeli, Resht, and Tabriz on the excuse of maintaining order. They did not immediately intervene on the side of the Royalists, but their presence caused a national crisis and a general invasion of Persia was expected.

V. MODERN PERSIA

The Constitutional Administration, 1908–1914

The whole period from the assassination of Shah Nasir-ud-Din in 1896 to the *coup d'état* of Riza Khan in 1921 was a normal interruption of orderly government between two dynasties. This interruption was comparable to the events of the first quarter of the eighteenth century, complicated by the intrusion of the unfamiliar Constitutional movement. The character of the period appears in the breakdown of order throughout the tribal areas. In 1880 and in 1930 a man might travel without armed guards through most of Persia, but in the first quarter of the twentieth century security hardly existed outside the towns. The nomadic tribesmen plundered both merchant and peasant and there was a continual shrinkage of internal trade and agricultural production.

The difficulty of governing Persia by Cabinet and Majlis, recruited from the ruling class of a people who for 2,500 years had been continuously subject to unfettered despotism, was exaggerated by the increasing Russian encroachment on Persian independence. In 1911 the ex-Shah landed near Asterabad from Russian territory and was supported by Russian officials in Persia, but this attempt to recover the throne was defeated by Persian troops and British diplomatic aid. The same year the Persians were compelled by a Russian ultimatum to expel the American financial mission of Mr. Schuster, who had been invited as an independent neutral to set the finances in order. The next year the Russians created an incident at Meshed and a Russian force, sent into Khurasan on the pretext of maintaining order, bombarded the holy shrine. Meanwhile Russian troops were maintained at Resht and near Tabriz, and the Turks took a hand by occupying the frontier passes in the Urmia region. British policy was to bolster up the Persian Government, but was weakened by the

necessity of making concessions to Russia in order to maintain the Entente in Europe against Germany.

The Constitutionalist administration was little better than its predecessor. Some officials were energetic but lacked experience and tact, others were full of fantastic schemes, others again were turncoats of the old order amongst whom the usual corruption prevailed. An attempt was made to restore order in southern Persia without Russian or British aid by the establishment of a new gendarmerie under Swedish instructors. This force, some 7,000 strong, repressed the Bakhtiaris in 1912, who thus lost the opportunity of creating a Bakhtiari dynasty. But generally its work was confined to policing routes and blockhouses rather than organizing effective flying columns against the centres of disorder. In the north the Russian-trained Cossack Brigade was the principal agent of security.

The Great War

When Great Britain and Russia declared war on Turkey in November 1914 Persia declared its neutrality, but this was observed by none. The war in Persia had several phases. In the north-west the Russians launched major offensives from Georgia and the Aras valley into Turkey, while the Turks attacked vainly from Erzurum and the Urmia border. In the south-west the Turks attacked, later, from Mesopotamia through the Zagros by Kermanshah. British forces were sent into Mesopotamia originally to control the head of the Gulf, and detachments were dispatched to protect the pipeline and refineries in Khuzistan, which were attacked by tribal elements stirred up by Turkish and German agents. In southern and eastern Persia generally British intervention was brought about by the appearance of German political agents, who stirred up a series of tribal and 'nationalist' disorders and succeeded in driving Allied representatives out of most of south-western Persia; this intervention was accompanied by guerrilla warfare. The Persians, however, did not seem to consider that the German activities were an infringement of their neutrality. After the British advance to Baghdad and after the collapse of Russia, British forces were sent into north-west Persia in order to prevent a possible Turko-German invasion of Persia and eventually of India; these troops finally became involved in hostilities with Bolshevik forces trying to win over Persia to the Communist cause.

Major Operations. During 1914 and 1915 the belligerents were fully occupied by the campaigns around Erzurum and Kars in the north and in Mesopotamia in the south. Early in 1916 the Russians

had a great success when they captured Erzurum and Bitlis, the keys to eastern Turkey. But this was compensated by the British disaster at Kut in Mesopotamia.[1] Turkish forces, which in reconnaissance strength had already penetrated to Hamadan and withdrawn, were set free for an invasion of western Persia by the Qasr-i-Shirin route and pressed beyond Hamadan to the Sultan Bulagh hills, the limit of their advance. In the winter of 1916–1917 the British in Mesopotamia, greatly reinforced, captured Baghdad, and the Russians drove the Turks out of Persia.

In March 1917 the situation was changed by the Russian Revolution and the collapse of the Russian army. The Turks were too occupied by the British forces in Mesopotamia and Palestine to reap the advantage in northern Persia, and the Peace of Brest-Litovsk provided for the evacuation of Persia by both armies. The Turks, however, pressed into Georgia and Russian Azerbaijan, where independent Republics were being set up, and the route to Afghanistan lay open. There was special danger in the presence of over 100,000 German and Austrian prisoners of war in Turkistan, whom the Germans schemed to organize as an army for the invasion of India.

To fill the breach a small force under Major-General Dunsterville was sent into north-west Persia by Hamadan. Its object was to seize the Caspian ports through which, after the German occupation of the Ukraine, an invasion was most feared. In 1917 an initial dash to Enzeli by a small party failed because the Russian Bolsheviks, then in control of Enzeli, were hostile. 'Dunsterforce' was also opposed by a rising of tribesmen in Gilan under Kuchiq Khan, who were armed with discarded Russian equipment and known as Jangalis. This was counterbalanced by the help of General Bicherakov, who succeeded in keeping together a small force for the maintenance of some sort of order in north-west Persia. In 1918 the Jangalis were chastised, and Dunsterville, with an enlarged force of some 3,000 men, a battery of field artillery, and 500 lorries, occupied Enzeli, where enough ships were found to transport a detachment to Baku. Native support proved feeble and the Turks too strong. Baku was evacuated and Dunsterforce was employed to watch the Turkish flank in Azerbaijan and northern Kurdistan, by holding Mianeh, Bijar, and Senna. After the armistice with Turkey (31 Oct. 1918) Baku was occupied with the help of a scratch naval force, built up by Commodore D. T. Norris on the Caspian out of armed merchantmen and motor-boats. Later Tiflis and Batum were also occupied, but supplied from the

[1] See B.R. 507, *Turkey*, vol. i., p. 306 ff; B.R. 524, *Iraq*, p. 279 ff.

Black Sea. The flotilla also helped to occupy Krasnovodsk on the eastern shore of the Caspian, and had several victorious scraps with Bolshevik vessels. At Krasnovodsk it linked with a force under Sir W. Malleson, which was dispatched to Meshed to watch the frontier of Russian Turkistan; there were hostilities with Bolshevik land forces, and several stations on the Krasnovodsk–Merv railway were occupied.

The Bolshevik Attack. The last phase of the war in north Persia came in 1920. The 'White Russian' Caspian flotilla took refuge at Enzeli (Pahlevi), whither it was pursued by Bolshevik forces. British troops were still in Azerbaijan, but the British flotilla had been withdrawn. The Russians occupied much of the coast and supported Kuchiq Khan and his Jangalis. The Persian Cossack Brigade after initial successes was driven out of Mazanderan, and the Russians were expected to cross the Elburz. But Bolshevik policy was completely reversed in 1921, because Persia was found not to be ripe for Communism, and the troops were withdrawn.

For Persia the principal result of the war in north-west Persia was the breakdown of communications and a fearful famine in 1918, from which scores of thousands perished. The harshness of the long Turkish and Russian occupations left bitter memories, though an equally serious cause of the distress was the cornering of wheat by Persian merchants.

The misfortunes of the Assyrian or Nestorian Christians of the Urmia region date from this period. They had assisted both the Russians and the British against the Turks, and in 1918 with the Assyrian tribesmen of Turkey many withdrew through the mountains to British protection, and were sent to Mesopotamia. Some who remained were massacred by Kurds in 1919.

Guerrilla Warfare, 1915–1918. Southern Persia was spared the operations of regular warfare, but became the scene of German intrigues. Before 1914 German penetration had not spread far beyond Mesopotamia. The Germans had no footing in Persia except for the opening of trading posts at the small ports of Lingeh and Bandar Abbas, and the visits of the usual 'archaeologists', predecessors of the Nazi 'tourists'. However in 1915 small parties of agents and propagandists, some 200 men in all, well supplied with money, tracts, and wireless sets, were sent into Persia to exploit nationalist sentiment.

The cherished German scheme of fomenting an Afghan invasion of India was a failure. The remarkable Niedermeyer managed to

cross the Lut and to reach Herat and Kabul in 1915, but the Afghan Amir refused to move until a regular army of the Central Powers reached his frontier. In south-west Persia the organization of the redoubtable Wassmuss was more successful. By the end of 1915 British and Russian representatives had been withdrawn from Fars, Shiraz, and Kirman to the coast or to Tehran. A 'National Committee' at Shiraz was inspired by the German consul, the Swedish officers of the gendarmerie sided with the Germans, and the Qashqai tribesmen in particular were easily roused. The extension of German influence eastwards was, however, checked by the establishment of an Anglo-Russian cordon of posts along the Baluchi and Afghan frontiers.

In March 1916, to check the influence of Wassmuss, now under the orders of Von der Goltz, the German military agent in Mesopotamia, two small forces were dispatched from India, one to eastern Makran, and the other and more important under Sir Percy Sykes to Bandar Abbas. The Makran mission's task was to strengthen the eastern cordon, but Sykes was commissioned to organize a force of Persian gendarmes with a nucleus of Indian troops, for the ejection of Wassmuss's agents and the re-establishment of order along the caravan routes of the south-west.

Sykes's British and Indian troops were eventually increased in number from 500 infantry and a squadron of cavalry to a force of 2,000 men. He was able to recruit a large number of men from the Swedish gendarmerie, until his total force, which was called the South Persia Rifles, numbered about 8,000. In 1916 a series of rapid marches and occasional skirmishes with tribal forces took him from Bandar Abbas to Kirman, Yezd, and Isfahan, where he gained touch with the Russians. From Yezd he marched boldly through the territory of Wassmuss to Shiraz, where the legitimate and friendly governor had just succeeded in re-establishing himself. In 1917 the South Persia Rifles were busy with the pacification of tribes and the conversion of caravan tracks into wheeled routes. But in the summer of 1918, when the Persians believed that Britain was losing the war, there was a serious rising of the Qashqai and other tribes and a number of mutinies among the South Persia Rifles. Some 6,000 tribesmen invested the central reserve of about 2,000 troops, mostly Indian and British, in the cantonment at Shiraz. But Sykes took the offensive, broke the Qashqais in a series of spirited encounters, and occupied the stronghold of Kazerun.

Among subsidiary results of the war was a great increase in the

geographical knowledge of north-western and southern Persia, and the surveying and building of two major highways connecting northern and southern Persia, from Meshed to Duzdab in the east and from Resht to Kermanshah and Khanaqin in Iraq in the west.

The Persian Revival, 1919–1941

Rise of Riza Khan

During the war the authority of the Persian Government disappeared and the Constitution was virtually in abeyance. The Majlis never met after 1915, and the Cabinet at Tehran could do little but plot against foreigners and waver from side to side with the changes in the fortunes of war. In 1915, as the Bolsheviks later revealed, the Anglo-Russian agreement of 1907 was changed into a virtual partition, the Russians being allowed full 'liberty of action' in their zone, and the neutral zone being added to the British zone. In 1919 the Persian Government tried to restore its fortunes by sending a delegation to the Peace Conference. Though this was excluded on the grounds of Persian neutrality, it published some remarkable demands, which included the abolition of the 1907 agreement, of capitulations and consular guards, and of foreign concessions in general, and the extension of Persian frontiers to the Oxus, Caucasus, and Euphrates (the maximum limits of the Persian Empire of the Safawids).

Great Britain was willing to agree to the abolition of the 1907 agreement, but at the same time secured the Persian Government's acceptance of a treaty which in effect turned Persia into a private mandate of Great Britain. British advisers were to be supplied to the various Departments of the Persian Government and given adequate powers; a military mission was to reorganize the Persian army whose supplies were to be British; the customs tariff was to be revised with British advice, and the construction of railways and roads was to be done with British aid. This treaty aroused a storm in Persia, particularly because it forced the abandonment of the Persian method of maintaining independence by dividing her 'friends' and choosing advisers from distant and disinterested nations.

In 1920 British advisers began to arrive while the Bolsheviks were establishing themselves in Gilan and Mazanderan. But the situation was changed by the Bolshevik withdrawal from north Persia and by the *coup d'état* of Riza Khan, an officer of the Cossack Brigade (photo. 184). He was encouraged by British officials, who had reorganized the brigade and noted his good qualities, to march with the Cossacks on

Tehran and to seize power (Feb. 1921). It was a stroke of good luck that a few days later he was able to publish a remarkably favourable treaty with Russia. The Russians agreed to renounce all concessions and privileges gained during the Tsarist regime, cancelled the Persian debt to Russia, and handed over their property in Persia to the Persian Government, excepting only the valuable fishing rights in the Caspian Sea which were reserved for discussion; surprisingly the treaty gave Russian armed forces the right of intervention in Persia if the Persian Government was unable to defend its neutrality against foreign attack.

Encouraged by this treaty, the Persians discarded the Anglo-Persian agreement. In June the Majlis, which had never been consulted, refused to ratify it. British advisers were sent away and replaced by an American financial mission under Dr. Millspaugh, the South Persia Rifles were disbanded, and friendly relations were established with States hostile to Great Britain, such as Afghanistan and the Turkish Government of Kemal Pasha. Persia also became an early member of the League of Nations, from which great things were hoped.

The principal force in this Persian revival was the personality of Riza Khan. He became War Minister with sufficient control of the Ministry of Finance to ensure the payment of his troops, and soon established his ascendancy over Cabinet and Majlis. A new army was formed out of the Cossacks, Persia Rifles, and Swedish gendarmerie, and increased to a strength of 40,000. With this Riza set about restoring authority in the tribal areas. In 1921 he suppressed Kuchiq Khan and his Jangalis, thus recovering Gilan. In 1922 the Persian Kurds, under the leadership of Ismail Simko, took part in the movement for Kurdish autonomy which originated in Turkey and Iraq. The revolt spread to Luristan, but the Kurdish rebellion was crushed by the end of 1922. In Luristan there was serious trouble in 1924, when a column of Riza's troops was defeated, but the Lur chiefs came to terms after energetic action. In 1925 the Qashqai and Bakhtiari tribesmen were disarmed and pacified, and also the Persian Turkomans on the Khurasan border, who had taken to raiding.

A more delicate task was the establishment of Persian authority among the Arab tribes of Khuzistan. Shaikh Khazal of Mohammerah (Khurramshahr), the paramount chief, had a special agreement with Britain. He protected the refinery and part of the pipe-line and was guaranteed his position over against the Persian Government, provided that he fulfilled his normal obligations towards Persia by way of taxation and nominal loyalty. Khazal unwisely defied Riza's

authority, was compelled to submit, and transported to Tehran (1925). A British protest was apparently dispatched but withdrawn before publication.

Though there were serious tribal disorders later, these events restored the prestige of the central government. Strengthened by success, Riza Khan became Premier in 1923 and encouraged the Shah to leave Persia for a protracted visit to Europe. In 1924 under the influence of events in Turkey, where Kemal Pasha provided Riza with the model of a modern autocrat, there was much propaganda at Tehran in favour of establishing a Persian republic. But the abolition of Islam as the state religion in Turkey turned the Persian clergy against republicanism, and Riza followed suit. In February 1925 he received dictatorial powers from the Majlis, secured the deposition of the Shah in October, and in December was elected Shah with the title of Riza Shah Pahlevi. This term, 'True Persian', or 'Ancient Persian', marked the fact that unlike all his predecessors since Shah Ismail he was not of Turkish race, and drew attention to his intended revival of the pre-Islamic tradition of Persian greatness.

Reign of Riza Shah Pahlevi, 1925–1941

Two principal tendencies are remarkable in this period, the rapid and violent modernization of the country and the attempt to free it from Russian and British influence in internal economy and foreign relations. Riza's policy was 'nationalist' in the full sense, though he hardly aimed at economic self-sufficiency, and with true Persian pliancy he generally secured his ends without pushing matters to extremes.

Policy of Modernization. The large schemes of railway and road construction and of industrial development are summarised in Chapters XI and XIV. The intention was to increase the wealth and strength of Persia and also to reduce the economic servitude of Persia to Russia. Hitherto Persian products from the rich northern districts were exported across the Caspian, and this route depended on Russian favour, sometimes withheld (p. 482). The new Trans-Iranian railway was intended, apart from its military uses, to supply a direct exit for Persian goods to the oceans of the world through the new port of Bandar Shahpur at the head of the Gulf. This in turn would be free from the British influence prevalent on the Shatt al Arab. Likewise the introduction of sugar-beet culture and the building of refineries were intended to decrease the import of Russian sugar.

To carry out his industrial schemes Riza was unable to dispense with foreign technicians and engineers, and a great number of them

came from Russia, though in later years many Germans appeared. Likewise Russia inevitably resumed her place as the principal customer in the Persian trade. But Riza was successful in avoiding the use of foreign capital, largely thanks to the great sums provided by the royalties of the Anglo-Iranian Oil Company, and in securing that the foreign experts did not rise above the rank of employees. Thus he dispensed with the services of the invaluable Millspaugh, whose mission had introduced the principles of modern finance to the Persian treasury, because Dr. Millspaugh was unwilling to accept a reduction in the executive powers which he enjoyed under his original contract. He was replaced by more amenable Swiss and German financiers. The policy of financial autonomy was furthered by the acquisition from the Imperial Bank of Persia of the right to issue bank-notes, and by the establishment of a Persian National Bank and of a new currency (p. 479).

Perhaps the greatest material achievement was the building of the Trans-Iranian railway without foreign financial aid. But it is noteworthy that Riza had not quite the boldness to attempt the direct exploitation of oil by a Persian company. A concession for prospecting oil resources in the eastern provinces was granted to the American 'Amiranian' company (p. 494).

The most radical changes dictated by Riza were social. The outward symbol was the change of dress, beginning with the introduction of a 'Pahlevi hat'. In 1928 a decree made the wearing of native costume illegal for townsmen, peasants, and tribesmen alike. This was enforced by police measures and spread rapidly. Between 1930 and 1935 the dress reform was gradually extended to women, beginning with the wives of officials, and in 1936 the use of the veil was forbidden. The extension of modern education (p. 402), with particular attention to technical education, was of deeper import; it was accompanied by improvements in the legal status of women, who secured the right to sue for divorce, while child marriages and the Persian custom of temporary marriage were discouraged. Women were urged to seek education and employment outside the home, though they were not given political rights. Equally radical was the interest in public health, the founding of a modern hospital system (p. 410) and the encouragement of physical training, sports, and such organizations as the Boy Scouts. The material trend of these changes was shown by the destruction of much of the older part of Tehran and the building of new quarters which were meant to resemble a persianized Paris.

The modernization of town life was accompanied by the restoration of agriculture through the compulsory settlement of nomadic tribesmen and the prevention of seasonal migration. There were many regions where the restoration of security was likely to ensure that cultivation would be resumed by those who had abandoned it in troubled times. But this policy was not always wisely applied where stock-breeding was the natural means of existence, and it caused considerable hardship. Together with the dress reforms and the exactions of the petty officials, who now appeared for the first time in tribal areas, the tribal policy caused several rebellions which were crushed, while the tribal leaders were removed to exile at Tehran. The agricultural policy, supported by the building of modern factories for farm products, was weakened by the formation of government monopolies, especially for tobacco and cotton, and by a system of price control. The effect of these measures was to divert profits to the Treasury and to restrict production.

Riza also met some opposition from the clergy, who were outraged by many of his social reforms, and had protested against the introduction of conscription by taking *bast* (p. 300) in 1927. But the influence of the clergy was not equal to their pretensions. Riza also created a plentiful store of enemies among the 'Constitutionalists', who resented his dictatorial methods; although government was carried out by the machinery of the 1906 Constitution, the Majlis became in fact a picked body. Unwisely Riza allowed his Court Minister to prevent easy access to the monarch, especially after 1930, and his ministers endeavoured to keep him in ignorance of public opinion, as appeared in the crisis of 1941 (p. 314). Riza also succumbed to the usual greed and rapacity of Persian monarchs, and much of the national wealth reached his private account. A great deal of his early popularity had been lost by the end of his reign, which in 20 years passed through the phases that usually occupy a whole dynasty.

Relations with Russia and Great Britain

Relations with Russia continued to be based on the 1921 treaty, but the original cordiality rapidly cooled. There were particular difficulties over trade relations, because of the closed economy of Communist Russia. Thus there was a Russian embargo on Persian goods in 1920 and a Persian boycott of Russian goods in 1933. Various trade agreements controlled the volume of trade, eventually on a barter basis. Enzeli (Pahlevi) was not handed over until 1928 and the dispute over the Caspian fisheries was not settled till 1933, when a

joint company was formed to work them. Russian trade and economic penetration continued to increase (p. 485) and in 1940 a fresh commercial treaty was signed. At heart, however, the ancient suspicion of Russia increased as the power of the Soviet Union was built up.

Riza Shah owed much of his prestige to his diplomatic scores against Great Britain, though after the initial triumph in the rejection of the 1919 treaty his successes were more showy than material. The abolition of Capitulations, which limited the judicial autonomy of Persia, was initiated by the Russian renunciation of them in 1921. The campaign was renewed in 1927, after a radical reformation of the judicial system, necessary to secure the consent of European Powers. The agreement of the French Government was first gained. Later the British Government accepted the abolition as part of a general settlement of several issues, including the establishment of a new Customs tariff and the grant of facilities for an air route along the coast of southern Persia. The latter had been used as a bargaining instrument, first being granted and then withheld and finally agreed again. Other European Powers soon followed the lead of Great Britain and France, and Capitulations disappeared from Persia.

Success did not attend repeated claims made between 1927 and 1934 for the restoration to Persian sovereignty of Bahrein island, made valuable not only by its pearl fisheries but by the recent discovery of oil. A more notable tussle, which might have led to serious trouble between two less intransigent Powers, was concerned with the Persian demand for a revision of the terms of the D'Arcy concession held by the Anglo-Iranian Oil Company. Hitherto negotiations had been between the company and the Persian Government. The Persians naturally regarded the original concession as unduly favourable to the company in respect of the area concerned, the obligations of both parties, and above all in the size of the royalties and the manner in which they were assessed. The oscillation of the annual payments between some three hundred thousand pounds sterling and nearly one and a half millions was a cause of great vexation, and the Persian Government's principal aim was to secure larger and more regular payments subject to a guaranteed minimum. They were also perturbed at arrangements which were being made by the various oil companies of the world for the limitation of production. When the annual payment for 1931 proved to be about £307,000 after more than £1,280,000 in 1930, although they had recently initialed a fresh agreement with the company, they suddenly took the highly arbitrary step of declaring the D'Arcy concession null and void. Later events

suggest that this was simply a bold method of bargaining, but at the time it raised the whole affair to a political level. The British Government, itself holding a considerable interest in the company, intervened and proposed to set the dispute before the International Court at the Hague, and when Persia objected to this brought it before the League of Nations Council. There the Persian representative disputed the competency of the Council in a case which had not yet been submitted to the ordinary Persian courts. Eventually the two representatives agreed that negotiations should be reopened between the company and the Persian Government, and in due course a new concession (p. 492) was framed. This was financially far more favourable to Persia, while extending the life of the concession for an extra thirty-two years.

Relations with Moslem Countries

Iraq. The ancient feuds between the Baghdad Government and Persia continued under the new regimes in both countries. The traditional interference of the Shia Mujtahids of Iraq in Persian affairs has been less effective, though their opinion on politico-religious matters is likely to affect that of the Persian Mujtahids. The pilgrimages to the Iraqi shrines sometimes cause trouble and have occasionally been banned by the Persian Government.

The division of Kurdistan is also a source of trouble, especially since the wakening of some Kurds to the notion of autonomy; malcontents from either side take refuge across the frontier, and the tribal policy of Riza Shah added to the difficulties by forbidding the seasonal migration of Iraqi Kurds into Persia. In Khuzistan and southern Iraq there are also local disputes over water-rights on the small streams which flow from the Persian foothills into the Mesopotamian plain, and about the national status of persons of Persian origin settled in Iraq, such as the Muhaisin tribesmen on the right bank of the Shatt al Arab and the Persian colonies of the Iraqi cities.

The most serious issue concerned the frontier along the Shatt al Arab, which in 1914 was drawn along the low-water line of the left or Persian bank, thus leaving the fairway outside Persia and cutting the Karun off from free access to the Gulf. Iraq succeeded to the rights of Turkey, but hopes of securing frontier revision led Persia to withhold recognition of the mandatory State of Iraq until 1929. It was not until 1937 that, after many incidents between Persian and Iraqi officials on the Shatt al Arab, Persia agreed to the retention of

the 1914 frontier and signed a Treaty of Friendship with Iraq; the agreement provided for the inclusion of both Abadan and Khurramshahr anchorages in Persia.

Turkey. As with Iraq, difficulties arose between Persia and Turkey over the loyalties and activities of the Kurdish tribes of the frontier zone, but the traditional hostility between the two countries seems to have greatly diminished. Treaties of perpetual friendship and benevolent neutrality in 1926 and 1932, a series of commercial and consular conventions completed by 1938, and mutual agreements for the amendment of the frontier signed between 1932 and 1939, have marked the progress of friendly relations; these gave Turkey Little Ararat and the Agri range in exchange for Kotur district and part of Bajirga district (p. 49). In 1934 Persia made use of a Turkish arbitrator in a frontier dispute with Afghanistan.

Afghanistan. The general relation of this country to Russia and Great Britain resembles that of Persia, and under the rule of Amanullah it underwent a superficial modernization akin to that of Persia under Riza Shah, who learned some wisdom from Amanullah's mistakes. Former quarrels with Persia were not revived, and treaties and conventions similar to those with Turkey were made in 1923 and 1928.

The most remarkable diplomatic development between these States before the present war was the Saadabad Treaty of 1937 by which Persia, Turkey, Iraq, and Afghanistan made a mutual pact of friendship and non-aggression. This treaty was a reaction against the revival of older forms of European imperialism revealed by the Italian invasion of Abyssinia in 1935. The four Powers hoped to keep free from European entanglements by this agreement, which provided for consultation in the event of any external threat and for the prevention of foreign intrigues in the countries concerned.

Recent Events

The Second Anglo-Russian Intervention, 1941–1944

Persia was little affected by the outbreak of the Second World War in 1939, except that her trade with Turkey was increased after the closing of the Mediterranean in 1940. In 1941 the German-Italian plan for penetration into Syria and Iraq was revealed, and defeated. But Great Britain and Russia, after the invasion of Russia by Germany, became concerned at the large number of Germans present in Persia. German trade with Persia had greatly increased between 1930

and 1940 until it exceeded that of Russia, and after 1933 the Nazi Government had commenced political propaganda in Persia by the usual methods of papers, books, films, and broadcasting, though with far less success than in the Arab countries. Riza Shah, in his policy of distributing widely his foreign economic commitments, had employed German material and German employees on a large scale to counterbalance Russian economic aid, while the Germans cunningly supplied engineers and electricians at low salaries to accompany German machinery and installations. The Shah like most Persians did not believe in the German menace, having had no real experience of German aggression in the last war (p. 302). His claim that he could not easily dispense with his German technicians was justified, though it is also true that the German diplomatic and consular staffs were unduly large, and that there was the usual flood of German commercial travellers and 'tourists'. The Shah refused to reverse the whole trend of his national policy at the demand of his traditional enemies, and various notes sent by the Allies requesting the expulsion of the bulk of the Germans were evaded or refused.

Hence the Anglo-Russian invasion of Azerbaijan and Kermanshah on 25 August 1941 was inevitable. The Persian army offered only a token resistance and on 28 August a new Cabinet ordered the ending of hostilities, though not before the Persian naval flotilla had suffered losses by what the Persians regarded as the unnecessary zeal of the Royal Navy. The Allies having declared that troops would be withdrawn when the danger was over, the Russians occupied Azerbaijan, Kazvin, and the Caspian coast, and the British a zone south from Qasr-i-Shirin and Kermanshah to the north-east corner of the Gulf. Tehran was meant to be left free from occupation, but the development of the transport route from the Gulf to Russia made the presence of allied troops at the capital inevitable. The Russians also seem to have stationed a force at Meshed.

In January 1942 after long delays, while some Persians secretly hoped that German victories would free them from their encumbrances, an Anglo-Russo-Persian treaty was signed which stabilized the situation. It secured the use of the ports and communications of Persia by the Allies, promised the withdrawal of the armed forces six months after an eventual armistice, offered to support Persian interests at a Peace Conference, guaranteed the independence and integrity of Persia, secured the breaking of diplomatic relations between Persia and the enemies of both Allies, and included economic clauses. These concerned the maintenance of the trade and liveli-

hood of Persia, payment for Persian services, and the eventual acquisition by Persia of communications and installations built by the Allies.

In August 1942, when the German advance reached the Caucasus, a new British Command was created in Persia under General Sir H. Maitland Wilson. American troops also appeared in Persia after the German attack on America, apparently as 'friends of friends', though their diplomatic position was not clarified by a new treaty. On 9 September 1943 the Persian Government, irked by the Iraqi declaration of war on Germany, followed suit in the hope of reaping advantage after the war, after having found out that no fighting would be required of her. In the following November Messrs. Churchill, Stalin, and Roosevelt met in conference at Tehran, an act which flattered the self-esteem of the Persians, and in public pronouncements they reaffirmed the principles of the 1942 Treaty.

Meanwhile in internal affairs Persia had ceased to prosper, and the three Allies in turn have been blamed for this and lost such popularity as they may have once possessed. The inevitable result of the invasion was the abdication of Riza Shah (Sept. 1941). He left Persia and was succeeded by his son, who had secured a claim on British interest by his marriage with the sister of King Farouk of Egypt. When Riza abdicated tribal rebellions began again. The army had lost much of its morale and suffered several setbacks. Order and security began to break down, particularly in Kurdistan and in the territory of the Bakhtiaris and of the Qashqais, whose leader in 1943 forced a settlement of his claims on favourable terms. These disorders were aggravated by the aerial descent of German saboteurs and agents upon Fars and Khuzistan, anxious to repeat the feats of Wassmuss in the last war. The failure of a Persian notable, head of the Arab Khamseh tribes (p. 374), to restore order in Fars was unfortunate, but gradually the German agents were rounded up by the tribesmen themselves. Accompanying this tribal activity there was a revival of the authority of the clergy in town and country, and a strong reaction against the modernization of Islamic customs, characterized by a demand for the voluntary veiling of women.

Together with anarchy there occurred a shortage of food. Peasants, landlords, and merchants hoarded and the occupying forces bought supplies within the country; there was a breakdown of distribution and of price-control, and the Persian officials failed to carry out such measures as were decreed by the Cabinet to remedy the trouble. Though there were adequate stocks of grain in the country, famine

appeared in some districts and there were many deaths from starvation in Tehran. The situation was aggravated by the failure of the Russians to assist the dispatch of the usual supplies of grain from Azerbaijan to the rest of Persia. The Persians put the blame on the British and Americans, who were expected to supply all deficits without limit from outside while the Persian speculators and racketeers made fortunes. Meanwhile the Allies were spending large sums upon labour and material; instead of saving there was a rush to spend, and the cost of all goods mounted steadily. However, in December 1942 an Anglo-American agreement to make good genuine deficiencies and to supply lorries to the Government helped to steady the situation.

Another cause of discord arose in the Allies' need for currency. Though the expansion of the currency was covered in gold and silver at London, it was represented as deliberate debasement at the instigation of Great Britain. But the most remarkable discords were between the Financial Adviser, Dr. Millspaugh, whose services the Persian Government had again secured in 1942, and the Majlis, which refused to carry out the financial reforms necessary to establish Persian solvency. In 1943 there was a huge deficit, tided over by an advance of royalties made by the Anglo-Iranian Oil Company, and Millspaugh recommended a heavy income tax. In face of Majlis opposition he resigned his post, but later withdrew his resignation. This performance was repeated in 1944 after Millspaugh had criticized army expenditure, but by the end of the year it appeared that thanks to his unremitting efforts, and to the news of Allied victories, prices were everywhere falling, distribution of goods and food was improved, and there was a financial reserve in hand.

The Persians for long compared the conduct of Great Britain and the U.S.A. unfavourably with the behaviour of the Soviet Army and authorities in Azerbaijan. When the Russians first appeared the Persians remembered 1914. There was a general panic and a breakdown of administration, and most Persian officials left their posts. When the Russians proved reasonable, public routine was restored and they gained great credit for the local abundance of food due to the failure to distribute it properly elsewhere. The Russians were far less in evidence generally than the other allies, who were busy from Tehran to the Gulf improving roads, railways, and ports. But in September 1944 the Russians spoiled their reputation by demanding an oil-prospecting concession in north-western Persia of 210,000 sq. km. for 5 years. The Persian Government refused to consider

the claim till after the war, and the Majlis passed a bill forbidding the consideration of concessions during the war, but the issue is still uncertain (April 1945).

Thus the Persians have come to distrust all their Allies, and within the country the administration is weak. The overthrow of the regime of Riza Shah has left Persia without a government that can claim authority, and without any visible elements from which a new order can be constituted. To have seen the constitutional government broken up twice in one generation as a result of foreign intervention has shattered for the time being such vestiges of political faith as the Constitutionalists possessed, and it seems unlikely that the tribes will be able, in the days of modern armaments, to create another strong dynasty as in times gone by.

List of Shahs from 1500 to 1941

Safawids	
Ismail	1500–1524
Tahmasp	1524–1576
Ismail II	1576–1577
Khudabanda	1577–1587
Abbas I.	1587–1629
Safi	1629–1642
Abbas II	1642–1666
Sulaiman	1666–1694
Husain	1694–1722
Nadir *Regent*	1732–1736
Shah	1736–1747
Karim Khan *Regent*	1750–1779

Qajars	
Agha Mohammed *Claimant*	1779–1795
Shah	1795–1797
Fath Ali	1797–1834
Mohammed	1834–1848
Nasir ud Din	1848–1896
Muzaffar	1896–1907
Mohammed II	1907–1909
Sultan Ahmad	1909–1925

Pahlevi	
Riza Pahlevi	1925–1941
Mohammed Riza	1941–

CHAPTER VII

THE PEOPLE

To describe the life of the Persian people to-day is no easy task. In race, language, and civilization there has always been great variety, and their way of life is at present going through a rapid transition after centuries of relative stability. The modernization of Persia was intensified by the multifarious activities of Riza Shah, and it is by no means certain what picture Persian life will present in ten years' time, whether the ancient pattern will be completely altered or whether conservative tendencies will reassert themselves so that something will emerge recognizably akin to the old Persia. Hence the description of the Persian way of life, which forms the second part of this chapter, has been written in an historical manner. Persian society is described as it was before about 1925 or 1930, and then the changes made or attempted by Riza Shah are outlined. In particular a great part of the description of the tribal system is no longer applicable in some areas and may presently cease to have any validity. Nevertheless, it is impossible to understand the problem of the nomadic peoples of Persia without reference to their tribal background. Likewise the Islamic religious system has been much shaken by secularism, and many customs described have disappeared or are disappearing; but the Persian mentality has been formed by Islam, and account must be taken of the peculiar religious and metaphysical outlook of the Persian intellectual. As for the description of the material of daily life, the inherent poverty of Persia will probably ensure that the cheap native objects will maintain themselves beside the chromium plate and bakelite of European industry.

Race

The inhabitants of Persia have neither racial nor linguistic unity. The principal elements are commonly called Persian (including Kurd and Lur), Turkish, Baluchi, and Arab, whilst minorities include Armenians, Jews, Nestorian Christians or 'Assyrians', Georgians, Dravidian Brahuis, and Afghan Hazaras of Mongolian origin.

Exact measurements have been made of only a few small groups of the population, but it seems that the bulk of the 'Persian' population is derived from the Indo-European Aryan-speaking Iranian invaders of the second millennium B.C., and from their intermarriage

with the previous inhabitants. The latter belonged by race to the 'Caucasian' branch of man which originally colonized the territories from the Caucasus to the Arabian peninsula.

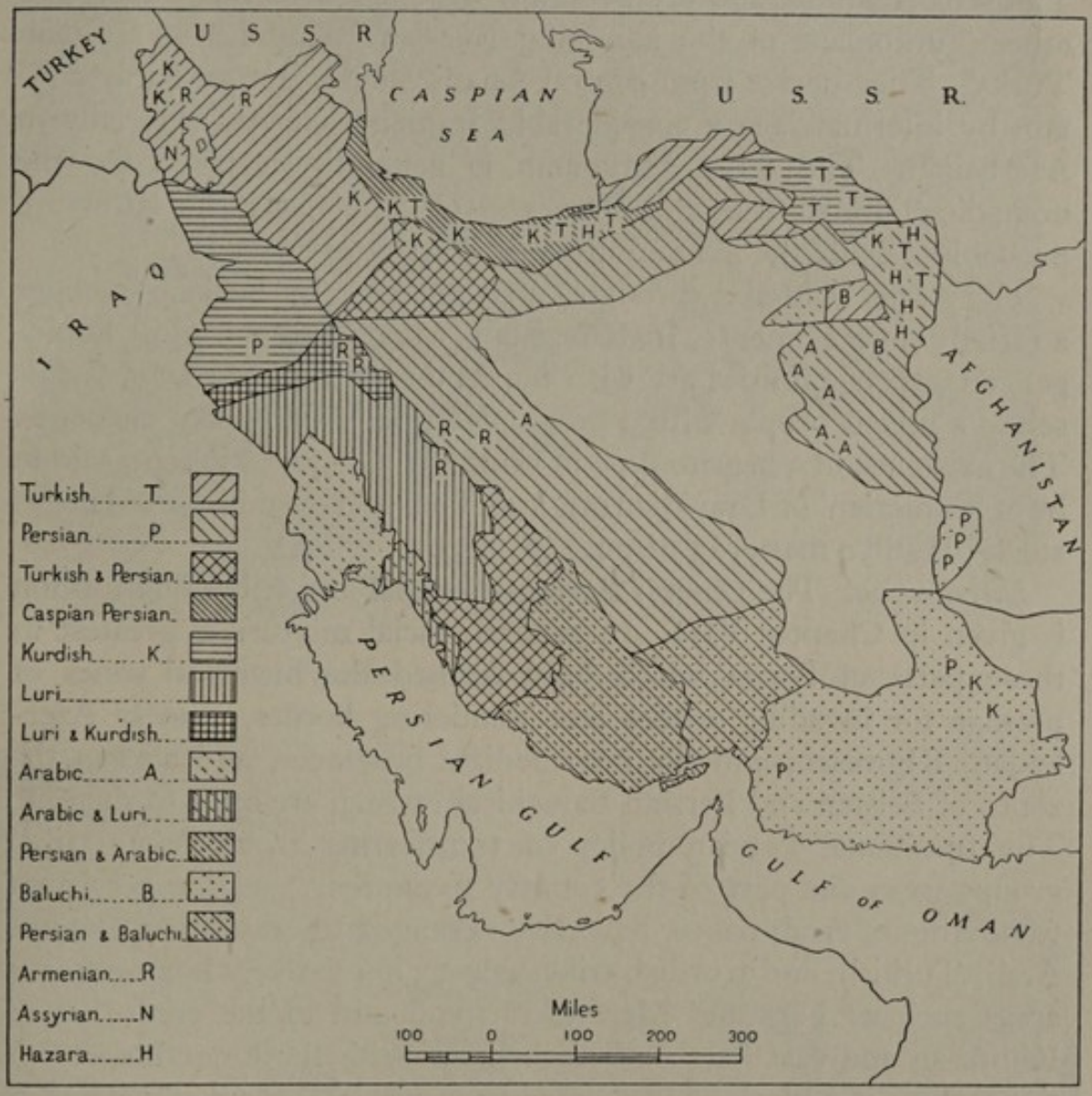


FIG. 50. *Distribution of people by language and race*

There are several widely different constituents within the 'Persian' block. In the most recent anthropological work on Persia the term 'Iranian' is reserved for a widespread physical type, on the border of the medium- and long-headed classifications, that occurs persistently in Persian-speaking areas. But within the Persian block there are some large groups which may prove to be racially distinct, and possibly purely Caucasian, such as the Bakhtiari tribes of the central Zagros, who are an extremely short-headed people. The Kurds, too, tend to be short-headed, and the exact affinities of the Persian-

speaking stock of Khurasan, commonly called Tajiks, and of the Baluchis, are not yet determined.

The Turks of Persia have few racial affinities with the Ottoman Turks of Anatolia, and are generally grouped with the Uzbeg and other Turkomans of the adjoining Russian Republics as 'Iranian Turks'. They derive from central Asiatic stocks, but probably contain by intermarriage a considerable Iranian element, especially in Azerbaijan. The term Turkoman is generally reserved for the nomadic Turkish tribes of Fars and of Khurasan; the latter are probably racially the least adulterated Turks of Persia.

The Arabs scattered through Persia are, like the Turks, no longer a racially pure element. In Khuzistan, where they are most homogeneous, their affinities are with the Arabs of southern Iraq, themselves a mixed people with a preponderance of Caucasian elements. The existence of a negrito type in southern Fars and Makran, said to be of 'Sumerian' or Dravidian origin and distinct from imported negro stocks, is still a matter of dispute (p. 323).

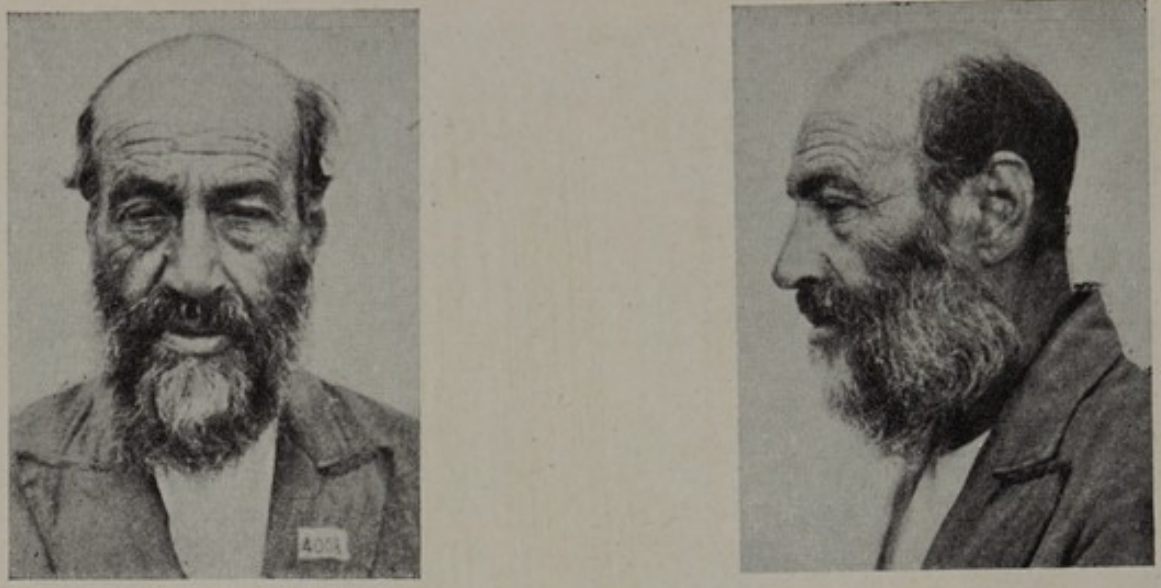
Distribution. The general account of racial and tribal distribution is given in Chapter VIII. In general, racial mixture is greatest in those parts of Persia which have formed the historical zones of passage for invading armies and wandering hordes, namely Azerbaijan, Khurasan, and the intermediate provinces, and also in the zones of Seistan and Persian Baluchistan which are open to the east. The traditional Persian policy of transferring troublesome tribal groups from one part of the country to another, and the persistent wandering of Arab tribes, have also deranged the racial map. Thus Arab, Turkish, and Kurdish tribes appear in relatively homogeneous areas such as Fars and Mazanderan and add to the confusion of Khurasan and east Persian Baluchistan. With these notable exceptions, there is a block of Iranian peoples speaking Persian dialects or allied languages throughout the Zagros regions and the populated basins west of the central deserts, and in the Elburz and Caspian provinces, while a similar element is considerable in the cultivated areas of Khurasan and continues through the Birjand highlands to Seistan; of specific elements Kurds live in northern Zagros and north Khurasan, Lurs in the central and southern Zagros. The principal area of the Turkish element, descendants of the Seljuk and later invaders, is from Azerbaijan eastwards to Tehran and Saveh districts; there is also a large Turkish group in eastern Fars and northern Khurasan. Arabs are found in the plains of Khuzistan, where they form the eastern fringe of the principal body of Arab peoples, in



185. *Persians of Tehran district in former dress*



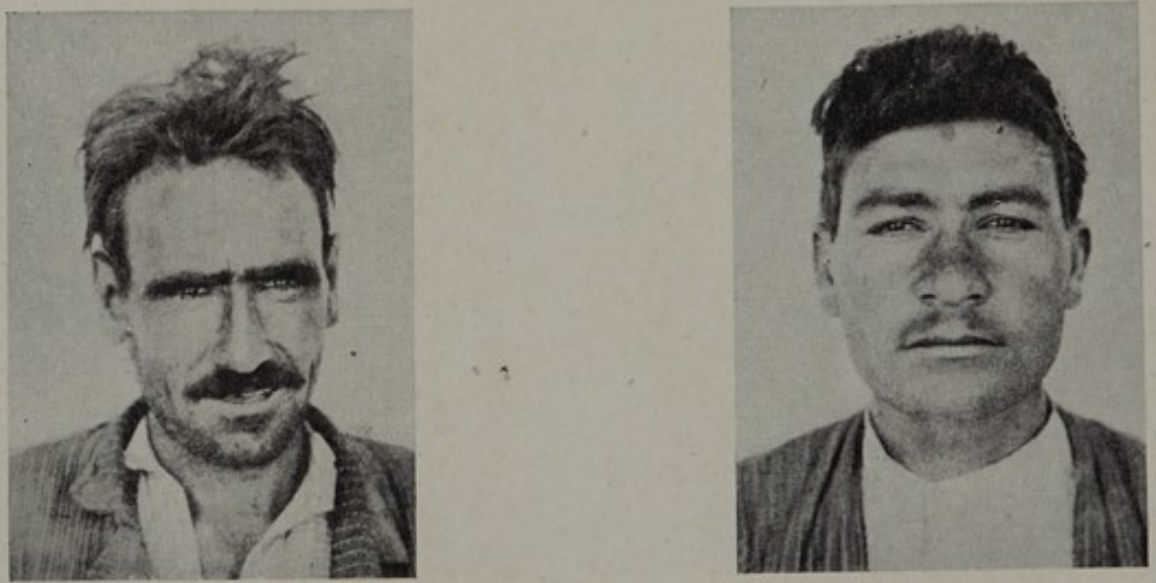
186. *Village women of northern Persia*



187. *Isfahani Jew, mesocephalic close to dolichocephalic*



188. *Persian villagers from the Niriz basin; the left-hand man is mesocephalic with Armenoid traces*



189. *Persian villagers from Yezd-i-Khast (Isfahan basin); ultra-dolichocephalic (left) and mesocephalic with Armenoid and Mongolian traces (right)*

southern Khurasan, in south-eastern Fars, and along the southern coasts, where they have arrived by sea continuously in ancient and recent times.

Armenians are most numerous as peasants in Azerbaijan, in the Burujird and Faridan districts of the north-eastern Zagros, and as townsmen in many cities of north-western and northern Persia, particularly in the Julfa suburb of Isfahan. Jews are widely scattered in towns throughout Persia. Georgians exist in much the same areas as the Armenians, but have generally been assimilated to Persians.

Nationality

These racial distinctions have little meaning in Persia. There is no racial animosity, social and political differences being concerned with religion and way of life. The distinguishing categories are: Moslem, Jew, Christian, and Parsi; townsman, peasant, and tribesman. These are considered more fully below, but it may be said that Persia is fortunate in the small size of its religious minorities and in the vast preponderance of a single form of Islam, so that in religion Persia is far more united than her Levantine neighbours. There are no political problems arising from religious division, such as trouble Iraq and Syria, though there are still some minor and local social grievances. In fact Shia Islam is the unifying bond of most of the diverse racial, linguistic, and social groups of Persia, except the Turkomans of Khurasan; for example, the Azerbaijani Turks, the most powerful and militarily efficient racial group, have long been accustomed to regard the Turks of Anatolia with religious aversion and to identify themselves politically with the Shia Persians. Moreover, the fact that Persia was ruled from the sixteenth to the twentieth century by dynasties of Turkish race has generally dissipated this racial distinction. But perhaps the principal factor making for unity is the existence of a distinct Persian way of life and code of behaviour, which is adopted by all the inhabitants, irrespective of race and language, as they abandon nomadic or barbarous habits in favour of a settled or civilized manner of living. The influence of Persian literature, of which Persians are immensely proud, is part of this unifying bond despite the illiteracy of a great part of the population.

Thus the basis of a national self-consciousness exists in Persian manners and Shia Islam. It was the policy of Riza Shah to strengthen and deepen nationalist feeling. He certainly created a dislike of foreigners among townsfolk and countrymen, but it is doubtful whether a sense of Persian *citizenship* exists outside the capital and

the largest towns. The sense of local patriotism is possibly still the strongest political feeling in provincial towns and villages, and the great tribal groups have still to absorb the idea of a loyalty that transcends the tribe, though tribal separatism was much weakened by the mixing of all classes in military conscription during the Riza regime.

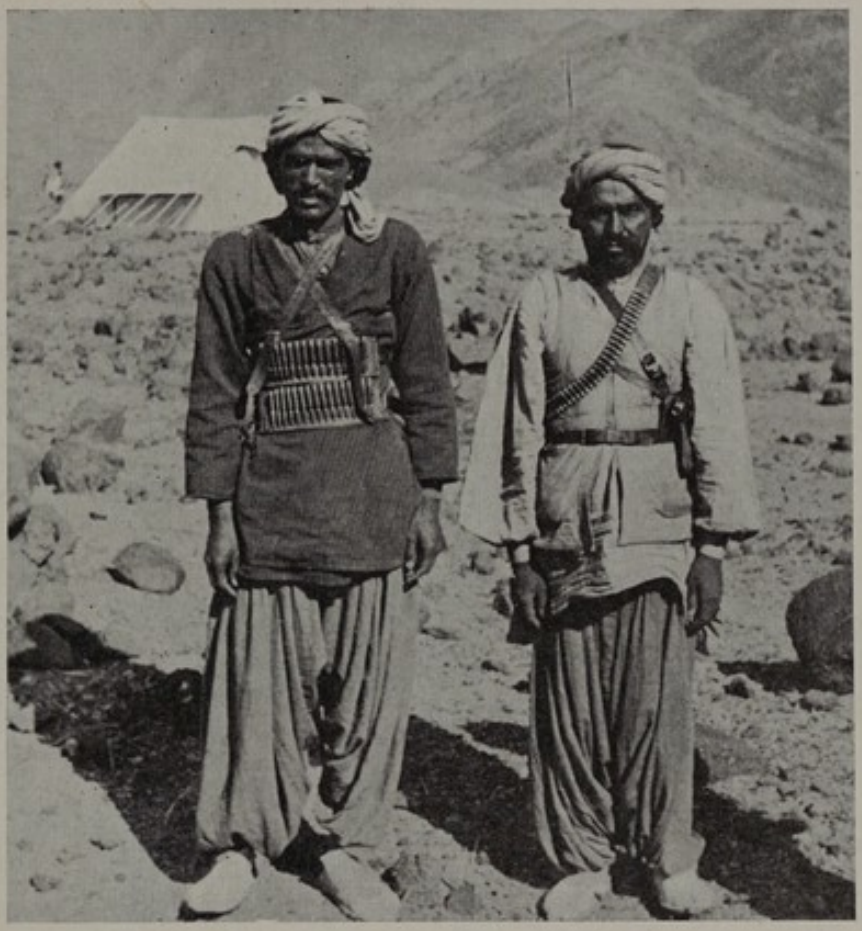
The legal definition of a Persian or 'Iranian' citizen includes all the inhabitants of Persia qualified by birth and residence (p. 395), but at present Persia includes many people who are not Persian, or who are only partly Persian, by civilization. Few would regard the more barbarian inhabitants of the Makran or the Turkomans of the Khurasan frontier as fully Persian, and many would hesitate so to describe some of the Zagros tribesmen.

Physical Characteristics

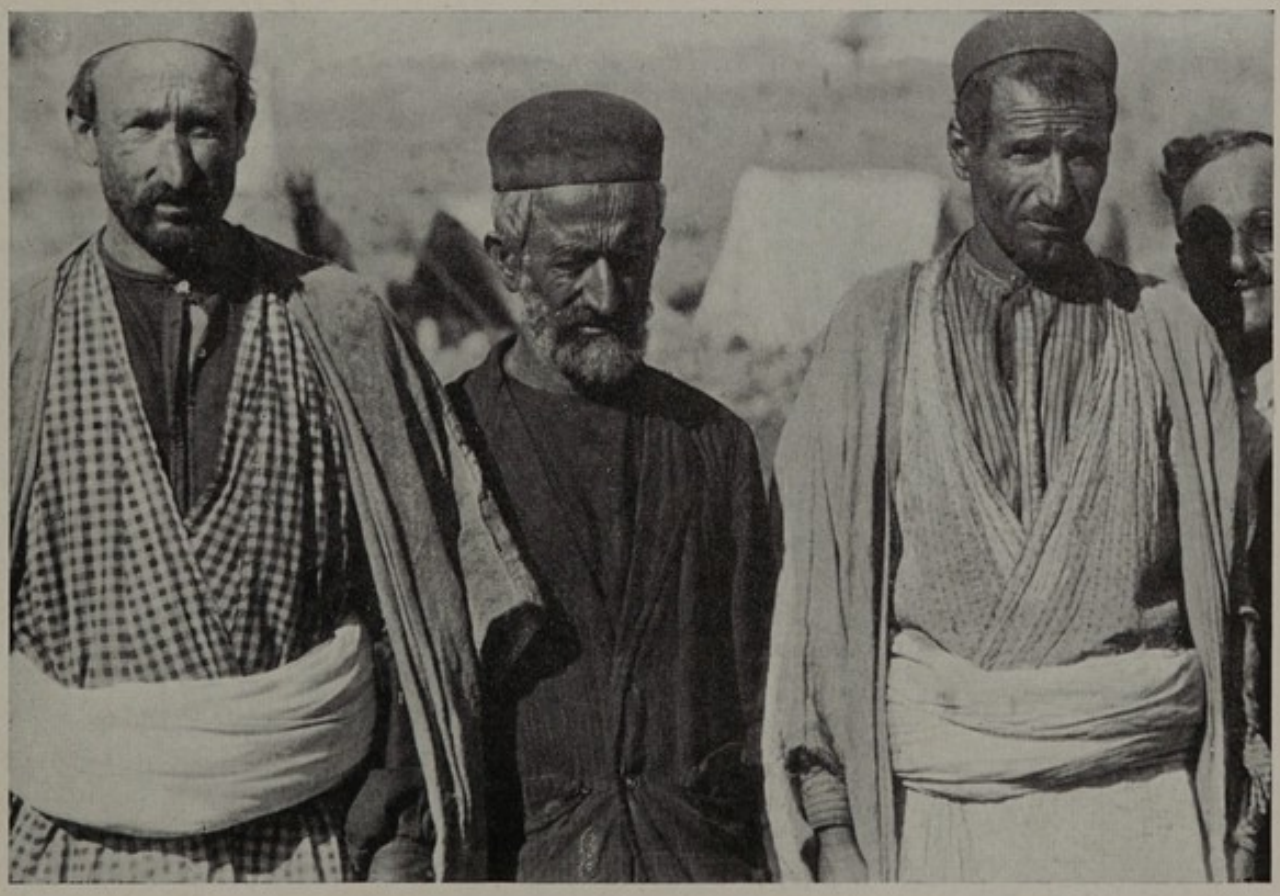
The Iranians of western Persia and their cognates are a brunette people, resembling southern Europeans in skin and general colouring. Hair varies from dark brown to black and from low waves to straight. Unexposed skin colour ranges from medium light to tawny and is often surprisingly light; eyes are generally dark brown. But submerged blond characteristics occur such as blue or blue-brown eyes with reddish-brown hair, most frequently among Kurds and Lurs. In stature measured groups of peasants have given an average of 5 ft. 5 in. with a range of 5 ft. to 5 ft. 10 in.; the Lur tribesmen appear to be taller, a measured group ranging from 5 ft. 3 in. to 5 ft. 11 in., and show a marked increase of trunk length; Kurdish groups inside and outside Persia averaged 5 ft. 6 in. to 5 ft. 7 in. in height. In head measurements dolichocephalic types appear to predominate with a brachycephalic admixture, especially amongst Kurds and Bakhtiari Lurs, Kurds being mainly brachycephalic and the Bakhtiaris hyperbrachycephalic. Average cephalic indices[1] of measured groups were 73·5 and 76·35 (peasants), 74·25 (Lurs), and 88·38 (Bakhtiaris). Noses tend to be narrow and either straight or convex; the latter type is said by some anthropologists to be characteristic of the purest Iranian stock. (Photos. 185–189, 197, 198.)

The Turks of Azerbaijan, who are probably a mixture of Turkoman and Iranian, are larger, heavier, and taller than western Iranians,

[1] The cephalic index shows the proportion of breadth to length of head as a percentage. Indices below 75 represent a large narrow head termed dolichocephalic; those above 80 a round head or brachycephalic; those between 75 and 80 are usually called mesocephalic.



190. *Baluchi chiefs*



191. *Kuh Galu Lurs in tribal dress*



192. *Kurds from Gilan*



193. *Turkomans from Gurgan province in traditional dress*

though anthropometric statistics are rare. A measured group averaged 5 ft. 6¾ in. tall. They have dark eyes, dark brown to black hair, broad faces, large noses, and well-developed chins; sometimes the eyes are set aslant, betraying a Mongolian element. One measured group had a cephalic index of 76, mesocephalic just above the dolichocephalic standard, whereas the 'Turks' of Anatolia are strongly brachycephalic. The racially purer Turkomans of Khurasan have not been measured but are said to resemble closely the adjacent Turkomans of Russia. The latter are described as medium to tall in height, averaging 5 ft. 6 in., with elongated oval faces and broad cheek-bones, yellowish-white to brown complexions, straight prominent noses, dark eyes, and thick lips; their cephalic index varies from meso- to brachycephalic (75–85) (photo. 193).

In south-east Persia the Baluchis and Seistanis, including the apparently aboriginal Sayyads (p. 390), seem to form a closely linked mesocephalic group (76–77). The Baluchis have oval faces with long aquiline noses, brownish-white skins, dark eyes with no light-eyed individuals, and dark wavy hair; they are of medium stature (5 ft. 4½ in.–5 ft. 6 in.) and wiry build. The Brahui element is apparently more mesocephalic and of middle size and square build, sinewy, shorter, and more thick-set than the Baluchis, with sharp faces, high cheek-bones, and long narrow eyes. (Photos. 190, 194–96.)

Of the minor racial groups the Jews and Armenians preserve their type well. In a measured group of Isfahani Jews stature averaged short to medium (5 ft. 5 in.) and the head type was predominantly meso- and dolichocephalic (77·43). They have dark brown to black wavy hair, and skin of a light to medium brown, though individuals occur with fair skin and reddish hair. Eyes are generally dark brown with lighter variations; noses are mostly convex but often straight (photo. 187). Physical development is poor. *Armenians* have dark eyes and oval faces with long aquiline noses; their heads, reckoned brachycephalic, are abnormally flattened at the back. The so-called *Assyrians* of Urmia region are robust and generally tall, with oval faces and prominent noses, generally straight; complexions are fair and hair and eyes brown, though blonds and red-heads occur.

There is no detailed information about the *Arabs* of Persia. In Khuzistan they resemble the Arabs of Iraq,[1] but in Fars and in eastern Persia they have been much modified by intermarriage with Iranian stocks to which they often approximate. Many Arabs of Khuzistan and the coastal regions of the Makran show negroid

[1] See B.R. 524, *Iraq and the Persian Gulf*, chap. vi.

features such as a broad slightly flattened nose, thick lips, dark skin, and short stature. This is probably due to intermarriage with imported negro slaves; there are many purely negroid individuals of African origin in the south (photo. 196).

The Hazaras of Khurasan, said to be Mongolian in type, are of short to medium stature (5 ft. 6 in.), strongly built, with somewhat fair complexions, paucity of beard, and brachycephalic heads.

Language

The languages native to Persia are: Persian; a group of languages akin to Persian and including Kurdish, Luri, and Baluchi; 'Azeri' Turkish; and Arabic. Of European languages French is spoken by some well-educated men, English is also studied and is spoken by individuals in the oil areas, and Russian is widely spoken in the north.

Persian or *Farsi*, the tongue of a great part of the population, is the official and literary language and is used for polite society and correspondence by many who have another tongue. It is an Aryan language, derived from Middle and Old Persian (pp. 226, 239), but has been modified by Arabic in general vocabulary and in the constructions of written prose. The present tendency is towards the expulsion of Arabic words and forms in favour of Persian terms. Persian contains a remarkable number of words which are very close to their English or Latin cognates, e.g. *dukhtar* daughter, *behtar* better, *bad* bad, *du* two, *madar* mother or mater, *javan* juvenis, *ast* est or is, *nau* new, *tu* thou. There is no grammatical gender and the declension of nouns has virtually disappeared, as in English. The difficulty of the language lies in the subtlety and variety of meanings possessed by words, so that whole sentences are capable of varied interpretations. In sound, Persian is sonorous and has been called the most musical of all languages. It is written in Arabic characters, but in an elementary form it is capable of Romanization.

Several provincial dialects are spoken, especially in Gilan and Mazanderan, and there are several small communities speaking horrid patois of their own. Mazanderani contains many grammatical forms and words belonging to Middle Persian. Gilaki, spoken in Gilan, is very rapid and less sonorous than other forms of Persian. Talish, spoken in the Talish hills, is peculiarly rich in vowels and open diphthongs.

Kurdish is distinct from Persian, being directly connected neither to Old nor to Middle Persian. Of the three principal forms of the Kurdish language two are spoken in Persia, Kurdi and Gorani, but

these two have numerous dialects. The purest Kurdi is the Mukri Kurdi spoken mostly north of Baneh and on the Little Zab; in the Senna district it becomes Arabicized and Persianized, and south of the Sirwan watershed similar dialects generally called Lek or Lakki are spoken in the valleys of the right bank of the Gamasiab. The Gorani group of dialects, properly called Macho-Macho, are spoken by members of the Goran confederation along the Kermanshah road and in Avroman Dagh; there is also a literary form of Gorani which was predominant, even among those who spoke Kurdi, until the nineteenth century. There is a body of Kurdish literature both in Gorani and in Kurdi.

Luri, the language spoken by most Faili Lurs of Luristan proper (Pish-i-Kuh and Pusht-i-Kuh), by the Bakhtiari, the Kuh Galu and Mamassani tribes, is closer to Old Persian than is Kurdish. The Ab-i-Diz is said to be the frontier between Kurdish Lek and pure Luri. In Malayer and Burujird mixed dialects are spoken of Persian, Kurdish, and Luri elements.

Baluchi is another Aryan language akin to Old Persian and often modified by modern Persian. The *Brahui* language is a philological puzzle, having no certain affinities, though it is probably akin to the Dravidian tongues of southern India.

Arabic is spoken by the Arab tribes of Khuzistan, along the coast of the Gulf and of Makran, and, with a varying mixture of Persian or Turki elements, by Arab groups of the interior such as the Khamseh tribes of Fars.

Azeri, the Turkish language spoken by the Turks of Azerbaijan, is grammatically close to the Ottoman Turkish of Anatolia, though its grammar is more simple and the vocabulary includes many words in the original East Turki form, while Persian accretions are commoner than Arabic. The pronunciation differs considerably; gutturals are much more prominent, those that are soft and barely breathed in Ottoman Turki sounding hard in Azeri. The nomadic Turkomans of Khurasan speak a form of Turki, sometimes called Jaghatai, which is much closer to East Turki and yet harsher in the number of its gutturals than Azeri. The Turkish languages differ completely in grammar and construction from Aryan languages. They are 'agglutinative', nouns, verbs, and grammatical constructions being formed by adding suffixes continuously until the original term is hardly recognizable. In Persia Azeri is written in Arabic script, though in Turkey the Roman alphabet has been adopted.

Of minor nationalities, the Armenians retain their native language

and the 'Assyrians' speak East Syriac, an ancient language of the Semitic group, intermingled with Persian, Turki, and Arabic words. Jews speak Persian and also a Persianized Hebrew.

Religion

Except for one or two hundred thousand Christians, Jews, and Parsis, all the inhabitants of Persia are nominally Moslems, and Shia Islam of the Jafari code is the official religion of the State. Persia is peculiar in that the dominant form of Islam is not the Sunnism which is reckoned orthodox in other Moslem countries, less than 1 million out of 10 or 12 million Persians being Sunni Moslems. This has done much for Persian unity, and now that the modernist Islamic movement called Bahaism (p. 330) is a spent force there is no serious religious division in Persian Islam. Persia with southern Iraq is thus a Shia enclave between Sunni Afghanistan and Russian Turkistan in the east and the Arab and Turkish States in the west.

Europeans generally exaggerate the religiosity and the fanaticism of Moslem countries. In Persia Islam has moulded the mental and moral habits of the people to a special type, but the majority take their religion for granted. Conventional and nominal Moslems are numerous, especially in towns, whilst amongst those who have a secondary education agnosticism is now common; the opening of the great mosques to non-Moslems by order of Riza Shah was a great blow to the prestige of Islam in Persia. Religious speculation is, however, of absorbing interest to large numbers of Persian Moslems, and Persia has been a notable source of religious movements within Islam, especially those of a pantheistic kind, such as the Ismaili and Sufi sects in earlier times and Babism in the nineteenth century. Persians are accustomed to the presence of non-Moslems, and the governing class has always possessed a certain tradition of religious tolerance, though till recent times various social degradations and inabilities were enforced upon non-Moslems. But even before 1914 missionaries observed that the fanatical spirit was exceptional and that it was not possible to stir up a mob to persecution for a religious cause alone without the incentive to plunder. The last serious outbursts of this kind were in 1903, when many Babis were killed at Yezd, and about 1925, when an American was killed at Tehran. The spread of modern education and the general improvement of communications have greatly strengthened this spirit of toleration. It is, however, desirable for a non-Moslem

to behave circumspectly in places of special sanctity and in the solemn seasons and festivals of the Moslem year. Villagers too are slow in some districts to abandon the rules which limit the sharing of meals with non-Moslems.

Islam

The essentials of Islam both in faith and practice are common to its various sects: surrender to the will of God revealed through the Prophet, prayer, fasting, charity, and pilgrimage. The first is expressed by recital of the creed: 'there is no God but God, and Mohammed is the messenger of God'. *Prayer* means the five daily prayers, particularly at sunrise, noon, and sunset, accompanied by certain gestures of the body, which must be rendered clean by ceremonial ablutions. Public prayer is offered in Sunni mosques daily when the muezzin summons the faithful. *Fasting* from both food and drink is performed throughout the month of Ramadan between sunrise and sunset, a very trying feat when Ramadan falls in a hot month; it is not, however, incumbent on those in military service or on travellers, who must, however, make up their omissions later. *Charity* includes fixed obligatory alms (*zakat*) and voluntary (*sadaqat*). *Pilgrimage* means not only the great pilgrimage or *Haj* to Mecca which gives a man the title of Haji, but also voluntary pilgrimage to local and national shrines. In Persia pilgrimage to Meshed and Qum, and also to the Shia shrines of Iraq is very popular, and many men and women end their lives as pilgrims. Though Riza Shah discouraged pilgrimage, Persian governments have generally encouraged internal pilgrimage. The taboo against eating pork is general amongst Persian Moslems, but the drinking of wine is more common than in other Moslem countries. Religious rules regard the touching of food and vessels by a non-Moslem as pollution, though practice varies, and most Moslems limit the veto to wet foods. In many parts of Persia, both in tribal and non-tribal regions, communities of *Sayyids*, or reputed descendants of the Prophet, enjoy remarkable privileges and respect, and until recently could live, without much work, on charity.

Moslem clergy consist of the *Mullas*, who are the village priests and who hold the village schools, and of the clergy of the town mosques, of whom the more senior are called *Imams* (not to be confused with the Shia Imams, below). *Qadis* are teachers or theologians who act as judges of the religious law or *Sharia*. They refer disputed points to the authority of a *Mufti* or *Mujtahid*, who is the leading Imam of a principal mosque. The senior theologians are known

collectively as the *Ulema*, or 'the learned'. The juridical functions of these clergy have now virtually disappeared.

Shias. The historical origins of Shiism and its establishment as the national religion in the Safawid period have been described (p. 264). It was only then that the form of Shiism prevailed which recognized a canonical list of twelve Imams, the direct descendants of the Prophet Mohammed and of Ali, culminating in the disappearance of the twelfth, Imam Mohammed, at Samarra in Iraq. The sect takes the title of Ithna Asharia or Twelvers, to distinguish it from such sects as the Ismailis who recognize only seven Imams. Devotion to the Imams and particularly to Ali and Husain is the characteristic of the Shias, who add the words 'and Ali is the vicegerent of God' to the Moslem creed; conversely they execrate the first three caliphs who intervened between Mohammed and Ali. Shias value, more than Sunnis, the prescriptions of ritual purity, the washings of persons and utensils, which are regarded as the main duty of the faithful. Since the disappearance of Imam Mohammed, the Imams, who are regarded as the mouthpieces of God, have been represented by the mujtahids or superior clergy who give authoritative decisions on religious matters. Shia clergy are trained in seminaries (*madrasas*) at the holy cities of Iraq and Persia, and the most learned and influential gain the title of *Mujtahid* by tacit consent. The mujtahids on occasion intervene in politics.

Najaf and Karbala in Iraq, the sites of the tombs of Ali and Husain, and Meshed in Persia, which contains the shrine of Riza the eighth Imam, are the principal Shia shrines, and their pilgrims gain the title of Najafi, Karbalai, or Meshedi. The latter two rank close, in Persia, to that of Haji gained by pilgrims to Mecca. Qum, with the shrine of Fatima, the sister of Imam Riza, is also a city of sanctity and pilgrimage. Persia is full of local shrines, *imamzadehs*, the tombs of holy men, generally the descendants of Imams; sometimes these are places of sanctity and sanctuary, sometimes they are entirely neglected (photos. 199–203). But the great shrines have a very holy character and are usually surrounded by quarters which share the sanctity of the shrines. In former days the sanctuaries were places of *bast*, where criminals and political offenders had the right of asylum from the officers of the Shah, though *bast* is not necessarily religious and was attached to many secular places such as the original Telegraph Offices. At the shrines the pilgrims buy rosaries, shrouds, and tablets of sacred earth (*turba*), on which a Shia bows his head at prayer instead of on common earth. Burial within the cemeteries of the holy

cities is greatly esteemed, and until Riza Shah put a temporary stop to it there was a constant traffic of coffin caravans to the shrines, where the clergy gained much money by burial fees.

The most notable festival of the Shia year is the mourning for Husain during the first ten days of the month Moharram. Passion-plays (*taziya*) tell the story of his death, and troops of mourners work themselves into a frenzy in which they flagellate themselves with swords and chains until the blood flows. It is a time of great excitement, and outbursts of fanaticism may occur. There is a considerable element of genuine religious emotion among both mourners and spectators. The attempts of Riza Shah to suppress the religious processions caused much bitterness, and there has been a revival of their influence since his abdication.

A peculiarity of Shia Islam is the doctrine of *tekkiya* or dissimulation; a Shia is not expected to tell the truth when discussing religion and may deceive to hide his religion. The religious and personal duty of Shias is regulated by the Koran, by the pronouncements of the mujtahids, and by a general body of religious law called *Sharia* and known as the Jafari code. This has grown up from the writings of the learned, though, unlike the Sunnis, the Shias do not recognize a fixed canon of traditions about the sayings of the Prophet.

Sunnis. An account of Sunni Islam is given in *Iraq and the Persian Gulf*, B.R. 524, pp. 251 ff., and need not be repeated here. Sunnis have a closed system of scriptures, i.e. the Koran and the Sunna or Traditions, which contain a final account of their religion. These are expounded by four schools or rites of theology and jurisprudence, the Hanbalite, Hanifite, Malikite, and Shafi. Mohammed is the central figure in Sunnism and no other figures or shrines overshadow him and Mecca, though great respect is felt for the first three caliphs. In Persia, apart from scattered groups, Sunnis are found mainly in Persian Baluchistan, in northern Kurdistan, and among the Turkomans of northern Khurasan.

Dissident Sects

Sufism. In Abbasid times there arose within Islam a form of religious mysticism called Sufism (*Tasawwuf*) which has always appealed to the Persian mind. This devotional system assimilated many foreign ideas from Christian, Neoplatonist, and Buddhist sources, and ran to excess in mystical interpretation of the Koran and the neglect of the religious practices and ceremonies of Islam. A strong tendency towards pantheism and the absorption of the

individual in the deity, with consequent antinomianism and disregard of normal rules of morality, are characteristic of Persian Sufism, though at its best it is a great spiritual force, reinvigorating Islam. The Sufi preachers created Orders for instruction and propaganda, and these brotherhoods of *Dervishes*, the only ecclesiastical organizations of Islam, have maintained Sufi thought down to the present day. The wandering dervish, a 'seeker of truth', dependent on charity for bread and with little respect for mullas and their rites and ceremonies, has been a great feature of Persian life, though they have been discouraged by the Shia mujtahids and in recent years by the regime of Riza Shah, and some have even been induced to work for their living. Though some are impostors, the dervishes number many well-educated and intellectual types.

The *Ismailis* originated in a Shia schism after the death of the sixth Imam (*c.* A.D. 797). They accepted posthumously his elder son Ismail instead of his second son Musa al Kadhim, as seventh Imam. The sect was strongly influenced by Neoplatonism and developed a theology which identified the Imams with emanations of the Deity. From the Ismailis sprang the heterodox and agnostic society of Assassins (p. 259) from which the modern Ismailis derive. They are now, however, fairly normal in their observance of Moslem faith and conduct. The community is scattered, being found also in the Hindu Kush and in India, and is under the leadership of the Aga Khan, whose family, since the rebellion of 1840, resides in Bombay and leaves spiritual affairs in the hands of the 'Bombay Recreation Club'.

The *Ali Ilahis* are an extreme Shia sect, found mainly among Kurds, both in Kurdistan and Mazanderan, who also hold mystical doctrines, including belief in the deification of Ali and the transmigration of souls, and have a communion service. There are degrees of initiation and of sanctity, and the adepts refer to themselves as Ahl-i-Haqq, 'people of the divine truth'. The Kakais of Qasr-i-Shirin and Khanaqin neighbourhood in which each adept has a *Pir* or guide, belonging to one of ten holy families, are a branch of Ali Ilahis.

Bahaism. The origin of the Babi movement has been outlined above, p. 295. The Bab held a characteristic Persian medley of beliefs, partly Sufi and partly concerned with the doctrine of a Mahdi or the second coming of Mohammed and the last Imam. But after the withdrawal from Persia of Baha-Ulla, who ousted the nominated successor of the Bab, the sectaries, especially the 'Bahais'

or followers of Baha-Ulla, developed a strong interest in non-Islamic faiths, and ethics began to preponderate over metaphysics. Outside Persia Bahaism hardly ranks any longer as an Islamic sect and inside Persia it is decidedly syncretistic. The movement played a great part in preparing the modernization of Persia, but in recent times Bahai influence and numbers have declined. Persecution continued into the twentieth century, and Bahais and Babis used to conceal their beliefs. Bahais are said to number about 100,000.

Non-Moslem Religions

Parsis. The descendants of the ancient Mazdaeans, known as Gabrs or Guebrs in Persia, form a small but interesting group whose chief centres are Yezd and Kirman. Since the Moslem conquest they have been subject to disabilities both in law and in dress, housing, and social life. These had greatly weakened by 1900, and were nominally swept away by the Constitution of 1906, and more effectively by the equalitarian regime of Riza Shah. Their faith retains the basic dualism of good and evil, and its interest in ethics. Its outward symbol is still the cult of fire, though the shrines are now in private houses. A system of ceremonies controls the actions of daily life, and they expose their dead in roofless enclosures to be scavenged by birds of prey. Their clergy are graded from Dasturs and Mobeds down to Herbads (cf. p. 247), the priesthood being hereditary but voluntary. The Parsi era dates from the fall of the last Sassanid emperor in A.D. 640, and their calendar has 12 months of 30 days with 5 unattached days. New Year's Day is their principal festival and has many special rites. Many Parsis have migrated to India in past centuries and there is a close connexion with the Indian community. Parsis are said to be free from many of the characteristic Persian failings in truth and honesty, and since they intermarry they have conserved a pure physical type. They are both an urban and a rustic people, successful as merchant sand bankers, and particularly noted as gardeners. They number about 15,000 persons.

Jews. Persian Jewry dates back possibly to Achaemenid and certainly to Sassanid times; their best known shrine is the so-called Tomb of Esther at Hamadan (p. 518). Their ritual is akin to the Sephardic form which developed in Spain and Portugal, and their language is a Persian dialect written in Hebrew characters. Like the Parsis they suffered severely until recent times from disabilities of occupation, dress, and habit, which marked them out as a despised class. They still live in ghettoes, of which the largest are in Isfahan,

Shiraz, Hamadan, and Tehran; small groups are found in most towns. Jews have now widened their commercial enterprises beyond the former money-lending, and also entered the modern profession of medicine. Jewish interests are represented with the central government by the agents of the Alliance Israélite of Paris. There are from 20,000 to 30,000 Jews in Persia.

Sabians or *Mandeans*. At Khurramshahr and Ahwaz there are small settlements of this strange community, whose adherents are more numerous in Iraq. They are a pagan sect of ancient origin whose distinctive mark is periodic baptism and frequent ablutions. They respect St. John the Baptist and their supreme being is the 'King of Light'. There are apparently no Moslem elements and no notion of a Saviour in their faith. Their holy books are written in Aramaic, which is their domestic language. They always live close to running water and generally work as silversmiths and boat-builders.[1]

Christianity is represented in Persia by the Armenian and the Assyrian or Nestorian churches, apart from European and American missions. *Armenians* belong either to the Gregorian or to the Uniate communion. The Gregorian Church, which is the national church of the Armenian people, is akin to the better known Greek Orthodox in its services but opposed in doctrine, since its theologians adhere to the 'Monophysite' doctrine of the nature of Christ. Uniate Armenians are Gregorians who entered into communion with Rome after a schism within the mother church; they have the benefit of Roman educational and other missions. Armenians are noted in Persia for the persistence with which they maintain their national faith and identity even when sundered for generations from the ministry of upper clergy, of whom the principal are the Archbishop and the Catholicos or Patriarch of Echmiadzin. There are Gregorian bishops at Tabriz and Isfahan, and a Uniate bishop at Isfahan.

The Armenian communities are both peasant and urban, the largest town group being at Julfa, the suburb of Isfahan. Urban Armenians are traders, clerks, and artisans. Peasants are most numerous in Azerbaijan and in Faridan and Burujird districts (pp. 368, 383). The urban Armenian is disliked in Persia and has given Christians a bad name. The regime of Riza Shah excluded them from a wide category of state employments.

The *Assyrians* of the Urmia region, or Easterners as they call themselves, belong either to the original Nestorian Church or to its Uniate branch known as Chaldean, though Chaldeans are commoner in Iraq

[1] See B.R. 524, *Iraq and the Persian Gulf*, p. 331.

than Persia. The Nestorian Church, established by the disciples of the theologian Nestorius in the fifth century A.D., retains forms of worship used at a very early period of Christian history. The present community is the remnant of an organization once powerful throughout central Asia (p. 259). In recent times a great part has been played in reviving the traditional faith of this community, when it was on the verge of disintegration, by a mission of the Archbishop of Canterbury (1888–1914) both in the adjoining Hakâri district of eastern Turkey, whence they have fled to Iraq, and in Persia. The Church is governed by its bishops, since the hereditary patriarch or Mar Shimun now has authority only over Assyrian elements in Syria and Iraq. The ecclesiastical and native language is Syriac. A fuller account of the fortunes of the Assyrians in recent years will be found in B.R. 524, *Iraq and the Persian Gulf*, pp. 312, 333. In Persia they are mostly peasants by occupation, and Urmia (Rizaieh) is their centre; they have also taken to mechanical trades and many are motor-drivers.

Foreign missions include the Church Missionary Society, the American Presbyterian Mission, and the French Roman Catholic Mission; their schools have, however, been absorbed into the state system. There is an Anglican bishop whose headquarters are at Isfahan.

Moral and Mental Qualities

Generally the Persian has been greatly abused by Europeans, the townsman and peasant as a liar, cheat, rascal, and coward, and the tribesman as a brigand, cut-throat, and perjurer, the only admitted virtues being the social grace of the townsman and the physical strength of the tribesman. Such judgements are partly the superficial observations of those who have spent least time in the country, and partly the result of judging by Christian standards without reference to the Persian and Islamic background. The townsman is the product of 2,400 years of continuous civilized autocracy and efficient extortion; the tribal code on the contrary has grown up as a local discipline amidst external anarchy. Hence the townsman has learned the arts of concealment and evasion in order to survive, while the tribesman has come to regard all but his kinsmen as enemies who must be killed or robbed before he is himself killed or robbed. The judgement of those who have lived in Persia in a private capacity is often more favourable than that of government agents, soldiers, and political officers, since the more outstanding Persian vices are directed against the Government. Thus the Persian townsman may be an accomplished liar, but

he does not expect to be believed. The poet Sadi says that 'a falsehood mixed with expediency is better than a truth which stirs up trouble'. The object in dealing with officials is to baffle rather than deceive, and in ordinary conversation to please the other person or to maintain the dignity or *shan* of all concerned. *Shan*, the standing or dignity of the individual, possibly akin to *face* in the Far East, is greatly treasured, and may include honour, grace, looks, culture, or wealth. Persian etiquette is greatly concerned with its preservation; the love of hollow titles and palpably false statements of an honorific kind derives from it. The religious tradition of dissimulation, *tekkiya* (p. 329), has also done much to deprive Persians of a sense of truthfulness.

The open dishonesty that occurs is likewise to be referred to its historical background. Particularly since the Moslem era rapid reversals of fortune have been the rule in Persian society; through tribal violence or through royal caprice the beggars and cooks of yesterday become the princes and millionaires of to-morrow. But, as in the classic novel of *Hajji Baba* (p. 287), sudden ruin and sudden enrichment are equally familiar; hence rights of property have become precarious. In more equable circumstances and in private relationships the virtues of trustworthiness have been swift to develop, though the old bad code of public morals is deeply rooted.

The military cowardice of the Persian townsmen and villagers is notorious. They were always left without positive means of self-protection against tribal forays and foreign invasion, and their traditional defence was to retire within a city wall or mud tower, block the entrance, and hope for the best. Yet the physical endurance of these same men is remarkable. They are capable of immense marches in the extreme Persian climate with the poorest provisions and most inadequate clothing, and show remarkable endurance of heat, cold, starvation, and discomfort of all sorts. The true weakness of the Persian army has not been its human material but the bad training of its leaders and the lack of selection of its officers. Amongst the Turkish peasants of Azerbaijan and the tribesmen of the Zagros the human element is excellent, though untrained tribesmen, while not cowards, have a universal aversion to casualties.

To physical endurance the Persian peasant adds a great capacity for patient toil under heart-breaking circumstances, being ever ready to make the desert yield blossom and fruit. Both peasants and townsmen are noted also for their hospitality, sometimes to the embarrassment of the European, since the poorest peasant is generally ready to share his meagre food with a stranger.



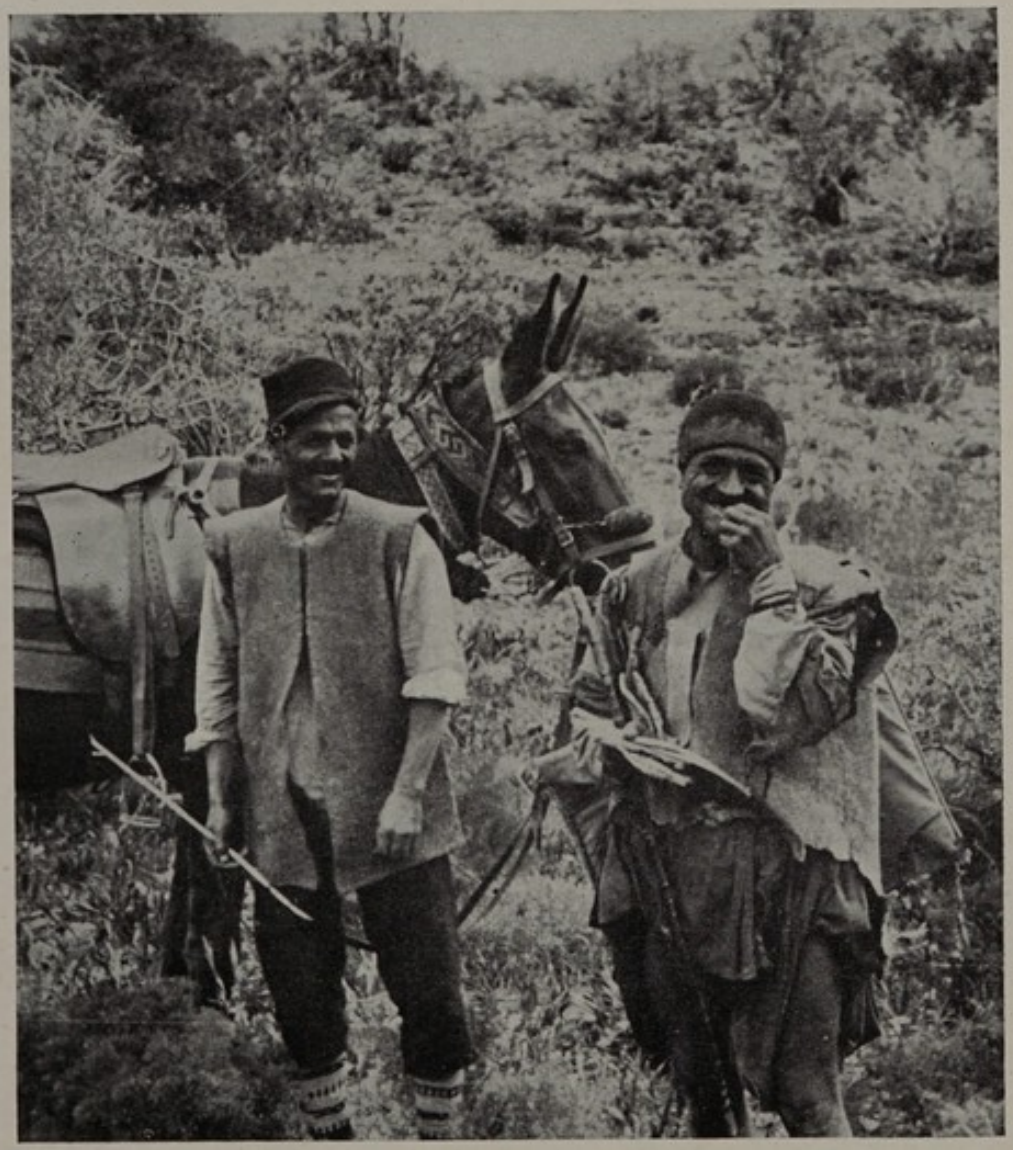
194. *Sarhad Persian*



195. *Bashagirdi Persian*



196. *Bashagirdi negrito*



197. *Felt waistcoats of Zagros tribesmen*



198. *Bakhtiari smock*

The mental qualities of the Persian townsman are more impressive than his moral sense. The double tradition of theological disputation and devotion to the national poetry have maintained a high level of intelligence. Even in remote mountain villages copies of Firdausi and Sadi, or modern books of history, are treasured and regularly read. The Persian, apart from great charm of manner and extreme courtesy, is an excellent mixer in foreign company and is mentally neither aloof nor unduly insular. He has, however, a love of metaphysical speculation expressed in rhetorical and metaphorical language, without reference to the world of conduct and affairs, and his principal weakness is a remarkable indifference to logical contradictions. To the 'oriental' mind contradictory conclusions from the same premisses imply, not a fault in the chain of argument, but an ineradicable human inability to sift all residue of error from the premisses, and both conclusions are taken as equally true.

There are exceptions to this general level of intelligence and dishonesty. The Azerbaijani Turks are said to be slow and stupid. There is a Persian proverb that the donkey asked Allah, 'Lord, seeing thou hast created the Turk, why hast thou created me?' The Mazanderanis also lack the Persian quickness and brilliance and are reputed to be, for Persians, an ignorant people; the Gilanis, however, are rated higher both for intelligence and for honesty. The Atrek Turkomans, though formerly fearsome brigands, are said to be exceptionally honest in commercial transactions.

Tribesmen. The usual difficulty in dealing with the tribesmen of Luristan and Kurdistan is that the tribal code (p. 337) does not recognize the force of agreements and oaths made outside the tribal group. To rob the outsider cleverly is a merit, and though no tribe ever lived by brigandage alone it has for centuries been the principal sport, and the skill of the Lur thief is remarkable; British expeditionary forces have often successfully employed Lur bandits as guards and watchmen on the principle of setting a thief to catch a thief. Within the tribal relationship virtues are more apparent, since as a whole these peoples are brave, hospitable, and faithful to their kin, and have a keen sense of humour. But they are essentially childish and liable to fits of uncontrolled temper, in which sudden acts of violence are committed. The most serious charge against them is that the sanctity of the guest-tent is not inviolate, and guests have been robbed and even killed, a fault hardly ever to be charged against the Arab peoples. Those few Europeans who have lived with tribesmen commend their courtesy in conversation and their polite attention to guests. Many

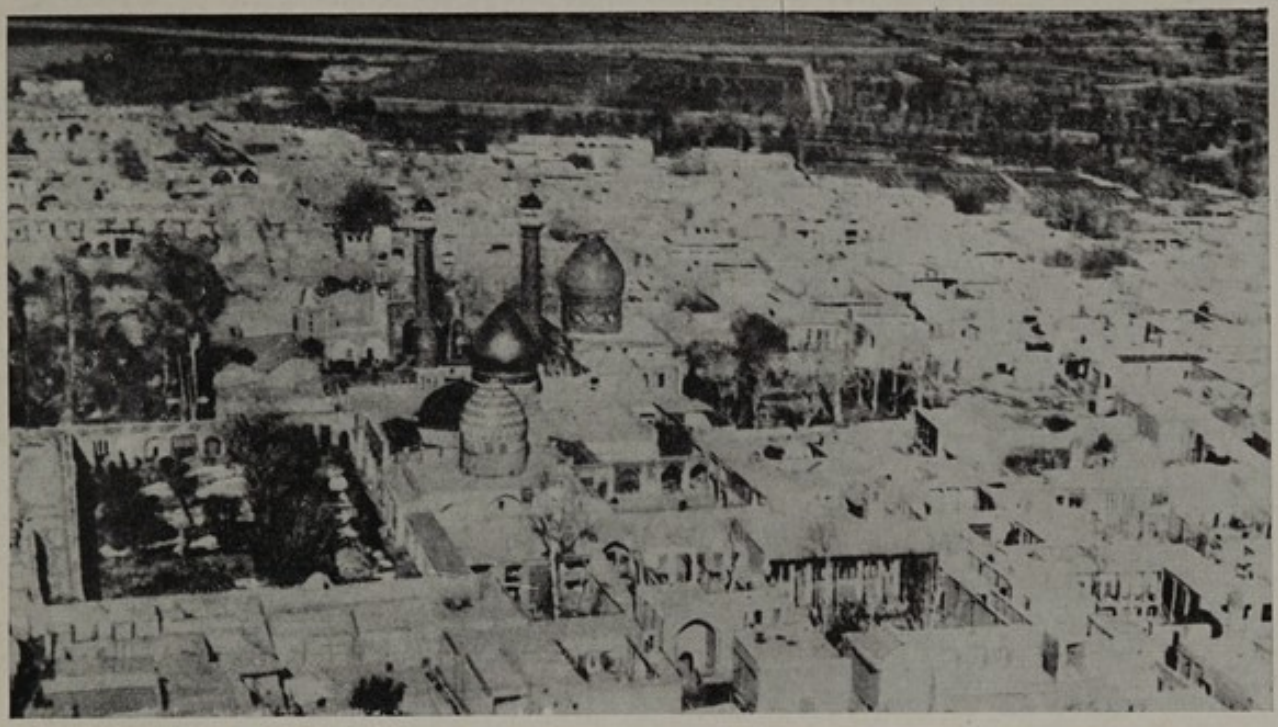
Lurs and Kurds have shown remarkable adaptability for working with modern machinery in the establishments of the Anglo-Iranian Oil Company. This practical intelligence is matched by general shrewdness. A Lur chief who was shown all the wonders of a modern transport plane and told by the R.A.F. officer in charge that 'all this actually flies', replied drily, 'I suppose that is what it was made for'.

Way of Life

The Persians are primarily an agricultural people drawing their hardly gained livelihood as peasants, shepherds, and landowners directly from the land, as described in Chapter XI in detail.

The basis of the towns is commercial rather than industrial, and the characteristic townsman is a shopkeeper or shopkeeper-artisan working in a single room. Until the regime of Riza Shah all industry, except oil, was domestic, and the score of large modern factories which Riza organized have hardly modified the general picture except at Tehran and Isfahan. Oil royalties and dues are a great source of revenue to the Exchequer, but except at the great refineries of Abadan the numbers employed in its extraction are comparatively small. Thus the vast majority of working Persians still either till land or herd sheep and cattle, and despite the oil of Persia, the vast majority of its inhabitants live a hard life in great poverty.

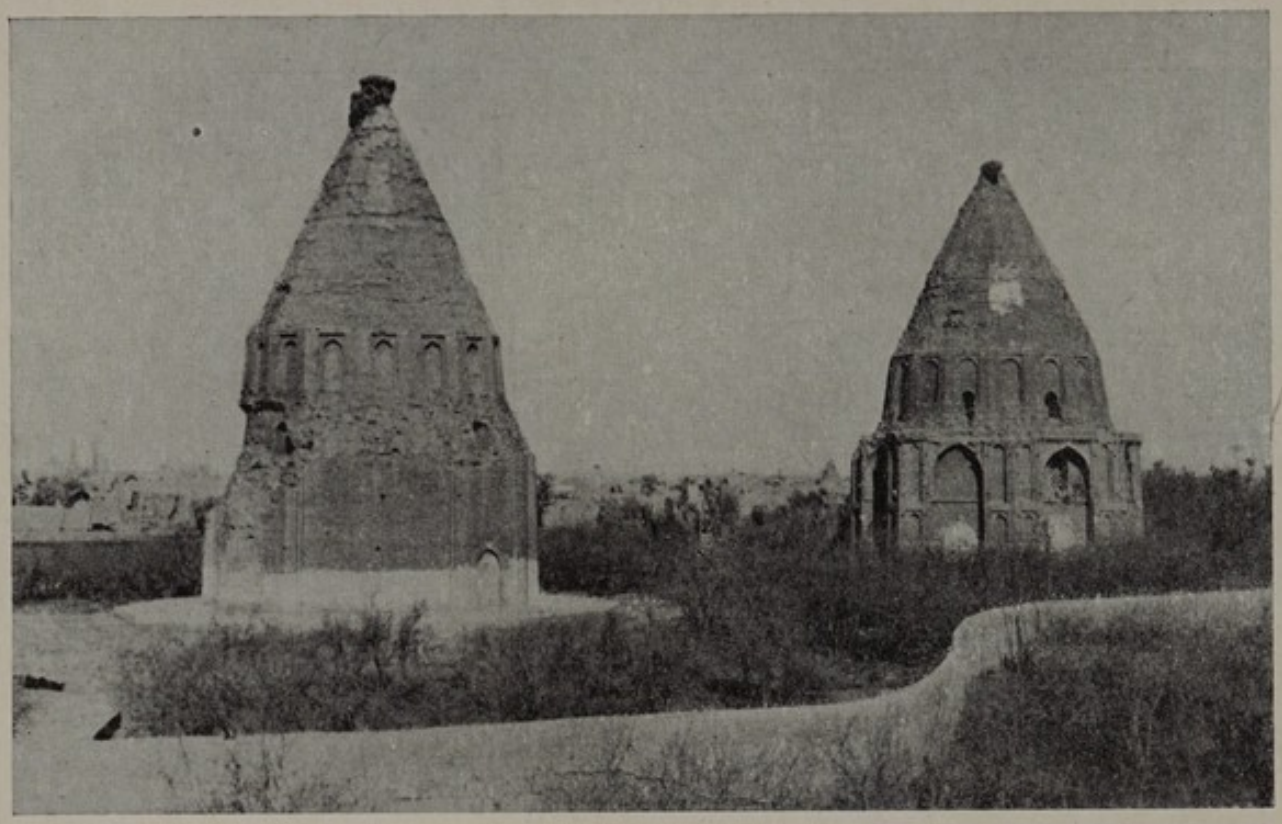
Seasonal Nomadism. As in all stock-breeding countries where rainfall and vegetation are limited, pastoral nomadism or seasonal migration is the rule. The sheep follow the vegetation from the lowlands and valleys by stages up the high hills in summer and return in autumn, and the shepherd communities move with their sheep, while the peasants or cultivators tend to be fixed to their lands and villages But Persia is peculiar in that this tendency is not absolute. A large fraction of the present peasant population were originally nomads, and some, at least in the vicinity of the Zagros and Elburz, have retained the habit of a summer migration, which does not interfere with their simple cultivation systems. Townsmen, too, make every effort to escape the worst heats by seeking a summer station (*yailaq* or *sardsir*) on higher and cooler ground. Thus the distinction between nomad and settled is one of degree. So too with cultivation. A mixed economy is characteristic of Persian nomads (*iliat*), who do not live by meat and milk alone. Most shepherd communities sow crops in their winter quarters (*qishlaq* or *garmsir*), which are either reaped on their return or cared for by a detachment left behind for the purpose; some



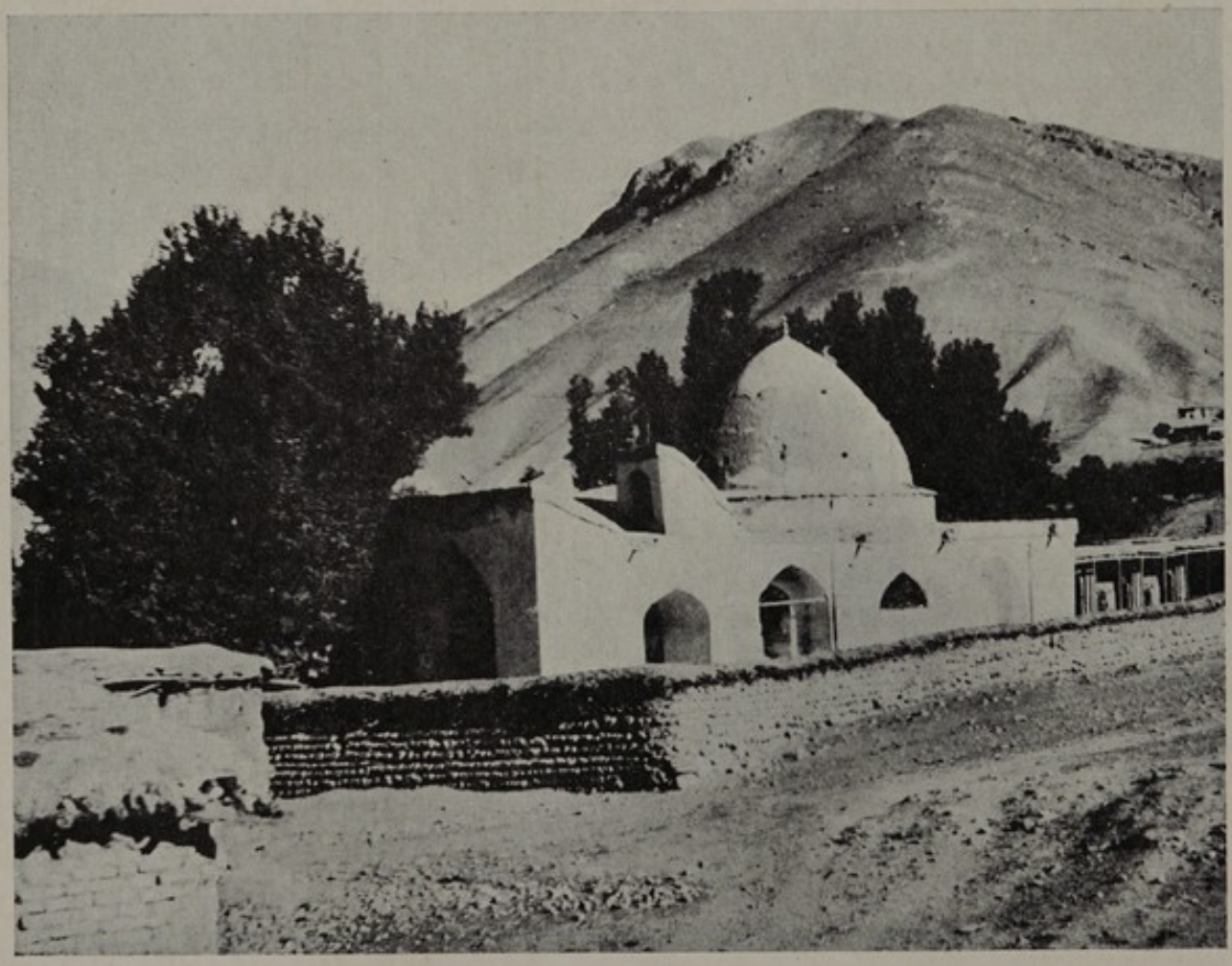
199. *Shrine of Abdul Azim near Tehran*



200. *Shrine of Nimatulla at Mahun near Kirman*



201. *Imamzadehs at Qum*



202. *A rural imamzadeh*

shepherds also sow cereals in their summer quarters which are reaped the following year. Likewise the peasants of the Zagros often have small flocks which must be sent to the hills in summer. The distances of seasonal migration vary considerably; often it is very local from valley bottom to adjacent mountains, but in the central Zagros the Bakhtiari used to move 70–80 miles from the highest valleys down to the outer foothills, and in the southern Zagros the Qashqai trekked some 200–300 miles from the interior to the coastal ranges; some Kurds moved 50–60 miles from the Zagros down to the plains of northern Iraq in winter. These migrations were not done quickly, but with frequent halts for rest and pasture, and might occupy two months in either direction (photos. 212, 213.)

Peasants and Tribesmen. Socially, peasants and cultivators are distinguished by the tribal organization of the shepherd communities, but nomadic tribes which have settled down to agriculture usually retain their tribal organization, at least in part, for a long time. Even the general distinction between shepherds and peasants as tent-dwellers and house-dwellers is not absolute, since Arabs, Lurs, and Turkomans who have taken to agriculture do not readily take to houses; most tent-dwellers prefer wattle shelters in the hottest weather, and in the rainy Elburz the shepherds find houses more convenient than tents (p. 351).

Thus there is no sharp dividing-line between peasants and shepherds, migrants and settled, tribesmen and non-tribal. But there are certain regions, of which the Zagros is the most important, where the tribal system and the nomadic pastoral tradition is very strong, and the way of life is different in essentials from that of the townsman and peasant, whereas over the greater part of Persia the peasant and townsman regard the tribal system as something barbarous. Hence the way of life of these opposites calls for separate discussion. Special note needs also to be made of conditions in Mazanderan where the two ways of life are more closely intermingled than elsewhere (p. 362), and of Persian Baluchistan which is much the least civilized and most un-Persian part of Persia (p. 342).

Tribal System

In western Persia the tribal system is strongest among the pastoral Kurds of the Iraqi border; the Luri-speaking folk—Faili Lurs, Bakhtiari, Kuh Galu, and Mamassani—of the central and southern Zagros; and the Turkish Qashqai and mainly Arab Khamseh of the southernmost Zagros in eastern Fars. In eastern Persia there is less

detailed information, but the Turkomans of Khurasan call for special comment. The system is known best from Kurdistan and Luristan, but though terminology differs, the material distinctions between Persian, Arabian, and other Asiatic tribal systems are not great. The main difference is the degree to which tribal sections recognize the authority of paramount tribal chiefs. The essential function is the same. The tribe exists to protect its members and their property where law and security are not provided by a central government, and also to organize the seasonal migration of the flocks, a complicated business which calls for authority and discipline. The curse of the Persian tribal system has been the great fragmentation of the tribes and the general lack of central tribal or inter-tribal authorities to maintain order throughout large areas, either by themselves or in harmony with the Shah's government. It is this factor, due mostly to the broken nature of the mountain terrain, that lies behind the disorder of Kurdistan and Luristan, and not the innate wickedness of their inhabitants. There are exceptions to this internal disorder. The Qashqai and Bakhtiari confederations have always possessed a central authority in their Il Khans, strong enough to prevent internecine tribal warfare, though local feuds and cattle-raiding persisted within the groups. In Pusht-i-Kuh for two centuries there was relative prosperity under the firm rule of a tribal dynasty recognized by the Shahs as Valis until they were dispossessed by Riza Shah.

The tribe is an extension of the family and family group or clan. Tribes are divided into sections consisting of one or many such clans, and may be grouped into confederations of several tribes. Size varies enormously. A few clans of a few hundred souls may form an entirely independent tribe, or a confederation such as the Khamseh may number its families by thousands. Amongst Kurds, Faili Lurs, and Bakhtiaris the family connexion is fairly strict, but Arab and Turkoman tribes often contain diverse elements that have combined out of self-interest or have been forged into unity by the force of a strong personality.

Kurds and Lurs. Amongst agricultural and semi-settled Kurds the tribe, *ashiret*, is divided into sections, *taifa*, and these into clans, *tira*, which contain one or more villages, *gunds*, of closely interrelated families. In the smaller tribes ashiret and taifa, or taifa and tira, may be identical. Among nomadic Kurds the corresponding divisions are *kabila*, *khel*, and *hoba*, which is a settlement of tents in one location, containing, e.g., the father and married sons of one family. Kurdish chiefs are called *agha*. The tribal aghas of nomadic tribes such as the

Herki have considerable power, but among settled Kurds the aghas of ashiret and taifa have little authority beyond the function of arbitration in tribal disputes; the agha of the tira has more power, often being landlord of his villagers as well as chief.

In Luristan things are ordered somewhat differently. Luri tribes are divided between the *khans*, or members of the ruling family, which forms a separate clan, and the *rayats* or common tribesmen, who are divided into sections and clans each under a rayat chief (*kalantar*) or headman (*kedkhoda* or *riz safid*, 'greybeard'). These units tend to split up or to be regrouped when strong personalities challenge the authority of an ageing kedkhoda or kalantar, or when on his death his sons set up as rivals. Similarly the clans of the tribal khans tend to break up, the sons of a single supreme chief dividing the tribe between themselves, with the result that the authority of the individual khans becomes weak and the rayats gain independence. There is then much rivalry among the khans to win the support of the tribal sections, which they seek by intermarriage with the daughters of the headmen. Tribal fragmentation is also maintained by the blood feud, usually caused by quarrels over loot in the migration season which stir up deadly enmity between tribe and tribe and also between section and section. Chiefs of tribes and sections are in constant intrigue to form alliances and to detach doubtful adherents from rival groups. The matrimonial alliance is again the favourite method of this 'group tying' or *dastehbandi*, which is often ineffectual on account of favouritism towards one or other wife.

Social life revolves round the family and the guest-tent of the headman or chief. Within family and clan the women of Kurds and Lurs have a far more honoured place and far more freedom than in the towns and in peasant communities. It was never the custom for women to veil and they are not absolutely secluded from male company; in Kurdistan there is even a tradition of matriarchy, and tribes have been ruled very successfully by women. Polygamy is limited by the expense of the bride-price and a general dislike, amongst Lurs, of the Shia custom of temporary marriages (p. 346), and also by the influence of the women themselves. Few rayats can afford more than one wife, but in the households of chiefs there is work for several. The domestic duties of the wife include collecting fuel, fetching water, milking, making curds and butter, cooking, sewing, and weaving. The women also help to pitch and strike tents and to carry loads when the tribe moves. Cultivation is done by the men.

In Kurdish and Lur encampments the tents are usually set in small

groups (*hoba*) and the whole tribe covers a wide area, distances being determined by the sparsity or density of the vegetation. The guest-tent or guest-house of the kedkhoda, agha, or khan is the centre of tribal society and the abode of visitors. Admission to its hospitality depends upon conventions fixed by tradition; once a stranger has been admitted the chief and tribe are bound to protect him. The maintenance of the guest-tent is expensive, though partly borne by the gifts of the guests. It is the centre of tribal intelligence and rumour, and of diversions such as the recitation of ballads. Other amusements include dancing to a band of pipes, drums, and kettle drums, or beating on an empty kerosene tin; the Bakhtiaris have a special stick-dance.

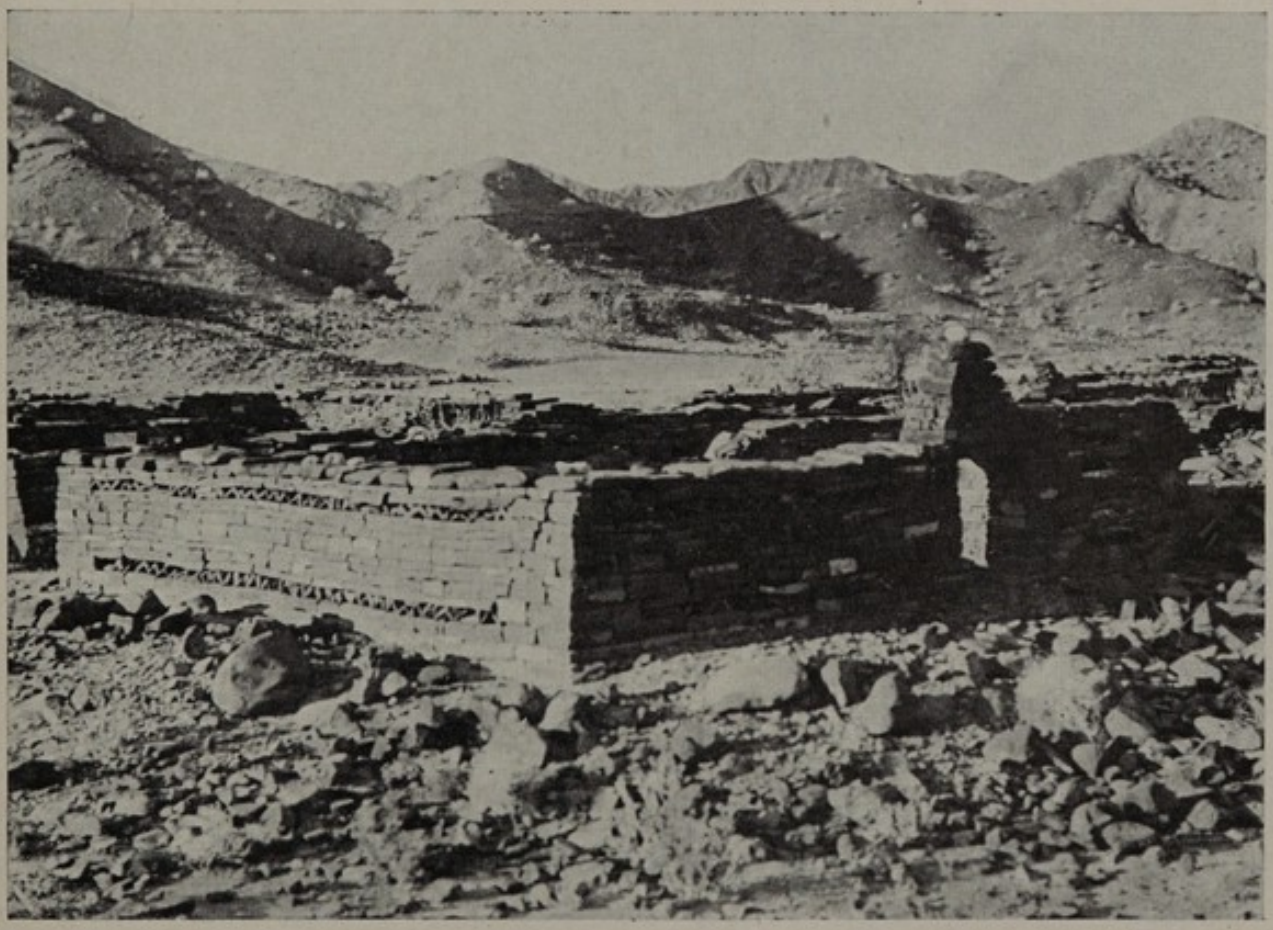
Each tribe has its summer and winter territory of which the boundaries are well known. When migration takes a tribal confederation across alien territory there is a fixed order of precedence for the passage of the tribes. Tribesmen will not enter the territory of those with whom they have a feud. A peculiar use is made of settlements of Sayyids (p. 327), to insulate the territory of hostile tribes; the holiness of the Sayyids protects them from raids and thus acts as a shield for the patron tribe also. The winter quarters of absent tribes are often marked by the mud walls of enclosures in which they set their tents. The furnishings of a nomad tent are very simple—a few copper vessels, goatskins of water, and rough mats or blankets. They have little other property, except their flocks, their horses, and, until disarmed by Riza Shah, their guns, in which their chief pride was placed. Until the reforms of Riza Shah they often owned finery, but they are now miserably attired (p. 354).

Bakhtiaris. The Bakhtiari Khans, whose intervention in 1909 turned the course of the Persian constitutional movement, are among the more intelligent tribal folk of Persia. Their tribal system is generally similar to that of the Lurs already described. There have always been two great confederations, Haft Lang and Chehar Lang, under the authority of a supreme chief, the *Il Khan* and his deputy the *Il Begi*. In the middle of the nineteenth century the Chehar Lang were supreme, but on the death of their great leader Mohammed Taki Khan became subordinate to the Haft Lang, until Riza Shah created a separate Il Khan for them. The Bakhtiari Ilkhanate has generally been subject to the approval, and even the appointment, of the Shahs.

Properly the term Bakhtiari is restricted to the ruling families, their retainers, and retainers' families. The titles of *khan* and *bibi* or Lady are given to Bakhtiaris of the ruling stock. The wives, particularly



203. *A shrine in Persian Baluchistan*



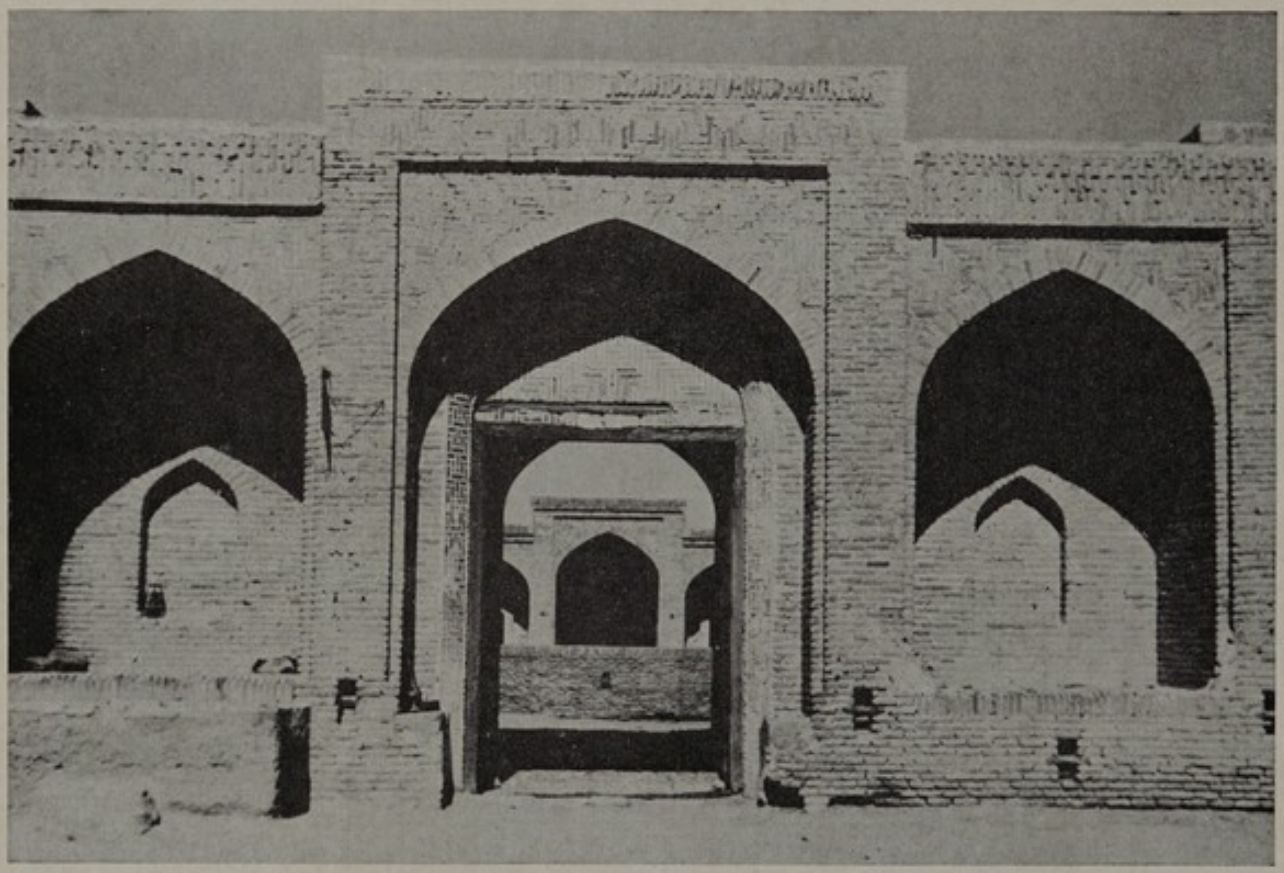
204. *Tombs in Persian Baluchistan*



205. *Isfahan bazaar*



206. *Tehran bazaar*



207. *A caravansarai*

those of Bibi rank, have a pre-eminent position and considerable freedom, being allowed to visit freely the households of a wide but carefully prescribed circle of relations, and to talk to all men who are of a lower social grade than themselves. Other wives, the daughters of kedkhodas or of ordinary rayats, are governed and even chosen by the Bibis, who often manage estates and even tribal affairs in the absence of their husbands at Tehran, and may possess property of their own. Even before 1914, education in the three R's was general among the daughters of the ruling class, and the sons of the wealthiest were being educated in Switzerland with moneys derived from the Oil Company. The authority of father and brother ranks before that of husband, and wives often withdraw for a temporary separation to parental or fraternal home; wives are often successful in preventing inter-tribal wars involving their close relations. The khans are keen business men and have shown great interest in the development of agriculture among their rayats, to whom they are hard landlords, while they monopolize the services of the tribal women for carpet-making in return for very meagre payment. Their business instinct and unparochial outlook is shown by their co-operation with Lynch Brothers for the opening of the Isfahan road, and later with the Anglo-Persian Oil Company.

Bakhtiaris are generally only nominal Moslems, though some khans make the Haj to Mecca for the sake of the title and others are buried at Karbala; their mental attitude is practical and somewhat agnostic, though they have many superstitions, charms, and lucky days.

Both among the Bakhtiaris and amongst the Kuh Galu and Qashqai confederations, about whom less information is available, great use was made formerly of fortified positions and castles or *diz*, to which the khans withdrew with their armed men when hard pressed by the forces of the Shah or of their tribal enemies. These castles, which were not only very strong but also were residences of some comfort, have generally been destroyed or ruined by Riza Shah. In the territory of all these groups there are a considerable number of settled villages owned by and subordinate to the ruling families of the nomadic tribes. The castle and the village thus provided two elements of fixed property within the nomadic system (photo. 217.)

Turkomans. The Atrek Turkomans on the borders of Russian Turkistan and Khurasan have absorbed least of Persian civilization. There are two great tribes, Yamut and Guklan, consisting of a number of sections and clans. Apart from the *aqsaqal*, 'greybeards' or headmen of the sections, there is no central authority, so that inter-

sectional feuds are strong, while the two tribes are perpetual enemies. Both tribes, however, respect the neutrality of a 'holy' section of Sayyids called Khwaja.

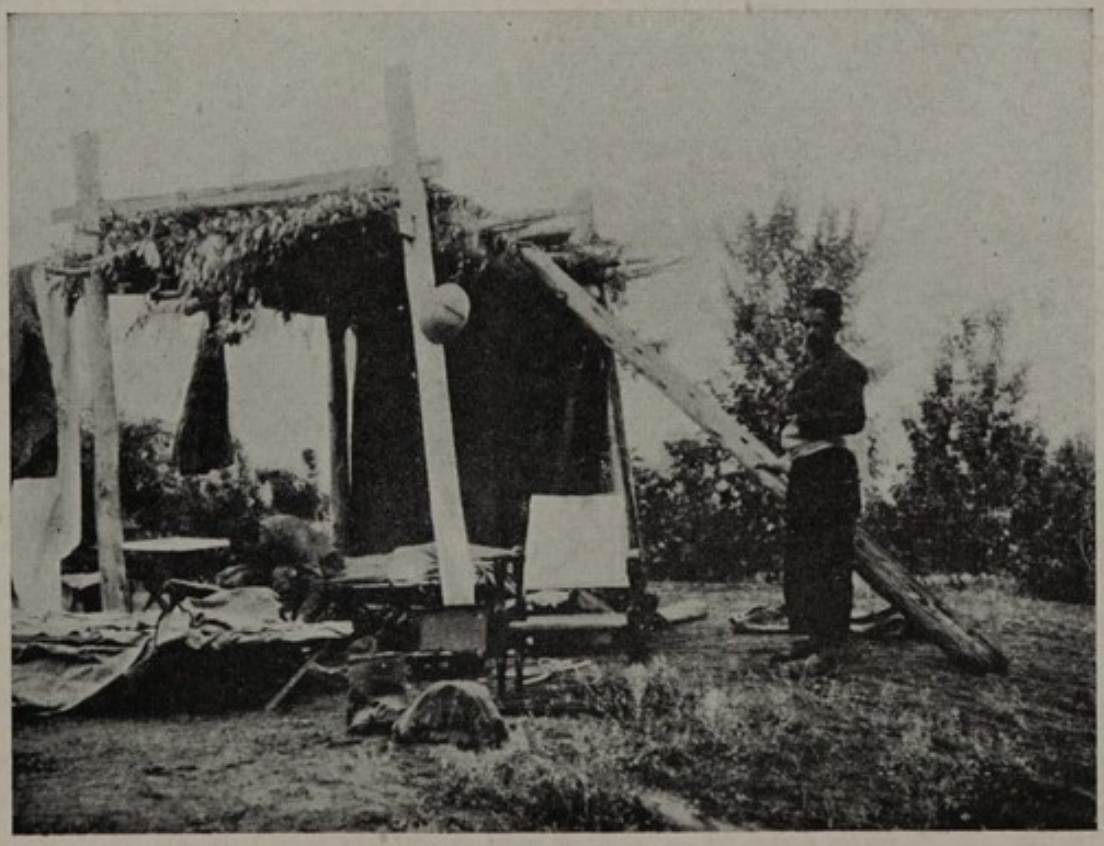
The bulk of these Turkomans are cultivators or *chumur*, but a minority of the Yamut are, or were till recently, nomads or *charwa*, though the *chumur* kept some flocks and herds and made small migrations; likewise the *charwa* cultivated some ground, sowing in November and returning to reap in summer, though their agriculture is primitive by Persian standards and they do not plant fruit-trees or make gardens. Those dwelling close to the Caspian are traders, fishermen, and sailors. All are by tradition tent-dwellers, generally living in settlements of about 300 tents, which are great beehives (*kibitkas*) made of felt and horsehair in a style different from the tents of other Persian peoples (photo. 193); but Riza Shah took away the tents and compelled them to live in houses.

Persian Baluchistan. Little need be said about the tribes of Baluchistan beyond what is remarked under *Distribution* (p. 390). It is the least populated, perhaps the poorest, of Persia's many poor districts, and also the most barbarous. A special feature is the existence in several districts of what was till recently, and may still be, a serf population, which cultivates the lands of the ruling Baluchis. In the inaccessible Bashagird district there is a truly barbarian population which speaks a Persian dialect and has a peculiar organization suggestive of caste. Some clans pay no dues or taxes to their chiefs, others are free cultivators who pay taxes, and others again are serfs. They are semi-nomadic, living in small reed huts, one family in each, which are grouped in small hamlets of ten or fifteen; there are sometimes separate huts for animals and for stores, and if a stranger arrives a new hut is built for him. Women do the household work, but men tend strangers. Men wear few clothes, often only a loin-cloth, but women wear trousers, blouses, and cloaks. Their religious and ethical customs are Islamic, and there are even Koranic schools in the villages, but they are generally monogamous. Physically they are of remarkable endurance; they have many wild barbarian characteristics, murder is common, and they are very cunning under influence of avarice, and mistrustful among strangers. (Photos. 195, 196, 220.)

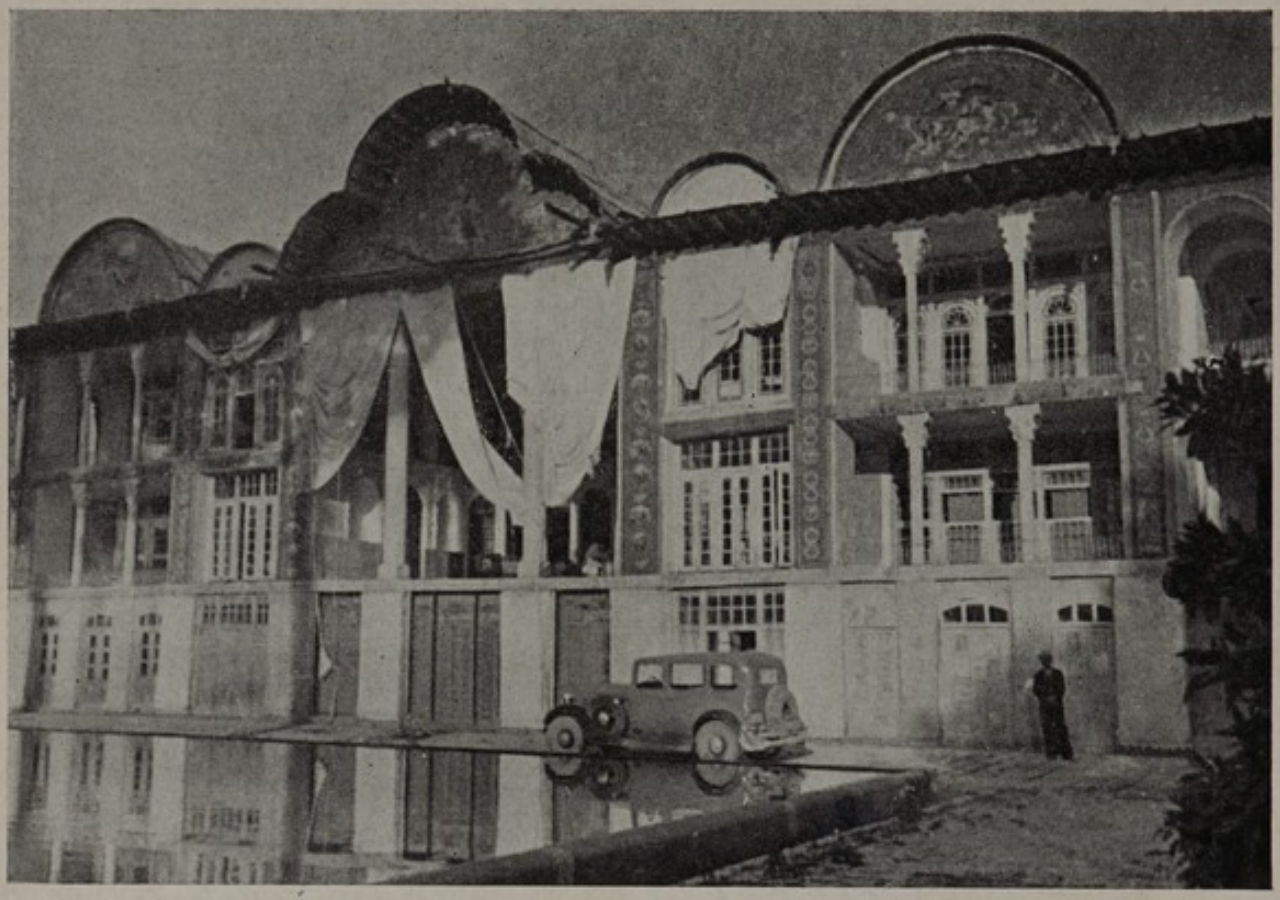
Gipsies. Genuine gipsies are found in most parts of Persia, living a nomadic, though not a pastoral life, and pursuing their traditional crafts and trades much as in Europe; they are commonest in the Caspian provinces and in Azerbaijan, and were reckoned to number about 20,000 families before 1914, when they had a tribal organiza-



208. *Chaikhaneh or tea-house, with kalyan or pipe in foreground*



209. *An elevated talar of simple type*



210. *Persian palace*



211. *Garden of palace seen from terrace* (210)

tion under a supreme chief. They call themselves *Firij*, but are known by Persians as *Qara Chi* in Azerbaijan, *Kauli* in Fars, *Kaishmal* in Khurasan, and *Luli* in Kirman. They speak a dialect called *Gurbat*, which contains diverse elements.

Tribal Settlement

A very great effort was made by Riza Shah to pacify, disarm, and settle the nomadic tribes on the land as cultivators, and forcibly to prevent or diminish pastoral nomadism; thus the migration of Persian Kurds into Iraq and of Iraqi tribes into Persia was forbidden about 1930, and the principal chiefs of Luristan and other areas were taken to Tehran, where many perished. Riza also revived the Qajar expedient of transferring Zagros tribesmen to the northern provinces; thus the Bairanawand had largely disappeared from Pish-i-Kuh in 1937. The paucity of travellers' accounts makes it difficult to judge the success of this policy. Certainly a very great measure of security was achieved along the roads of Persia, and the Pusht-i-Kuh was so effectively disarmed that the Lurs had not even the necessary means of keeping wild boars out of their crops. Stone villages were built in the Pusht-i-Kuh, but some at least were inhabited only so long as a police patrol was near by. Tents were sometimes successfully secreted, or wattle huts were used instead. The agricultural policy was most successful where the Shah acquired ownership of tribal lands and thus had the powerful position of a landlord. Since his abdication it is notable that tribes have been successfully reclaiming the ownership of confiscated lands. The pacification of the Qashqai was a failure; since 1941 the confederation has reasserted its former autonomy, partly with weapons taken from the disorganized Persian army, and has again become a force in politics. Some Kurdish tribes also were able to raise an armed revolt in 1941.

Three factors that have had a permanent influence on tribal life are the employment of Lurs and Bakhtiaris by the Anglo-Iranian Oil Company, the extension of education, and conscription. The first has greatly enriched and hence emancipated many rayats, bringing them in touch with mechanical civilization and medical facilities of an advanced kind, and also encouraged them to look for employment generally outside the pastoral life. For the second factor, the less remote tribes were compelled to send a quota of children into such towns as Khurramabad and Kermanshah to attend elementary schools, while the Anglo-Iranian Oil Company also provides modern instruction. The broadening effect of conscription which mixed

together tribesmen, peasants, and townsmen of all kinds, and provided a certain amount of adult education, must also have been considerable.

The policy of tribal settlement has, however, a political, not an economic motive. There are generally too many tribesmen for the available land, and pastoral nomadism is essential for meat and wool production. Hence the policy caused great hardship by upsetting the economic balance; also the sudden change of mode of life involved nomads in diseases which they escaped when nomadic, because the sanitary habits of nomads are quite unsuited to settled life, which compels them to live amid their own dirt.

Townsmen and Villagers

The characteristic form of civilized life in Persia appears fullest in the towns, whence it spreads strongly through the peasant villages of the inland basins, and percolates more weakly to the tribal areas and the remote agricultural settlements of the high mountains. The villages differ only in scale and wealth, not in kind, from the towns. The function of towns is less specialized than in Europe. Continuous and extensive settlement and cultivation are not possible in the geographical conditions of Persia. Where water-supply and cultivable soil occur together settlements exist, always having a basic agricultural element which tills the surrounding land. If the site is a major centre of communications, or the natural focus of a region, or a place of great religious sanctity, it becomes a town rather than a village, adding to its substratum of peasants a wealthier layer of shopkeepers and merchants, clergy, landowners, and officials. The landowners are the most prominent and universal element, and do not always withdraw to large towns; many villages have the advantage of a resident landlord interested in his lands, though the absentee landlord who despises his peasants is also a characteristic factor. The administrative class is seldom large, and generally limited to police, tax collectors, and a very few schoolmasters and doctors. In the provincial capitals there are the governors with their not very numerous staffs.

Towns consist of the characteristic oriental maze of narrow lanes bordered by blank walls, with occasional small open spaces near mosques, though in the largest cities there are splendid squares, such as the great *maidan* of Isfahan, surrounded by magnificent mosques and palaces. Towns such as Kirman and Yezd are much more modest. The finest buildings are the mosques with domes and

tall minarets in the Persian style roofed with coloured tiles or gilded copper plates. The great shrines are very elaborate, though the basic plan is simple, consisting of a domed building standing within a walled and gated enclosure. There may also be *madrasas* or theological colleges, and *tekkiyas* or monasteries of dervishes, either in the style of a caravansarai or of a private house. Public buildings are limited to the *sarai*, containing government and municipal offices, the caravansarais, and the bazaars. The *caravansarai* is the oriental inn, consisting of a great courtyard surrounded by rooms for lodgers and stables, and with a loading platform in the courtyard; no services are provided by the caretaker. Some merchants may have offices in the caravansarai. The *bazaar* is the centre of commerce; this is a roofed lane with stalls on either side, which may number dozens, hundreds, or thousands, while the bazaar lanes may stretch for several miles in all; separate bazaars cater for different needs such as foodstuffs, shoemakers, tinsmiths; they contain both shops and workshops. Social life is provided by the *chaikhanehs* or tea-houses, which may be indoors or in gardens, and the *hammams* or baths; both are the centres of gossip, plots, and rumours. Baths at their best and largest consist of a suite of rooms of increasing heat with provision for tea and smoking after bathing. (Photos. 205–208.)

Such are the traditional elements of the Persian town, which reappear in limited size and number in the larger villages. The new regime has modified the towns principally by driving broad open thoroughfares (*khiaban*) through the tangle of lanes, and by adding new buildings such as hospitals and schools and modernizing or rebuilding the Sarais, built in the so-called Pahlevi style (p. 351).

The greater part of the urban area is occupied by private houses and garden enclosures, often of considerable size, and all with blank outside walls. The Persian house is built often of sun-dried clay in a courtyard (p. 349), and is frequently collapsing and being abandoned or rebuilt. Thus the towns have a monotonous and drab appearance, rising as brown heaps from the brownness of the surrounding plain, with only the domes and minarets of the mosques in spectacular contrast. Water-supply generally depends either on flowing streams, wells, or *qanats* (p. 424), and sanitation is limited at best to large pits within house enclosures. The true sanitary agent is the strong sun which rapidly dries up all refuse. Some southern towns such as Yezd gain a queer appearance from the numerous tall chimneys of the *bad-girs* or wind-traps (p. 350).

Habits. The life of townsmen and peasants may be said to be

leisurely and fairly free but not very easy. The principal subjections of the ordinary man are to landlords and government officials; the Moslem clergy cannot be said to control the people except through the general influence of Islam and public opinion. In the regime of Riza Shah police were continually interfering in the externals of private life; intellectual inquiry was free but political opinion was not. The tyranny of the landlord is the most permanent influence, though mitigated by the tendency for landlords to protect their villagers from government exactions. Outdoor life is dominated in towns by men, who do all the work outside of the home. The bazaars and tea-houses are frequented by men, not women. The essence of masculine life is after work in field, shop, or workshop, to take one's leisure in a private garden or *chaikhaneh*, drinking tea and smoking the *kalyan*, or hubble-bubble, conversing with friends or listening to a reading from Hafiz or Sadi. The principal vice is the smoking of opium. This takes the place of all the varied excitements of European life, which so far as introduced have not taken a firm hold of the Persian imagination. The visit to the *hammam* is always a great occasion, but rare because made only when a complete change of clothing is available. Cleanliness is a difficult virtue in Persia, because of the lack of water, and the ceremonial ablutions of Islam are only nominal. Private houses are frequently swept, but cannot be washed; with the poorer classes overcrowding dominates everything. Standards of niceness are non-European, and in the best society the servants walk across the tablecloth as they lay it, when tables are not in use.

Women. Moslem Persia outside the tribal areas holds to the worst oriental tradition of regarding women as chattels. To the normal polygamy and easy divorce there is added the Shia custom of permitting temporary wives, *siga* or *muta*, in addition to the statutory four. Polygamy is, however, a great check on prostitution (which occurs only in the largest towns), and has the merit of providing for the surplus women, who are numerous and for whom until recently there has been no work available. Until 1936 women appeared in public swathed in enormous cloaks (*chadar*, p. 354) and never conversed with any men except their fathers, husbands, and brothers. Legislation now forbids the use of the *chadar*, and allows women to visit cafés, restaurants, and cinemas, though such intercourse is common only in the largest cities. Elementary education of women seldom existed except in the richer homes, though individuals played a part in certain religious movements. Hence



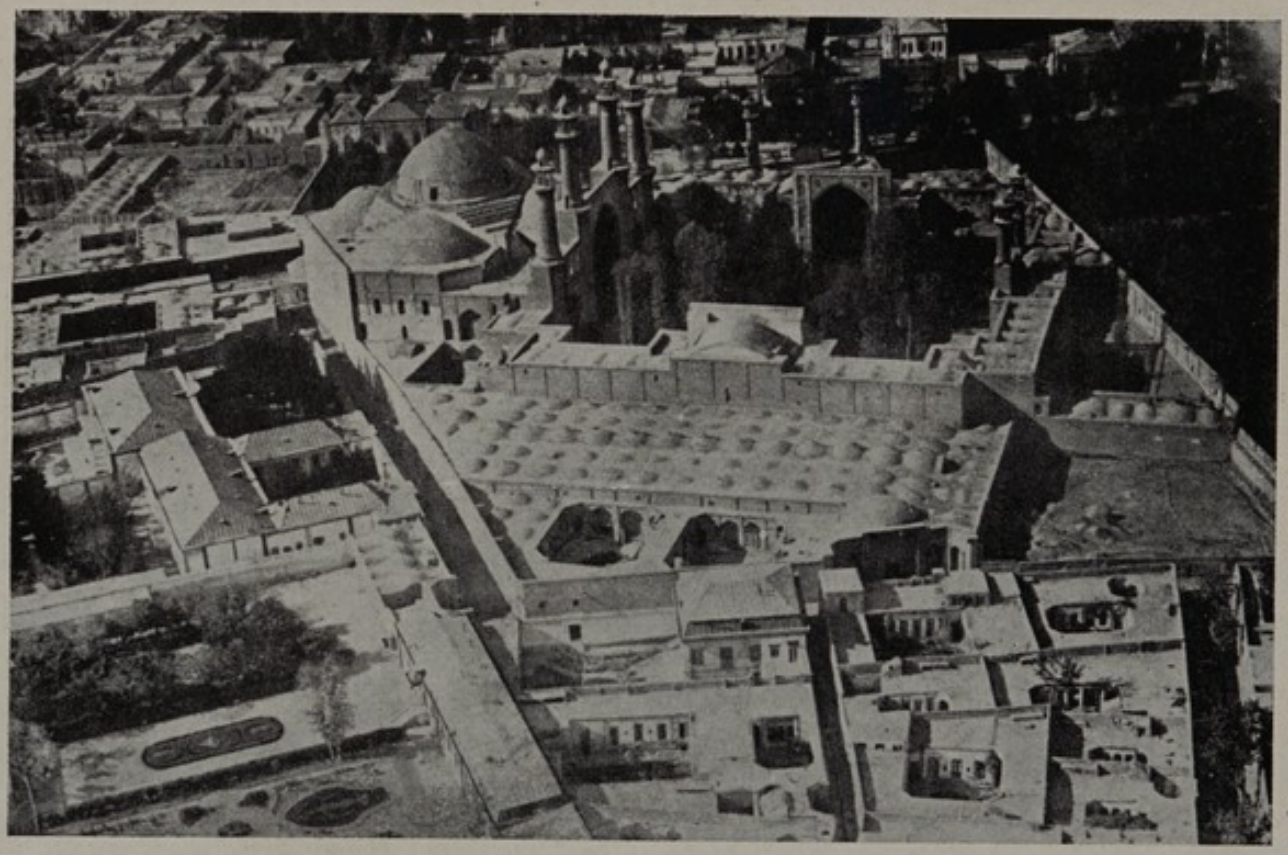
212. *Tribal encampment*



213. *Tribe on the march*



214. *Village of domed houses*



215. *Flat-roofed houses built round courtyards*

the interests of women were narrowed down to gossip and the home, where the system of polygamy provided them with plenty of leisure which they could not employ profitably, since there were no traditional interests, pursuits, or hobbies for them. The effect of Islam upon the private life of this non-Semitic people has been especially unfortunate, because the Persians retained a romantic tradition in their literature for which the Islamic way of life allowed no scope. The result seems to be an unsatisfactory compromise: the young folk sigh for romantic forms of courtship which are never realized except by rare and sordid intrigues. Betrothals and marriages are in fact arranged by parents without consulting the children, and completed at an early age, though recent legal restrictions are supposed to limit marriage to above 18 for men and 13–16 for women.

Centuries of cloistered life have thus unfitted the majority of women for rapid improvement in their status. Hence the abolition of the *chadar* by Riza Shah has precipitated rather than removed a problem, which needs time and education for its solution. At present both men and women, where they depart from tradition, are trying to accept a European standard of external relations while retaining the mental reservations of the Islamic system. Educated men want their wives to be companions and yet wish to be free to beat them. Where women work in the fields, as in the Elburz provinces, and amongst agricultural Kurds, who often retain the tribal respect for women, things are better. The legislation of Riza Shah has greatly improved the status of women, allowing them to initiate divorce on certain grounds, and giving them control over their own property and the right to a dowry. But domestic influences generally are still those of the ancient regime, and the present agitation for the permissive use of the *chadar* probably reflects a considerable body of feminine opinion.

Modernization

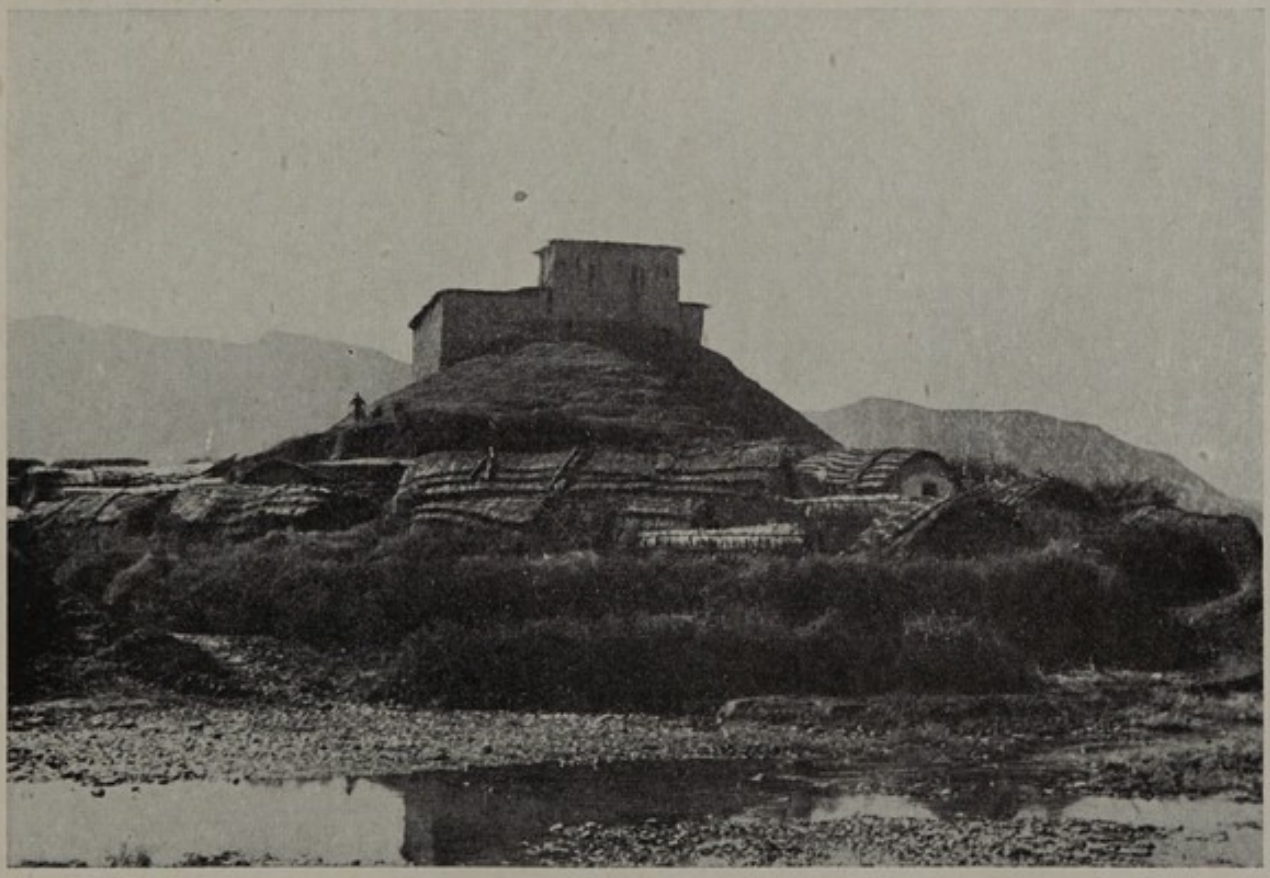
After 1880 there was a steady infiltration of European civilization and education into Persia, through the medium of medical and religious missions, the agencies of the telegraphic and commercial companies, especially the A.I.O.C., and to a less extent even through the activity of the Government itself. This movement was intensified by the policy of Riza Shah after 1925. Great stress was laid on modern education, particularly in technical and scientific methods, on the establishment of modern industries, and on the

replacement of the external insignia of the Persian way of life by the use of European goods and dress (p. 353). There was also a secular movement aimed firmly but somewhat indirectly against Islam, which was blamed for the corruption of Persian abilities and character; Persian intellectuals have been taking an interest in the ethical aspect of the Parsi faith, and even preaching a return to Zoroaster. Materially the motor-car, new roads, and the Trans-Iranian railway have greatly improved communications and reduced the isolation of the towns: officially the camel ceased to exist as a means of transport, and picture postcards of it were forbidden. This veto is characteristic of a somewhat childish attitude towards the 'backward' elements in Persian life, which are ignored rather than reformed by 'progressive' Persians. Factories, the cinema, radio, and modern journalism have appeared; the cult of outdoor activities such as football and scouting have had royal patronage. But these things are concentrated in the largest cities, particularly Tehran, Tabriz, and Isfahan. The greatest achievement has been the foundation of at least an urban system of elementary and secondary education (p. 402) and the establishment of the elements of a modern medical profession with hospitals and laboratories. To assess the depth of changes is not possible, though it is apparent that the official and educated classes have been considerably affected, and all folk have been touched in externals. But though the nation has changed its clothes it has not changed its fundamental habits, not only because these are based on permanent physical and climatic factors, but because modernization has not penetrated deeply into the home. A large number of girls are growing up at Tehran and Isfahan to become teachers and nurses, but the vast majority even of urban women retain the mental habits of the nineteenth century still. Yet even to them a different sort of society is being presented as desirable, especially at the cinema, which is visited by women; generally Persian women have proved capable hostesses since a European etiquette of entertainment was introduced.

Since the abdication of Riza Shah there has been the inevitable conservative reaction, as repressed forces regain liberty. But it is unlikely that the new professions and industries will all fade away or that European modernities will cease to be admired. The most violent changes of religion have been successfully imposed by force from above in the past (p. 265), and the superficial modernization of Persia is likely to endure, while the Persian interest in intellectual pursuits is likely to maintain the new education, on which all depends.



216. *Kurdish village of Najar*



217. *Thatched houses and fort of Lur chief at Tal Aspid*



218. *Eaved houses in the Elburz*



219. *House in Mazanderani style with decorative woodwork*

It is probable that Russian influences will prove strongest, though whether the highly individualist Persian will take kindly to collectivism is another question.

Houses

The factors which determine the house types of Persia are partly climatic and partly social. The Persian house proper, generally found in the open basins and plains, is built for family seclusion and for protection against heat rather than cold. But the 'mountain' or Kurdish house of the Zagros and Elburz reflects a less segregated style of family life and offers better protection against winter cold. In Mazanderan there are variants of both types built to withstand the heavy rainfall. The new 'Pahlevi' type of modern house offers improved protection against the climatic excesses and is intended for the emancipated modern Persian. The fourth style is the nomadic tent which provides barely adequate shelter for a somewhat gregarious and communal family system.

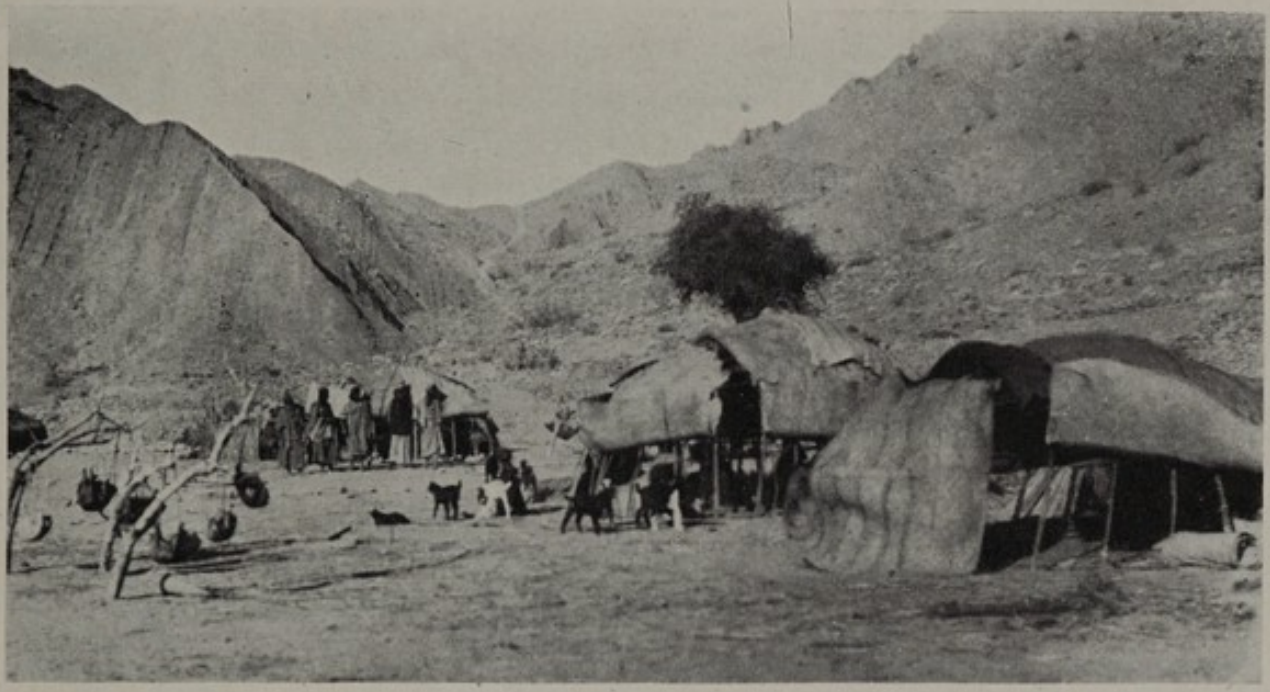
The Persian house consists of one or more courtyards surrounded by rooms, stores, and stables (photos. 214, 215). Summer rooms are on the south side and open to the court, the aperture being filled by a curtain when required. The *talar* or principal room is in the centre and separated from the flanking rooms by short passages, which provide access from the courtyard but not intercommunication. The *talar* is about 3 feet above ground level in order to allow for a grating which ventilates and illuminates the *serdab* or cellar room; this retreat is used in the hottest weather. The winter rooms on the north side of the court are closed generally by an ill-fitting kind of French window. Ceilings are usually arched and the inside walls have a number of arched alcoves which act as cupboards or may be fitted with shelves. The walls may be of natural colour or whitened with gypsum; sometimes they are decorated, often to excess, with fragments of coloured glass or mirror. Roofs are generally domed above the arches, except that some flat roofs are provided for summer sleeping quarters. A house thus consists of a system of outhouses, and may be of any size; the best courts are the *anderun* or women's quarters, and the *birun* or men's rooms. Second stories occur in the larger houses and in palaces, which may also have beautiful columned talars open on three sides. The houses are a better protection against heat than cold, and are not very durable, since the usual housing material is sun-baked clay brick to which rain means ruin. In Persia old houses are bad houses; they are

continually being rebuilt on fresh sites, so that Persian towns usually contain a great number of ruins (photos. 111, 143).

Within the house court, or in a separate enclosure, there is usually a garden, delectable in Persian eyes, but containing little more than channels of water, trees, shrubs, and a few formal beds of rather isolated plants. The larger gardens average about 1 or 2 acres. Except for some of the royal palace gardens in a magnificent formal style, Persian gardens disappoint the English eye (photos. 210, 211.)

House furnishings are few and simple, and rooms appear rather empty. The floor is carpeted and the carpet may be overlaid with an edging of felt. Traditionally there are no chairs or tables; cushions and bolsters replace them, though small low occasional tables are used for tea-things and sweetmeats. Lighting is by oil lamps, which with the samovar for tea and the *kalyan* for smoking may stand in the alcoves. Winter warmth is provided by the *kursi*, a rough stool about 18 inches square covered with rugs beneath which an iron brazier of charcoal is placed; the family sit round the kursi, tucking their legs under the rugs. Ventilation of summer rooms is provided in southern towns by an aperture in an alcove communicating with a tall chimney-like *bad-gir* or wind-trap (photo. 305); the top of this has numerous slots to trap the prevailing wind, and acts like a ship's ventilator. Bedrooms are prepared simply by bringing out pillows and bedding from alcoves. Up-to-date Persians have added to this simple system such articles as European chairs and tables, brass bedsteads, fire-places, and primus stoves. Many minor imported household goods exist. Persian pots and pans are made of tinplated copper, which frequently needs replating. Many larger articles such as tubs, breadpans, and even cupboards are made of sun-dried clay; water-bottles, pitchers, bowls, and toys are of fire-baked but unglazed clay; even doors of cupboards and ovens may be made of clay. All these articles are kneaded with such skill as to show no joins between the layers which form them.

The mountain house is simply built (photos. 17, 18, 216, 217). It is a box-like, flat-roofed building, with accommodation usually limited to an inner and outer room and a storeroom, often built without a courtyard, and in some districts having windows placed high up in the outside walls. The rooms may be decorated in the style of the Persian house. Stone often replaces clay as the material, and the roof is a composition of mud or clay rolled over roof timbers. The houses are often grouped close together and ranged in terraces up hill-sides. Sometimes there are large cellars, opening like caves, for the



220. *Palm-house village of Bashagird district*



221. *Frame of a palm-house*

protection of the cattle in winter and aired by a kind of chimney, though often animals share the family's rooms. Intercommunication is simple, and some of these closely built villages in winter live an ant-like existence beneath the snow.

The Mazanderani house may be either a Persian or a mountain house adapted by eaved pent-house roofs of thatch, tiles, or wooden shingles, and outside balconies, to suit the rainy climate. They are built of timber which is usually caulked and whitewashed, though the poorest houses are simple log cabins. In some areas there is a fine tradition of stucco ornamentation and patterned ceilings. Two floors are fairly common, and, where mosquitoes are troublesome, there is a special type of *talar* used for sleeping which consists of an open wooden framework of two floors, the upper story having a plank floor beneath the thatch roof; air and rain are excluded by simple lattice blinds which roll up and down. (Photos. 209, 218–19.)

The Pahlevi or modern Persian house, introduced by the Riza regime, is a compromise between European architecture with its large outward-facing windows and the best form of the Persian house with its high arched rooms and halls. But the new houses are generally limited to the fashionable suburbs and summer stations of Tehran and Isfahan and to government buildings. The cottages built for tribal settlement were boxes which differed little in essentials from the mountain house (photo. 54).

Tents and Huts. The finest tents are large marquees of pole-and-ridge type containing several compartments. They are made of lengths of striped wool or camel-hair cloth woven by the tribe, but the cloth walls are often replaced by a wattle fence for the sake of coolness, and in the hottest weather most nomads and semi-nomads live in simple wattle shelters, though in the Elburz stone huts are in use. In winter the tents are surrounded by mud enclosures for greater warmth. The tent of the ordinary rayat is small and extremely ill furnished. The Turkoman *kibitka* has been described above (p. 342). Reed huts of a peculiar design like elongated beehives, 15 feet long, 9 feet broad, and 6 feet high, are commonly used in Baluchistan, and a similar more commodious type in Khuzistan. All these tents and huts are exactly suited to their occupants, who are miserable in houses. (Photos. 89, 116, 212, 220, 221.)

Food

The basic food of the poorer classes in town and country alike is either bread or rice, according to region, and milk in some form;

in Baluchistan and the coastal region of Fars dates are a staple food. Bread is baked of wheaten flour generally, in long thin slices or round flaps; barley flour is used in times of scarcity. Milk of sheep and goats is commoner than cows' milk and is eaten curdled as *mast*, or as cheese and clarified butter (*raughan*); in winter it is mixed with flour and dried in balls. Curds mixed with water and flavoured with herbs, salt, and pepper, are a favourite long drink (*dugh*). This diet is varied by salads such as radishes, small cucumbers, and rather bitter lettuces. Chickens and small eggs are fairly common, but meat is eaten only on special occasions. In some Zagros districts when flour supplies are exhausted acorns are used, soaked for 3 days before milling to make them palatable; the result has little food value, and causes the death of many children, though digestible by adults.

The wealthier classes have a wider range of food, though diet is relatively simple. The staple of most meals is rice. Served separately as *chilau* it is first boiled and then baked until it is light and dry. *Pilaus* are mixed rice dishes, often heavy with fat, which may contain herbs, eggs, meat, sultanas, onions, either separately or in a variety of combinations. Mutton, chicken, and partridge are the principal meats; beef and veal are little esteemed since cattle are not slaughtered young. The best meat is eaten as *kababs*, choice pieces grilled with fat and onion over a brazier, folded in bread and seasoned with a pungent red spice. Very young lambs stuffed with raisins, chopped meat stewed in vine-leaves, and *fizzenjan* or *fusojan* are great delicacies. Fizzenjan is mutton or fowl cooked till it falls to pieces and served with a sauce of walnuts, pomegranate-juice, and butter. Eggs may be fried and sprinkled with sugar or served as an omelette with a great admixture of chopped onions and greens. To an English palate these cooked dishes are generally overcharged with mutton fat.

Pickled relishes, nuts, and fruits in season replace puddings. Grapes, raisins, apricots, peaches, and very large water-melons are the best fruit; mulberries, cherries, and other stone fruit are less good. Nuts include walnuts, almonds, hazels, and pistachios; unripe almonds are cooked and eaten hot or cold. *Argil* is a pleasant mixture of dried nuts, seeds, and raisins, often carried by travellers. Sweetening agents, apart from the ubiquitous sugar-loaf, include a sweet mulberry syrup called *shireh*, and date syrup. There are many bazaar-made sweets and sweet biscuits akin to European sorts. A speciality is *gaz*, made of 'manna' (p. 197), honey, and pistachios; it is shaped into round flat cakes and resembles a hard white nougat; another mixture contains powdered almond, sugar, and saffron.

Tea (*chai*) and sherbets are the commonest drinks. Tea is drunk very sweet without milk, as also is coffee. Sherbets are sweetened and iced fruit drinks prepared from syrups of quince, lemon, orange, or mint. Wines are common, particularly in towns such as Shiraz, Tehran, and Isfahan. They are inclined to be sweet and heavy, and are generally very new, raw, and strong. The best are seldom more than three years old; some of the white wines are pleasant. *Araq*, the native spirit, is distilled from grape residues or dates.

Meals are usually taken three times a day. A light breakfast of tea, hot milk, bread, fruit, and cheese may be followed by a noontide lunch of kababs, pilau, bread, vegetables, and fruit; a similar dinner is eaten late in the evening. Traditionally the cloth is spread on the ground, and forks, spoons, and plates are replaced by fingers and slices of bread. Tea prepared in a samovar is served in small cups or glasses. Sherbet appears in a large bowl and is drunk from deep wooden spoons.

Kitchens are not necessarily in the same compound as the house, the food sometimes being carried through the lanes on large trays covered with cloths. Cooking is done by charcoal fires; the stove consists either of a single pit or of a shelf of tiles in which there are a series of pits or holes for the charcoal. Clay or brick ovens are used for baking, and charcoal may be replaced by dung or camel-thorn as fuel. A chopping knife, pestle and mortar are the chief tools, many foods being available only in crude forms like sugar-loaf and rock-salt. Water is cooled by storing in a porous canvas bag or baked-clay pitchers, the evaporation reducing the temperature.

Dress

Formerly there was great variety and splendour of national and tribal costume in Persia. About 1890 de Morgan was able to photograph Kurdish warriors wearing armour and shields very like those of Sassanid times. During the nineteenth century there was a considerable simplification of the more sumptuous wardrobes of the Safawid period and certain garments nominally modelled upon European originals began to appear, such as the ballet-skirt which Shah Nasir-ud-Din ordered the ladies of his *anderun* to wear and which thus spread through high society, and a kind of long frock coat which became the universal overcoat of Persia. Turbans went out of fashion in towns and were replaced by the fez. But standard European dress made little headway even in the twentieth century until the reign of Riza Shah, who by a series of edicts, attacking first

the hat and then the whole costume, made it illegal for Persian men to wear native costumes and finally abolished the characteristic female cloak or *chadar*, miscalled veil. In the great towns the change has been effected. Persian men wear a motley assortment of European shirts, trousers, short coats, and soft hats or caps. The Pahlevi peaked cap, for a short time the prescriptive head-dress, was abandoned because its peak shocked religious custom too severely, preventing the forehead touching the ground at prayer. Despite rigorous police control there has been a certain compromise as far as the dress of peasants and tribesmen goes. The turbans and felt hats, the voluminous trousers, the sashed waistbands, the picturesque overmantles have generally disappeared. Persia was the home of the trouser as distinct from the long shirt or robe of Arab lands, and long-sleeved shirts were tucked into the trouser-top over which mantles and cloaks were worn. The materials were soft wools and cottons rather than the hard European cloths. It was possible to bring some of these domestic products into line with the royal edicts, so that in many regions the peasant still wears his indigo blue shirt and dark cotton trousers, but his long frock coat is shortened, and a European hat replaces the tall oval sheepskin or felt helmet (*kula*) which was formerly universal. The factory-made garments from Isfahan are often shoddy and unsuitable for the climate. Certain extra garments must still be worn, such as the thick felt waistcoats of the mountain tribes, and the peculiar felt capes of the Elburz (*shaular*), which are spread out on wooden stumps across the shoulders beyond the width of the body, to give full protection against the heavy rains. *Giveh*, universal in the south and very useful on slippery hill-sides, are slippers soled with tightly packed rags. (Photos. 185, 192, 197, 198).

Amongst well-to-do women there has been a considerable interest in 'Paris fashions', which existed before the edicts of Riza Shah, and were worn beneath the all-concealing chadar. Unfortunately both cut and material of the Persian-produced modern dresses are very bad, and the women look worse in their factory-made dresses than in the native trousers, long-sleeved gowns, and full skirts. The now abolished chadar was a shapeless cloak of great volume which completely swathed the figure and covered the head. It had no grip, and was held on by pins and physical effort. In the towns its colours were dark blue or black, but peasant women used a variety of patterns and bright colours. The native gowns and trousers are still worn by peasant and tribal women. (Photo. 186.)

In the costume of tribal women the special features are the turban

and the full skirts, often containing 8 yards of material. At least four skirts are worn and sometimes as many as twelve, above scarlet trousers, fastened tightly over the ankles. Loose gowns of printed cottons may be worn also, and velvet coats full-skirted and open in front. Ornaments include nasal rings of turquoise and gold, bead and metal bangles for ankles and silver bracelets on the wrists. Tattoo marks on the face are popular amongst some tribes, and most Persians like to dye their hair and beards with henna, while women are partial to the use of kohl (antimony) for eyes. The Riza regime, however, seems to have discouraged the traditional Persian beard.

CHAPTER VIII

DISTRIBUTION OF POPULATION

THERE is no regular census in Persia, and few reliable estimates of population, either regional or national, have been made. The present account is based on a series of district estimates dated to 1934 which give the peculiar total of exactly 10,000,000 inhabitants. This

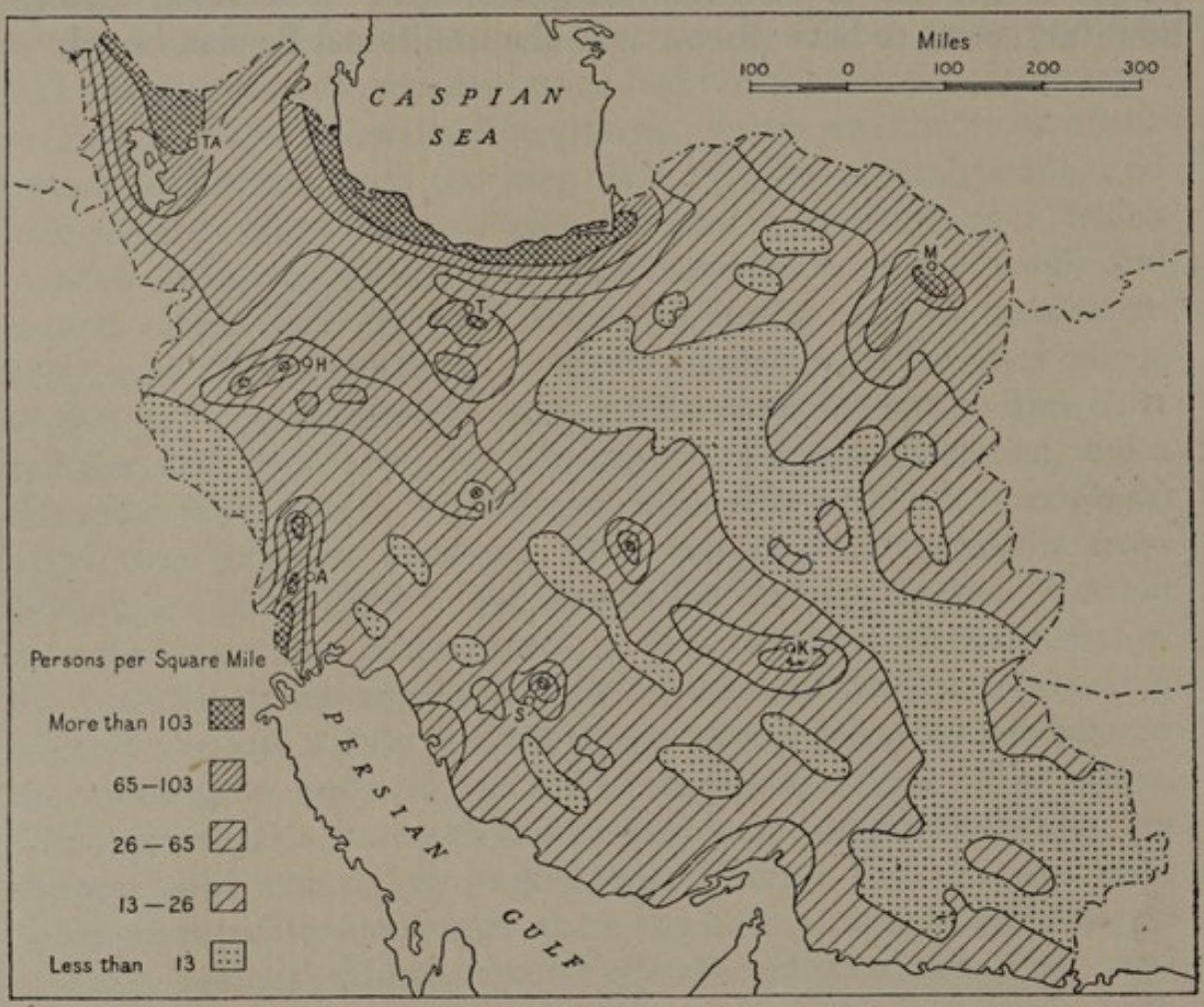


FIG. 51. *General density of population*

figure, which is close to estimates made at the end of the nineteenth century when the administration was far less efficient and well informed than in the reign of Riza Shah, is probably nearer the truth than another 1934 estimate which gave the population as 15 millions; a later estimate of which details are not available gave the total as 12 millions. The district estimates in detail have intrinsic probability and some are unexpectedly low instead of being exaggerated. *But all figures quoted in this chapter are the merest approximations liable to all sorts of error at source.* The inhabitants evade

registration in the hope of escaping taxation and conscription, and local officials sometimes estimate by sheer guess or by repeating former estimates long out of date, though probably greater care was taken when Riza was Shah. In Persia estimates of settled population are generally made by counting houses and reckoning five persons to a household. This rule of thumb has proved remarkably accurate where checks have been made, though in Kurdistan the household population is often as high as ten. Tribal estimates are made by counting the tents at points of passage such as passes or bridges during the seasonal migrations and reckoning likewise five persons to a tent. *But the tribal figures are particularly rough and unreliable* and often more traditional than real. In this chapter, however, some relatively recent information has been used to correct older figures.

General Distribution

The diagrammatic figure of density (fig. 51) hardly brings out the great concentration of population in northern and north-western Persia and gives little idea of the extreme irregularity of population throughout. Half of the estimated 10 or 12 million inhabitants live in the north-western and Elburz provinces. Average density over all Persia is about 16–19 to the square mile rising in the main inhabited regions to 65–104 and over. This may be compared with the figures for India, 195, Iraq, 23, U.S.A., 43, and England and Wales, 703. Roughly in terms of the main physical divisions (p. 34) the population is grouped thus:

Northern and southern Elburz		2,079,000
North-western basins (Aras, Urmia, Qizil Uzun, Iraq–Saveh)	2,454,000	3,155,000
Little Zab–Diyala basins and N. Zagros (Kurdistan and Luristan)	701,000	
Southern Zagros (Bakhtiari country and Fars)	1,017,000	1,560,000
South-western lowlands (Khuzistan)	543,000	
South-western inland basins (Isfahan–Kirman)		1,745,000
Northern Khurasan	881,000	1,081,000
Birjand–Qain highlands	200,000	
Persian Baluchistan and Seistan (Jaz Murian basin, Makran, Taftan ranges and eastern lowlands)		240,000
TOTAL[1]		9,860,000

The general thinning out of population in southern and eastern Persia is even more apparent, since a great part of what exists is concentrated in climatically favoured districts: the river zone of

[1] The district of Erwenek (140,000 inhabitants) has not been identified; it probably belongs to the north-west, where there is a village of Arvenek near Ardebil.

Khuzistan and the Shiraz–Niriz basins in the south-west, the districts of Isfahan and Kirman in the south-western inland basins, and the Meshed–Quchan and Nishapur districts of Khurasan. The rest of Fars, Persian Baluchistan, and north-eastern Persia are very scantily populated. Except for the north-western basins and the Caspian coastal areas, where settlement is fairly continuous, distribution is very uneven and cannot be satisfactorily generalized. Large and small oasis regions with relatively heavy density are scattered irregularly through immense stretches of deserted plains and mountains; these oases owe much to the skill of the Persian peasant in concentrating the drainage of considerable mountain areas into small cultivable districts by use of the qanat. A detailed summary of each main physical region has therefore been given below, with an account of the distribution of settlements and nomads.

Towns and Villages

The village and the small town of 3,000–10,000 persons are characteristic of human settlement in Persia, though it is in the few large towns that Persian civilization is seen at its fullest. Only one-fifth of the population lives in towns of 30,000 inhabitants and over, and the distinction between urban and peasant population is not rigid. Persian towns are surrounded by zones of cultivation which are tended by a part of the urban population. As in neighbouring countries with a hot dry climate, towns, particularly small towns, often originate by the grouping together of agricultural communities for the organization of water-supply.

Of the twenty-four larger towns three—Tehran, Tabriz, and Isfahan—have 200,000–300,000 inhabitants and four, Meshed, Shiraz, Resht, and Hamadan, have 100,000–150,000; the remaining seventeen are almost equally divided between the categories of 100,000–50,000 and 50,000–30,000 inhabitants. Distribution corresponds fairly closely with the areas of heaviest density: twelve are in the north-western basins and the north-central (Elburz) areas, five are in the south-western inland basins, and four in the Khuzistan lowlands. But there is only one each in the northern and southern Zagros (Kermanshah and Shiraz) and in Khurasan (Meshed), and none in Seistan and Persian Baluchistan.

The pattern of village distribution and the size of villages vary considerably and are described in the regional summaries. The average Persian village is taken by expert estimates to contain about 50 houses, but villages of 100–400 houses, and large villages or small towns of

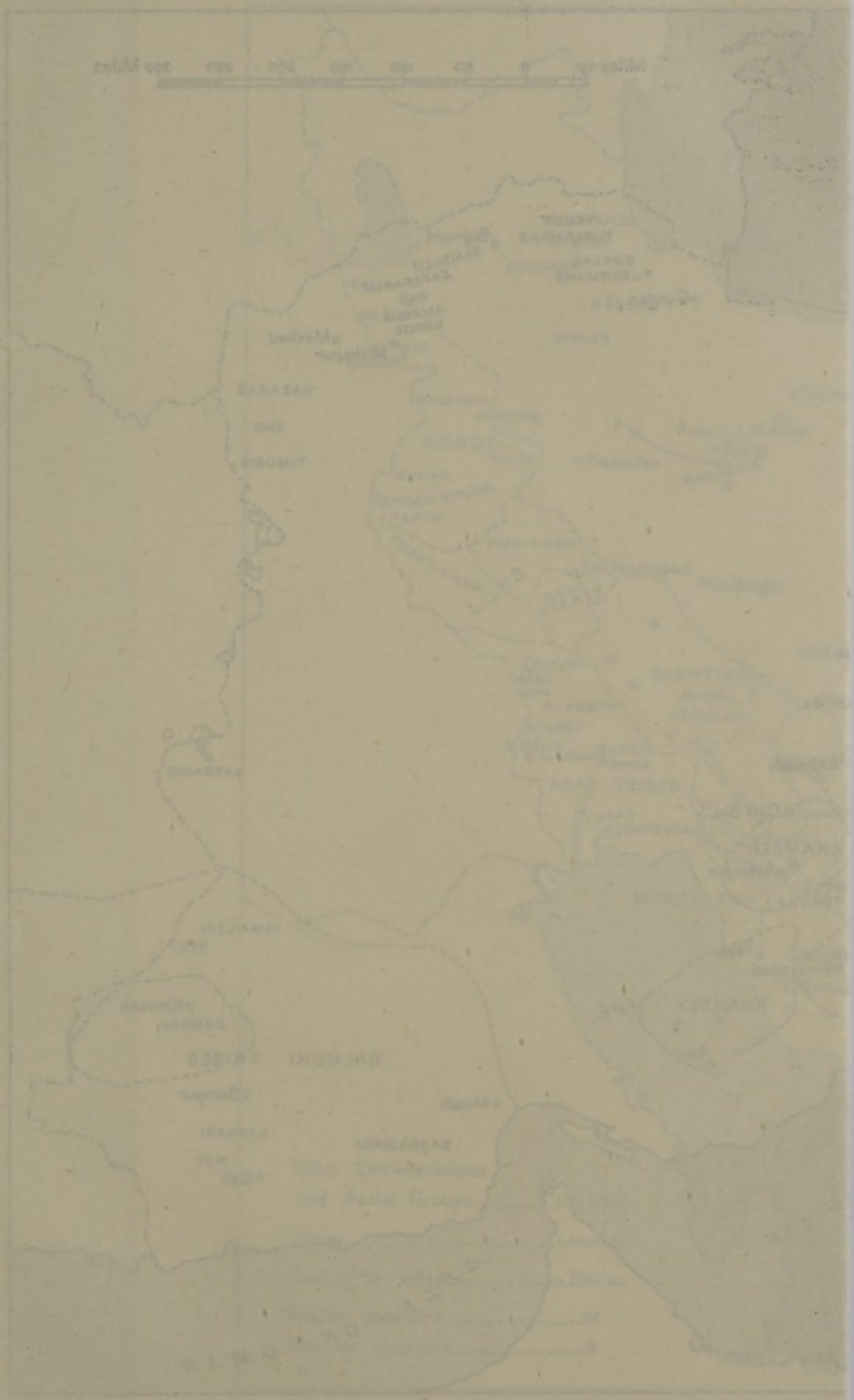




FIG. 52. *Tribal Distribution.*

500–2,000 houses, span the gap between the average village and the small town. There is a general tendency to larger villages in the drier regions, and in Khurasan and the south-western inland basins usually the larger villages have a number of outlying hamlets of 5–20 houses dependent upon them.

Tribal, Nomadic, and Settled Population (fig. 52)

The distribution of tribes is described below in detail region by region (p. 361). Generally it may be said that pastoral nomads are tribal, though not all tribes are nomadic. The pattern of tribal nomadism in Persia was considerably deranged by Riza Shah's policy of tribal settlement. But from present information it appears that there has been a considerable revival of tribalism and reversion to nomadism since his abdication. Therefore it has been thought best to describe the pattern of tribal and nomadic Persia as it was before the settlement policy, with such recent information about modifications as is available.

The Regional Distribution may be summarized thus, including in the term nomads only pastoral, fully nomadic, tribal elements, and excluding those who migrate for comfort and not from economic necessity:

In the north-western provinces nomads are a small minority. In the Talish and Elburz high valleys there is an unimportant nomadic population. In the northern Zagros settled folk preponderate over nomadic in the Kurdish zone, though there are several large groups of nomads; south of the Qara Su (Saidmarreh) the great region of nomadism begins and extends throughout the southern Zagros to the southern coast; sedentary elements are in a minority except in special areas such as the Shiraz basin. In the plains of Khuzistan only a minority are fully nomadic, the great majority being semi-sedentary. In the south-western inland basins the population is sedentary, except for the infiltration of nomads from adjacent districts of the Jaz Murian, the Makran, and also of the southern Zagros. In the east both northern and southern Khurasan have a predominantly settled population with a widely diffused minority of nomads. In the south-east, throughout the Taftan–Sarhad highlands and the Makran, nomads prevail over localized sedentary or semi-settled cultivators.

Nomadism is thus a major factor in the southern Zagros, where there is a large nomadic population, and in south-eastern Persia, where the total population is insignificant. The total number of Persian nomads has been assessed rather improbably at 'between two

and three millions'. But a more useful figure of between 800,000 and 900,000 persons has been given for the central and southern Zagros, made up as follows:

District	*Families*
Luristan: Pusht-i-Kuh	10,000–12,000
Pish-i-Kuh	27,000
Bakhtiari country	50,000–60,000
Fars	76,000
TOTAL	163,000–175,000

Even this figure, however, is really a tribal estimate and includes a large percentage of sedentary and semi-sedentary tribesmen.

Growth of Population

There is absolutely no reliable information about this topic. According to all available accounts of Persia the population had been either stable or declining for several generations before the reign of Riza Shah. In the nineteenth century three factors kept the population in check: tribal raiding, pestilence, and famine. The first aided the last by reducing the area of cultivated ground. The advent of a modern medical system is reducing pestilence, but famine, due largely to bad distribution, despite the improvement of communications, caused deaths in the largest cities during the troubled year of 1942. One new factor is the growth of an industrial population at Tehran and Isfahan, which have greatly increased in size in the last decade.

Race, Language, and Religion (figs. 50, 52)

The general racial and linguistic distribution has been summarized above, p. 320 and p. 324, and is shown on fig. 50. A detailed account is given for each region in the regional distribution below, together with mention of local religions and sects other than Shia Islam. Here it need only be recalled that there are no large groups of religious minorities in Persia corresponding to the racial-linguistic blocks. But there are some such minor groups, because Sunni Islam prevails among the Baluchis, Timuris, and Turkomans of south-eastern and north-eastern Persia, and in the west a great part of northern Kurdistan is Sunni, though many southern Kurds are not only Shia but Ali Ilahis. There are also some small blocks of Sunnis in the Talish district of Gilan and in the Birjand–Qain highlands.

No census of race or language has ever been taken in Persia, but a *very rough* estimate of linguistic groups could be made by combining

the table of population (p. 357) with information given in the regional distribution. It would seem that the following figures represent the proportion of the different elements in Persia.

Language	*Thousand persons*
Farsi Persian	3,200
Caspian Persian dialects	1,200
Kurdish and Luri	1,500
Turkish (Azeri and Turki)	2,900
Arabic	750
Baluchi	300

It is noteworthy that according to this reckoning not more than 3 or 4 out of 10 persons speak Farsi as their native language, less than half the population speak either Farsi or Caspian Persian, and nearly one third speak a form of Turkish. The Kurd-Lur estimate is evenly divided between Lurs, Kurds in Kurdistan, and Kurds of northern Persia; many of the latter probably now speak Persian. The influence of the new education system should greatly increase the spread of Persian at the expense of all other languages.

Regional Distribution

The following account is based on the physical divisions used in Chapter III as closely as the human factors allow, but the order and grouping is not the same. All north-western and western Persia is described before north-eastern and south-eastern Persia. In particular, the Little Zab and Sirwan basins are taken with the northern Zagros; the foothills of the Zagros are not generally separated from the High Zagros. Northern Khurasan is taken with the other regions of eastern Persia; the Qain–Birjand highlands and Seistan are taken before the districts of Taftan–Sarhad, the Mashkel lowlands, Jaz Murian, the Rudian basin and the Makran, which together make up Persian Baluchistan.

Northern Borderlands

Except for the district of Tehran there is a great contrast between the density and distribution of settlements north and south of the Elburz range. Gilan, Mazanderan, and Asterabad, which include the northern flanks and the coastal plains from the Russian border in the west to the Gurgan river in the east, are the most densely and continuously inhabited parts of Persia, while the districts eastwards from Tehran to the fringe of Khurasan rival the south-western inland basins in the isolation and paucity of inhabited centres.

Northern Elburz and Caspian Coastlands (fig. 11)

As in climate and vegetation, so too in the numbers and distribution of its inhabitants this region differs from the rest of Persia. As a whole it is easily the most densely populated part of Persia with some 1,387,000 persons in an area not exceeding 18,000 square miles, and 80–90 per cent. of these are crowded into the narrow coastal plain and the lower foothills. This population is the most dispersed in Persia, living scattered in separate farmsteads and small hamlets throughout the countryside. The houses of a single village or parish may be distributed over several square miles, and there is a general absence of the consolidated village of 100–300 houses characteristic of central Persia. Such as occur are generally the market towns of local districts. Likewise towns are relatively few. The region has only one major city, Resht, of 122,000 inhabitants with its detached port of Pahlevi (37,000). In Mazanderan the largest town is Babul (30,000). The other urban centres, Lahijan and Langarud in Gilan, Sari and Gurgan in eastern Mazanderan and Asterabad, are places of 10,000–20,000 inhabitants. All are situated at the inner edge of the plain near the foothills (p. 145).

The short distance from sea-level to the high mountains makes seasonal migration a marked feature, though rather for the inhabitants of the foothill zone and the towns than for the peasants of the plains. There is a summer exodus of these classes up the mountains to cool retreats, and many inhabited centres are then deserted. Conversely the permanent inhabitants of the mountain valleys, particularly the shepherds, descend to the foothills and plains to avoid the worst of the winter.

Race, Religion, and Tribes. There is considerable variety of race and language north of the Elburz, though the groups are fairly well cantonized, except in the towns, which contain a medley of all sorts. In Gilan, extending from the Russian border to the small Miandeh stream east of the Pul-i-Rud, the plainsmen speak Gilaki Persian and the hillmen Talish in the northern Talish hills, succeeded by Gilaki towards the Safid Rud. In Rudbar, between the Safid Rud and the Shah Rud, the mountaineers are Kurdish Amarlu and Rashvand tribesmen. In some districts around Resht, Mazanderanis, Persians, Talish, and Turks replaced Gilakis after the ravages caused by the plague of 1830–1831. Gilan also contains more gipsies than other parts of Persia, and is visited by tribesmen from the western flank of the Talish for seasonal labour.

In Mazanderan the basic element is Mazanderani Persian both in plain and mountains, but there are groups of immigrant Kurds and Turks, and also scattered Gilakis. Georgians, Baluchis, Afghans, and Lurs formerly introduced have generally been assimilated to the Mazanderanis or eliminated by the climate. The Khwajavand Kurds live in Tunakabun district near Shahsawar, and in the plains and valleys of the Chalus Rud. The mixed Kurd-u-Turk tribe dwells in the plains and foothills north of Sari, and the Abdul Maliki Turks farther east, at the western end of Asterabad bay. In the hills flanking the Gurgan plain there are Hajjilar and Giraili Turks, originally settled there to control the Turkomans of the plain. Near Gurgan town a few hundred Afshar Turks survive, and there are several villages of Afghan Hazaras. Armenians and Jews in the towns and gipsies in the countryside complete the medley.

Shia Islam generally prevails except that the Talish folk of Karganrud and Asalem districts are mostly Sunni, some of the Mazanderani Kurds are Ali Ilahis, and the Turkomans of the Gurgan plain are Sunnis.

To what extent any tribal organization and sentiment now survives among the Turks and Kurds is uncertain. In Gilan the hillmen are generally grouped in clans and move as units, but there are no large tribes and little if any discipline within the clan. The location of the Turkoman tribes of the Gurgan plain is described on p. 387. They were forcibly settled by Riza Shah, but the shepherd elements may revert to nomadism.

Southern Flank of the Elburz (figs. 11, 16, 17)

Between the Elburz and Great Kavir the population is gathered into four pockets formed by plains and foothills within embayments of the Elburz and open to the Kavir on the south. From west to east these are the districts of Tehran, Samnan, Damghan, and Shahrud–Bustam. Each district, separated by 40–60 miles from its neighbour, has a central town and a number of scattered villages, and its urban population tends to equal the rural. In each of the three eastern regions both town and village populations are small, varying between 40,000 and 60,000, grouped around a single stream or qanat system, and occupying only a very small proportion of the 10,000 or 12,000 square miles lying between this part of the Elburz and the Great Kavir. But on the west the Tehran district, which is far better watered and less exposed to the influence of the Kavir, closely approaches the Caspian region in the density of its population. Within a radius of 20–25 miles of Tehran settlement is nearly continuous, dependent in

the plain upon a great system of qanats; the district numbers some 540,000 inhabitants, of whom over half live in the city.[1] The foothill valleys are well populated and summer stations of the townsfolk are scattered among the outer Elburz ridges; to the south-east the populous plain of Veramin reaches close to the Kavir Masileh, and is extended east of a low ridge by the Khar plain watered by the Hableh Rud where this debouches from the Firuzkuh valley.

In the western Elburz the Shah Rud valley has a population of sedentary peasants and semi-sedentary shepherds. The central Elburz between Tehran and Samnan is breached by the evenly but not densely populated Firuzkuh valley. On the east the Shahrud–Bustam district is linked to the Jajarm and Jaghatai–Sabzawar districts of northern Khurasan (p. 385) by two thin lines of settlements, which take their water either from the highlands flanking the Great Kavir or from the outer ranges of the Elburz.

Race and Tribes. There are three main elements, Persians, Turks, and Kurds. In Tehran district Persians outnumber Turks by about two to one. In the mountain valleys the Persian element predominates over Kurds and Turks westward to the Safid Rud, and in the south from Samnan to Damghan, with a mixture of Mazanderani Persian at Samnan. Eastward from Shahrud–Bustam to Khurasan the people are of mixed Persian, Turkish, and Arab origin, but speak Persian.

There are a few small, semi-sedentary tribes, listed below, in the Elburz valleys. The only nomads are the Inanlu Turks, who visit the plains north of the Kavir Masileh in winter (p. 366).

Tribe	*Families*	*Location*	*Remarks*
CHIGINI	800–1,000	Middle Shah Rud valley and hills to SW.	Semi-settled, speak Turkish, Lurs by origin.
GHIASVAND	600–1,200	Lower Qizil Uzun and Shah Rud valleys, and hills to SW.	Semi-settled, Kurds.
RASHVAND	600	Rudbar (p. 362) and Alamut valleys.	Sedentary; speak Turkish in Alamut, Kurdish in Rudbar.

North-Western Provinces (figs. 13, 16)

The Aras, Urmia, and Qizil Uzun basins (the former provinces of Azerbaijan and Khamseh) together with the western districts draining into the Qum–Masileh sump (Kazvin, Hamadan, and Iraq) contain a quarter of the population of Persia in 54,000 square miles, and the largest area of continuously inhabited territory. There are no deserts,

[1] The figure of 540,000 inhabitants recently given for Tehran city includes the rural district, but the city population also has increased greatly since 1940.

though the Qara Dagh and Savalan massifs are thinly populated regions, contrasting with the relatively dense population of the adjacent Urmia and Aras lowlands. Features characteristic of the rest

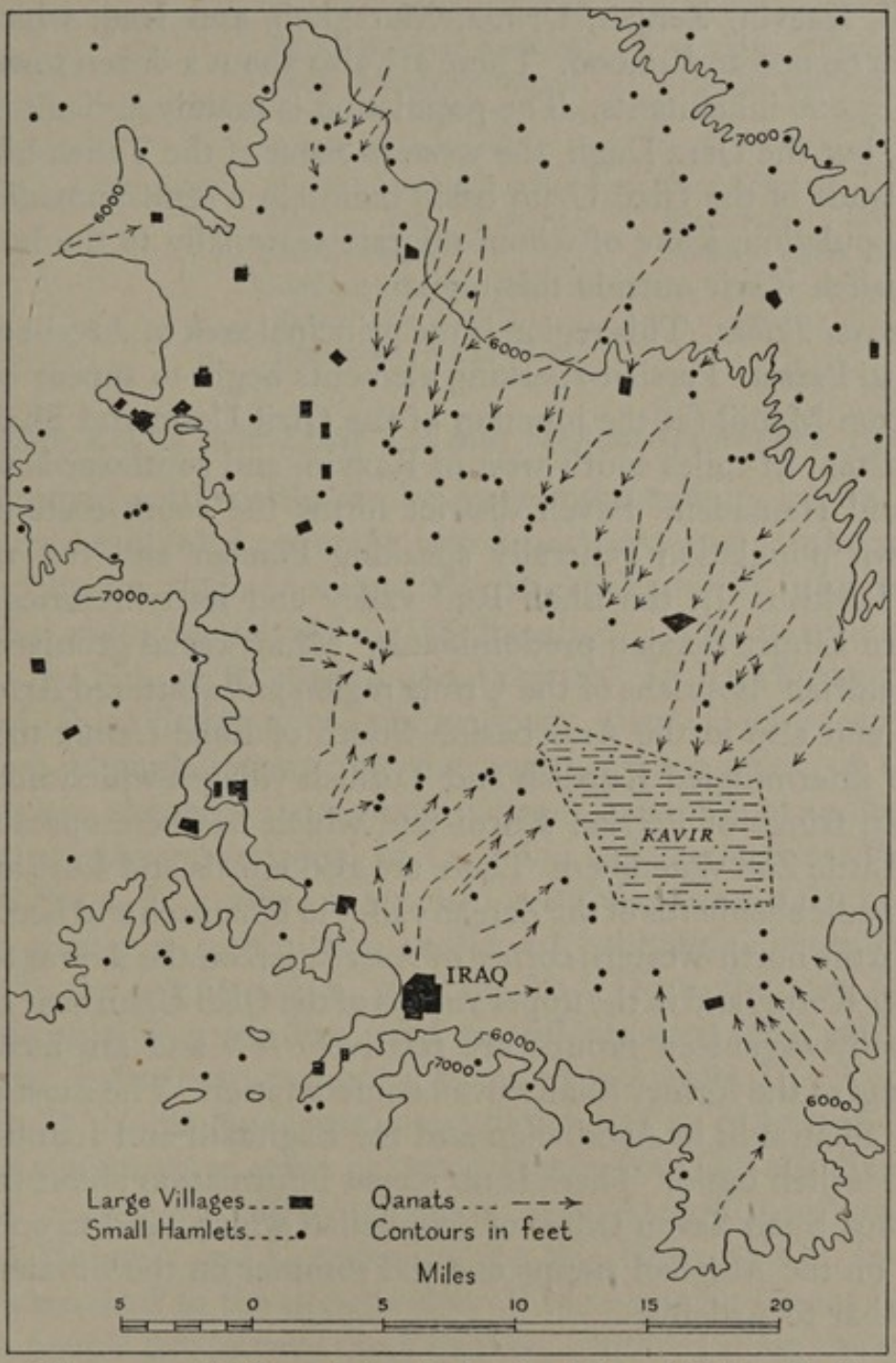


FIG. 53. *Settlements in the basin of Iraq (Sultanabad)*

of Persia only begin to appear in the east of this region; in the districts of Kazvin and Iraq (Sultanabad) qanat irrigation becomes common (fig. 53), and east of a line drawn from Yangi Imam (half-way between Kazvin and Tehran) through Saveh and Iraq, barren wastes and oasis settlements terminate the zone of continuous habitation. Villages are fairly close together; in Azerbaijan the larger settlements

are 2–6 miles apart, increasing to 8–15 miles apart in the districts of Kazvin and Saveh. Eight of the largest towns of Persia are in this region, ranging from Tabriz (214,000) and Hamadan (104,000) to Ardebil, Kazvin, Zenjan, Urmia, Maragheh, and Iraq, which vary between 60,000 and 40,000. There are also about a dozen towns with 8,000–15,000 inhabitants. The population is mainly agricultural and settled, but the Qara Dagh, the western flank of the Talish hills, and the uplands of the Qizil Uzun basin maintain a semi-nomadic shepherd population, some of whom migrate seasonally to the border of the Masileh Kavir outside this region.

Race and Tribes. This region is the principal area of Azeri-speaking Turks in Persia. Persian-speaking elements begin to appear east of a zone from Manjil (at the junction of the Qizil Uzun and Shah Rud) to Takistan, 21 miles south-west of Kazvin, and southwards towards Bijar and Hamadan. Saveh district forms the south-eastern limit, the town population generally speaking Persian and the villagers Azeri Turkish. In the Shah Rud valley and its tributaries in the southern Elburz Persian predominates. Minor racial groups include the Nestorian Assyrians of the Urmia region and scattered Armenians in this and also in the Aras basin. South of Lake Urmia there is a zone of intermingled Kurdish and Turkish villages which marks the northern fringe of Persian Kurdistan, which has here spread north of the Little Zab watershed. There are also Kurds and Lurs amongst the nomadic shepherds of the Zenjan valley in Khamseh and Kazvin districts, in the north-western corner of Azerbaijan on the Ararat foothills and near Kotur, and in the upper valleys of the Qizil Uzun near Bijar.

Tribally organized groups are relatively few and are mostly the remnants of the former Shah Savan confederation. The most notable are the Shatranlu in Azerbaijan and the Baghdadi and Inanlu in the Qum–Masileh basin. There is no recent information about the once numerous Shah Savan tribes of Azerbaijan which used to spend the winter on the Moghan steppe and the summer on the Savalan Dagh from Ahar to Ardebil.

Tribe	*Families*	*Location*	*Remarks*
SHATRANLU	2,000	Kalkhal district N. of Qizil Uzun to Herau.	Turkish-speaking, but Kurd by origin.
DUVAIRAN	1,500	Upper Qizil Uzun for 70 miles S. of Mianeh (Garus district).	Semi-settled.
AFSHAR	1,000	From Abhar Rud W. to upper Qizil Uzun (Garus district).	Sedentary.

Tribe	*Families*	*Location*	*Remarks*
GHIASVAND	600–1,200	Lower Qizil Uzun and Shah Rud valleys and hills to SW.	Semi-settled; Kurds.
INANLU	5,000–6,000	Winter: Plain N. of Masileh kavir and astride Tehran–Qum road. Summer: Hills N. of Saveh (Kharaqan).	Shah Savan, Turkish-speaking; Yangijak and Guqbar main sections.
BAGHDADI	4,000–6,000	Winter: Astride Tehran–Qum and Tehran–Saveh roads. Summer: Hills NW. of Saveh and NE. of Hamadan (Kharaqan).	Shah Savan, Turkish-speaking; Lek and Arikhlu main sections.

Northern Zagros with Little Zab and Sirwan Basins (figs. 13, 14)

The human settlements of the huge mountainous region of the Zagros can be divided generally into a northern and southern zone, separated by the main course of the Ab-i-Diz and its most easterly tributaries rising south of Iraq (Sultanabad). The northern zone contains the bulk of Kurdistan and Luristan. In Kurdistan cultivation and fixed habitations preponderate over stock-raising and nomadism, though throughout the region a proportion of the inhabitants are shepherds and many villages have a dual economy of agriculture and stock-raising. In Luristan, which comprises Pusht-i-Kuh and Pish-i-Kuh, there is a transition, stock-raising and nomadism increase greatly in importance, and fixed habitations generally disappear. In the southern zone, from the Ab-i-Diz to the coast of Fars, stock-raising and nomadism tend to predominate over cultivation and settled habitation, except in favoured localities.

Generally this region is thinly populated with an estimated total of 701,000 inhabitants in some 35,000 square miles. But the characteristics of settlement differ in three distinct regions: Kurdistan, Burujird-Malayer, and Luristan. (1) In Kurdistan, that is, from the Urmia watershed to the upper valley of the Qara Su (about latitude 34°), the people live in very small hamlets scattered along the valleys, while the high mountains are used for seasonal grazing. The most heavily populated parts are the Kermanshah and Mahidasht plains watered by the upper Qara Su. Elsewhere the outer western valleys are more heavily populated than the high valleys and plateaux approaching the highest ridges. There is one large town, Kermanshah (89,000), and a very few district centres of 2,000–6,000 inhabitants such as Marivan, Baneh, and Senna. Pastoral nomadism is commonest

along the mountains flanking the Iraqi–Persian frontier, from the pastures of the Vasneh Alp south to the Kalhur district between the Alwand (Hulwan) river and the Kabir Kuh. (2) In Burujird-Malayer, that is in the broader valleys between the highest chain of the Zagros and its actual watershed (p. 60), the distribution is quite different from the rest of the Zagros and more akin to that of the north-western provinces. Average density rises to 65–104 persons a square mile. There are five small towns, of which Burujird (*c.* 30,000) and Nihavend are the largest, and numerous villages, which are closely and evenly spaced and usually sited on mounds in the plains or on hill flanks. Nomadic elements are in the minority, but include an overflow from the central Zagros. (3) South and east of the Qara Su, Pusht-i-Kuh and Pish-i-Kuh, or Luristan proper, are a natural region of pasture. The only districts with fixed villages were, until recently, the Harsin plain east of the Gamasiab, and Alishtar and Khurramabad plains watered by the Kashgan Rud; Khurramabad (15,000) is the only town. Riza Shah built Ilam (Husainabad or Deh Bala) as the local capital of Pusht-i-Kuh, at the northern end of the Kabir Kuh, other government posts and several villages; but the population, whether nomadic shepherds or semi-settled cultivators, preferred to live in tents and wattle huts. The best estimates of tribal inhabitants for Luristan proper vary between 125,000 (before 1914) and 197,000 (in 1932), with one-third in Pusht-i-Kuh and two-thirds in Pish-i-Kuh.

Race. From the Urmia watershed Kurds are continuous southwards through the Little Zab basin, which with the Kurdish zone south of Lake Urmia forms the Mukri division of Kurdistan. The Kurds of the Sirwan basin form the Ardalan division, while the Alwand valleys and the upper basins of the Qara Su and Gamasiab are together comprised by the Kermanshah division. The eastern limit of Kurdistan is generally the watersheds of these rivers, but Kurds spread east beyond the watershed towards Bijar in the upper basin of the Qizil Uzun. South of Kermanshah there is a mixed zone of Kurds and Lurs both speaking Lakki Kurdish, succeeded by pure Luri in the heart of Pish-i-Kuh and Pusht-i-Kuh. The plains of Kermanshah and Mahidasht have, however, an ancient Persian-speaking population intermingled with Kurds.

Burujird-Malayer has a very mixed population of Kurdish, Luri, and Persian elements, and also a number of Armenian colonies in the plain, and some Jews in the towns.

The Kurds of Mukri and Ardalan are largely Sunni, but in the Kermanshah division there are many Ali Ilahis and Shias.

Tribes

Kurdistan. Both agricultural and pastoral Kurds generally retained tribal organization except in the open plains of Kermanshah and Burujird-Malayer until the regime of Riza Shah, but the units were generally small and there is little information about present conditions. No complete list even of the more important groups can now be given. The Herki in the north, the Guran around Karind, and the Kalhur south of Karind were the largest nomadic groups; Herki and Kalhur tended to migrate seasonally into Iraq, while the Iraqi Jaf and Pizhder used to visit Persian pastures.

Tribe	*Families*	*Location*	*Remarks*
HERKI	4,000	S. Headwaters of Little Zab. W. Ruwandiz–Erbil in Iraq.	Mostly nomadic. Mukri.
MAMASH	..	Little Zab–Urmia watershed (Lahijan district) nr. Ushnu.	Mukri, of Bilbas confederation, warlike.
MENGUR	..	S. Vasneh Alp, Sardasht to Ushnu. W. Rania plain in Iraq.	Mukri, of Bilbas confederation, warlike.
PIZHDER	..	S. Near Sardasht. W. Rania in Iraq.	Mukri, warlike.
ZIZA (ZARZA)	..	NW. of Ushnu.	Mukri.
GALBAGHI	..	N. of Marivan, on Sirwan–Qizil Uzun watershed	Ardalan.
MANDAMI	..	N. of Senna.	Ardalan, peaceful.
SINJABI	4,000	S. N. of Kermanshah. W. Mahidasht and Qasr-i-Shirin.	Kermanshah, nomadic, Ali Ilahis.
GURAN	2,000	Between Ab-i-Zimkan and Kermanshah – Khanaqin road, wintering in Zuhab plains; centre Gawareh.	Kermanshah. Ali Ilahis.
KULIAI	4,000	Sangur district, headwaters of Ab-i-Sirwan (Gau Rud) and Saidmarreh watershed.	Kermanshah, formerly nomadic, over 150 villages; Shias.
KALHUR	12,000	S. Mountains between Kermanshah–Khanaqin road and frontier, SW. to Kabir Kuh. W. Plains of Zuhab and Qasr-i-Shirin.	Kermanshah. Nomadic. Old statistics. Ali Ilahis.
ZANGANA	2,500	Mahidasht plain.	Kermanshah, sedentary.

Luristan. The limits of the Pish-i-Kuh tribes are the Qara Su (Saidmarreh) and Gamasiab in the west, the Ab-i-Diz in the east, the highest chain of the Zagros generally in the north-east, though a few tribes enter Burujird district, and the Kabir Kuh and Saidmarreh in the south, though some tribes reach Dizful. Within this region there

is the subdivision of Bala Girreh, properly the name of a tribal confederation, between the Kashgan Rud and the Ab-i-Diz, which used to contain the most warlike Lur tribes. It was here that fierce fighting took place in the reign of Riza Shah, and some tribes or sections were transported to Khurasan. In the tribal lists below this is mentioned, where known, but such tribes are not omitted because they may return. In Pusht-i-Kuh the tribes appear to be considerably smaller units than in Pish-i-Kuh, and much less turbulent. Names, numbers, and groupings are given variously by different authorities and only the best known groups are listed. In winter all the high regions are generally deserted, and the tribes seek the main valleys, the Dizful region, or in Pusht-i-Kuh the Iraqi border. The statistics are very high and probably relate to the period before the wars with Riza Shah, which decimated some tribes.

Tribe	*Sections*	*Families*	*Location*	*Remarks*
SILSILA	..	7,000	S. Alishtar plain	Western Pish-i-Kuh; speak Lakki Kurd.
	Hasanwand	5,000	W. S. to Saidmarreh	
	Yusufwand			
DILFAN	Quliwand	6,400	S. Alishtar and Harsin	Western Pish-i-Kuh; speak Lakki Kurd.
	Musawand	2,500	W. S. to Madian Rud	
	Itiwand	1,500		
	Kakawand			
	Three others			
TARHAN	..	11,000	Between Kashgan Rud and Saidmarreh, W. of Khurramabad	Western Pish-i-Kuh. Amrai speak Lakki; rest Luri.
	Suri	7,000		
	Amrai	..		
	Ten others			
CHIGINI		400	Between Khurramabad and Kashgan Rud	Western Pish-i-Kuh. Sometimes grouped with Tarhan.
SAGWAND	Haji Ali Khani	2,500	E. of Khurramabad; centre Abistan; reach Dizful district in winter	Bala Girreh; speak Luri.
	Rahim Khani	1,000		
PAPI	..	1,000	Ab-i-Sehzar (Diz) E. of Khurramabad	Bala Girreh; speak Luri.
JUDAKI	..	600	S. of Khurramabad on Ab-i-Sard	Bala Girreh; speak Luri.
DIRAKWAND	..	..	From Khurramabad river to Ab-i-Zal, Saidmarreh and Dizful district	Troublesome; associated with Bala Girreh; speak Luri.
	Baharwand	1,000		
	Qalawand	1,000		
	in 25 clans			
BAIRANAWAND	..	7,000	From Khurramabad in summer to Saidmarreh and Kabir Kuh (winter) (p. 379)	Turbulent; associated with Bala Girreh. Speak Lakki Kurd. 5,000 persons transported to Kazvin and Veramin.
	Yar Ahmad	1,000		
	Mal Ashad			
	Many others			
QAID RAHMAT	..	200	SE. end of Burujird valley	Allied to Bairanawand.

Tribe	*Sections*	*Location*	*Remarks*
BADRAI	..	Between Kabir Kuh watershed and Saidmarreh	Pusht-i-Kuh; Faili Lurs. Larti and Hindimini were pagans till fairly recently.
	Ali Shirwan	L. bank of Rud Garau	
	Musi	,, ,, ,,	
	Bana Parwar	R. bank of Rud Garau (Khirr)	
	Dusan	Ab Makala valley S. of Garau	
	Larti	R.-bank tributaries of Ab Makala	
	Hindimini	,, ,, ,,	
MISHKAS	..	S. SE. of Ilam at head of Ab-i-Kunjan W. Iraqi border	Pusht-i-Kuh, Faili Lurs.
MALIK SHAHI	Many sections	S. South-west flank of Kabir Kuh between Milawur and Puneh passes. W. Iraqi border	Pusht-i-Kuh, Faili Lurs.
ARKWAZI	..	Valleys W. of Ilam and S. of Kuh-i-Sharahzul	Pusht-i-Kuh, Faili Lurs.
AIVAN	..	S. Gangir valley N. of Ilam. W. Manisht Kuh.	Pusht-i-Kuh, Faili Lurs. Many cultivators on crown lands.
Many others	12,000 families with above	..	4,000 families speak Lakki Kurd, rest Luri.

Southern Zagros (figs. 14, 15, 24–27)

This region of some 75,000–80,000 square miles, from the Ab-i-Diz to Bandar Abbas and from the coastal plains of Behbehan and Bushire, which cannot be distinguished in the statistics, to the Zagros watershed, contains some 1,017,000 persons and is the least inhabited part of western Persia. Throughout the mountain zone men must either settle as cultivators beside permanent sources of water or range long distances in search of seasonal pasture. In the Karun basin, which roughly coincides with the Bakhtiari country, permanent settlement is generally confined to the foothills between Dizful and Ram Hormuz, and the main ranges have a nomadic population which in winter moves outwards to the foothills. South-east of the Karun basin, in the former provinces of Fars and Laristan, conditions change as the distances between the mountain ranges become wider and winters milder, and permanent settlements occur in the interior valleys. But the centres of permanent settlement are few and widely separated, except in the Shiraz and Niriz basins, which in about a twentieth of the area have a quarter of the population of the whole of the southern Zagros. Other areas with more than average density are: (1) The foothills of the Marun and Zuhra basins from Ram Hormuz to Behbehan, and some of the Rud-i-Zuhra valleys, particularly the Fahlian; (2) some sections of the coastal plains, particularly Dashtistan around Bushire and Borazjan, the adjacent inland valley of Dashti to the south-east of Borazjan behind the coastal mountains, and the

districts of Lingeh and Bandar Abbas; (3) in the Shahpur and Mand basin, the valleys of Kazerun and Firuzabad; the upper Mand valley near Asmangird and the Fasa plain. Kazerun was once reckoned to have 20,000 permanent inhabitants in an area of about 240 square miles. Within all these local districts the villages or groups of villages are considerable distances apart, and the districts themselves lie isolated by great tracts of territory empty or used only for seasonal grazing by tribal nomads.

South-east of the Mand basin the desolation increases with desiccation, and the settlements grouped round Darab, Jahrum, and Furg have the character of intermittent oases. Thus Darab district was formerly reckoned to have 50 villages and 16,000 inhabitants in an area about 50 miles by 27. Laristan, comprising the lower part of the Rud Shur basin, the coastal districts of Shamil behind Bandar Abbas and Minab, and Biaban from Minab south to Ras al Kuh, has a sedentary population of 70,000–90,000 largely gathered into the small towns of Lar, Minab, Ahmedi, and Bandar Abbas, and the island of Qishm.

The southern Zagros is remarkable in Persia for the general absence of towns. Apart from Shiraz with 130,000 inhabitants, towns are confined to a few small urban centres averaging 5,000–10,000 inhabitants, which originated partly as the markets of the nomadic tribes, partly as refuges of the agricultural population from tribal attacks. North of the Mand river several of these small towns, such as Kazerun, Behbehan, and Ram Hormuz are located where the routes from the tribal *sardsirs* reach the *garmsir*.

Race. From the Ab-i-Diz to the Rud-i-Zuhra the population are Luri-speaking Bakhtiari, Kuh Galu, and Mamassani tribesmen, with assimilated Arab and Turkish elements. From the Zuhra to the Mand river, in the Shiraz and Niriz basins, and in Laristan, Turkish-speaking folk of the Qashqai tribes, and both Arabs and Turks of the Khamseh tribes, have been superimposed upon the original Persian-speaking population, which is most numerous in the Shiraz and Niriz basins. In the coastal plains there is a medley of Persians, Arabs, Persian-speaking Arabs, and negroes, while in the coastal districts of eastern Laristan (Shamil and Biaban), Baluchis also make their appearance; in the districts of Dashtistan and Lingeh, Persians seem to be in a majority.

Tribes

Despite the efforts of Riza Shah the nomadic and semi-settled tribes of the southern Zagros comprise the largest and what are still

the most politically active confederations of Persia. South of the Bakhtiari of the Karun basin there are four main tribal groups: Kuh Galu and Mamassani, who inhabit each a single well-defined region, and the Qashqai and Khamseh, whose summer and winter quarters are each in separate regions.

Bakhtiari. The limits of these tribes generally coincide with the mountains and foothills of the Karun basin and the district between the northern tributaries of the Karun and the Ab-i-Diz, except that on the north-east flank of the Zagros they cross the watershed to the upper valley of the Zaindeh Rud, and in the south-east exclude the Ab-i-Khirsin tributary valleys. Their summer grazing-grounds are in the broad intermontane plains between the highest ranges of the Zagros and the actual watershed, particularly in the Chehar Mahal district, which comprises the upper valleys of the Karun north of Kuh-i-Zirreh and east of Zardeh Kuh, and also in the Faridan district of the headwaters of the Zaindeh Rud. Here they spend four months, then in autumn before the passes are blocked by snow they move down to their *garmsir* amid the outer foothills, which stretches from Malamir and Kuh-i-Mungasht towards Dizful, Shushtar, and Ram Hormuz. There they spend 4–6 months, returning in the spring, after the Nau Ruz festival, to the *sardsir*. The bulk of the sedentary cultivating tribes live in the *garmsir*, though permanent settlement has been spreading of recent years in Faridan and Chehar Mahal districts, where there are also tenant colonies of Armenians and assimilated Georgians on Bakhtiari lands. The chief summer capitals of the Bakhtiari in the high mountains are Ardal and Chigakhur.

Of the two main tribal divisions, Haft Lang used to number 35,000–40,000 tents and were mainly nomadic, while Chehar Lang had 7,000 families, mainly sedentary. Haft Lang included four main tribes divided into several large sections and numerous clans; but neither the localities nor size of these divisions are reported.

Haft Lang

Tribe	*Sections*	*Tribe*	*Sections*
DURAKI	Shahi Aihawand	BABADI	Ali Anur
	Shahi Kurkur		Akkasa
	Usiwand		Raki
	Maviri		Kalla
	Qand Ali		Malmali
	Baba Ahmadi	BAKHTIARWAND-I-JANAKI	Bakhtiarwand
	Arab		Ali-u-Jamali
	Astiraki		Janaki Sardsir
DINARI	Aurak		
	Susan		

Chehar Lang tribes are called:

Mahmud Salih	Sahuni
Mumzai	Zallaqi
Kiyurmasi (Kunursi)	Mugui
Janaki Garmsir	Hihawand

Kuh Galu. Their district consists of the Marun basin, the Zuhra basin except the southern valleys of the Fahlian tributary, and the uppermost valley of the Ab-i-Khirsin (Karun), and is generally delimited by the upper Karun on the north, the Kuh-i-Dina on the east, and the Fahlian on the south, beyond which lies Mamassani territory. The Boir Ahmadi were the main nomadic element with *sardsir* in the high valleys east to the Kuh-i-Dina and south-west towards Basht, and *garmsir* in the plains and open valleys around Behbehan. Other tribes were already settling down before the regime of Riza Shah.

Group	*Tribes*	*Families*	*Location*	*Remarks*
	AGAJARI	2,000	Upper Marun and Khairabad tributary of Zuhra	Settled; some speak Turkish. 9 sections.
	BAVI	1,200	Basht in Fahlian valley.	Settled.
CHEHAR BUNICHA (JAKI)				
	BOIR AHMADI	5,000	See text. Some settled near Sisakht	17 sections; many nomadic.
	CHURAM	1,000	Near Behbehan.	
	DUSHMANZIARI			
	NUVI			
LIRAVI (JAKI)				
	BAHMAI	3,000	Mountains NW. of Behbehan.	Many scattered and settled.
	TAYYIBI	2,000		
	SHIR ALI	1,000		

Mamassani. These inhabit the south-eastern part of the Zuhra basin, particularly the Fahlian valleys, and the upper basin of the Shahpur (Hilleh Rud). Kuh Galu territory bounds them on the north, Qashqai on the south and east, where Mamassani reach to Kazerun and Ardakan. There are four tribes, all semi-sedentary, making only local migrations, or settled:

BAKKASH	1,200 families	
JAVIDI or JAVI	1,000 ,,	
RUSTAM	1,300 ,,	
DUSHMANZIARI	2,000 ,,	16 villages; said to be detached from Mamassani in 1917.

Khamseh. This confederation of mixed Turkish and Arab elements had its *sardsir* in the Niriz basin, particularly on the flanks of the Kur and Pulvar valleys, and its *garmsir* south of the Shiraz basin, extending

from the upper Mand and Ab-i-Fasa east to Furg and Tarum on the Rud Shur (Laristan), and south to the more open plains of Jiyum and Lar. Many tribes and sections have long been settled or semi-settled; the principal nomads were the Arab Jabbara and Arab Shaibani tribes.

Group	*Tribes*	*Families*	*Location*	*Remarks*
	BAHARLU	8,000	Rud Shur (Darab).	Sedentary, speak Turkish; warlike.
	INANLU	5,000	S. Rud Kur below Ramgird. W. R. Mand, Asmangird, Darab, Fasa.	Now mostly settled; some speak Turkish.
BASIRI	..	..	..	Pacific; speak bad Arabic.
	VAISI	3,000	S. W. of Lake Niriz, S. of Arsinjan. W. Harm.	..
	ALI MIRZAI	1,500	S. Asupas on upper Kur, and N. of Shiraz. W. Sarvistan and Lower Kur.	..
	NAFAR	3,500	S. Hills N. of Lake Niriz. W. Plains of Darab and Jahrum.	Speak Turkish.
ARAB	..	..	..	Arabic by origin, with Turkish and Persian elements; some settled.
	JABBARA	6,600	S. Hills NE. of upper Rud-i-Pulvar, from Deh Bid to Bawanat W. Plains between Ab-i-Fasa, Rud Shur, Jiyum, and Lar.	..
	SHAIBANI	4,500	S. Lower Kur, and as Jabbara. W. Plains of Fasa, and middle Mand (Asmangird).	..

Qashqai. The *garmsir* of these tribes is enclosed by the Zuhra (Fahlian) on the north and the encircling Mand on the north-east, east, and south; westwards it reached to the coastal plain of Dashtistan around Borazjan, and the outermost valleys to the south-east, Dashti or Khurmuj district (p. 126). Thus it included the basin of the Shahpur and the western tributaries of the Mand; but a tongue of Mamassani

territory on the upper Shahpur divided the Qashqai *garmsir* into a larger southern and a smaller northern zone.

Their summer lands or *sardsir* lay in two adjoining but distinct regions: (1) In the Niriz basin, the hills flanking the headwaters of the upper R. Pulvar and the great horseshoe of the upper Kur. (2) Beyond the Zagros watershed in the Isfahan region, the plateau between Abadeh and Shahriza (p. 384). Information about names and localities of tribes is often contradictory; the statistics appear to be old.

Tribe	*Families*		*Location*
KASHKULI	12,000	S.	Upper Kur W. to Ardakan and N. to Kakan.
		W.	Khisht plain SW. of Shahpur; also Firuzabad, Jireh and Dashti.
SHASHBULUKI	11,000	S.	Upper Kur and Pulvar, centre Asupas; also Isfahan basin.
		W.	Near Farashband; Dashtistan.
KHALAJ	3,500	S.	Padina district E. of Kuh-i-Dina.
		W.	Dashtistan.
FARSIMAIDAN	4,000	S.	Padina district E. of Kuh-i-Dina.
		W.	Valleys NW. of Farashband; Dashti valley E. of Kuh-i-Gisakan.
SAFI KHANI	3,500	S.	Upper Kur, N. of Diz Kurd and Asupas.
		W.	Mand tributaries SW. of Farashband.
RAHIMI	4,000	S.	Upper Kur round Diz-i-Kurd; also Isfahan basin.
		W.	Valleys W. of Farashband.
GAHVA	3,000	S.	Upper Kur round Asupas.
		W.	Mahalla-i-Arba district, 45 m. SE. of Farashband.
KARRAI	3,500	S.	Uppermost Kur (Ujan) S. of Asupas.
		W.	Khisht plain SW. of Shahpur.
BAYAT	3,800	S.	Upper Kur N. of Ramgird.
		W.	Jireh plain SE. of Kazerun.
DARASHULI	8,000	S.	Isfahan basin.
		W.	Valleys S. and SE. of Kazerun and E. and SE. of Behbehan.
GALLAZAN	3,500	S.	Isfahan basin.
		W.	Between Firuzabad and Farashband, and W. of Shahpur.
IKDIR	3,000	S.	Isfahan basin; some upper Kur.
		W.	Firuzabad and valleys NW. of Farrashband.

South-western Lowlands (figs. 14, 23, 55)

The well-watered plains of Khuzistan or Arabistan between the Zagros foothills, the Iraqi frontier, the sea, and the Hindian (lower Zuhra) river on the east, differ in population and settlement, as in physical geography, from the rest of Persia, and are closely akin in these respects to the delta lands of southern Iraq.[1] All grades of

[1] See B.R. 524, *Iraq and the Persian Gulf*, pp. 335–339.

settlement exist from sedentary cultivation to pastoral nomadism, though pure nomads are in a minority and most tribesmen both cultivate land and keep stock; hence they are semi-settled rather than completely sedentary. In the marshlands there is also, as in Iraq, a mode of life dependent on the use of the *mashuf* or canoe for mobility.

There are several districts of permanent settlement along rivers and their distributaries, separated by large areas of seasonal pasture and intermittent cultivation with nomadic populations. Of these the most heavily populated are (1) the northern area, watered by the Karkheh, Diz, and Karun and their subsidiary channels, between the foothills and the zone of confluence near Band-i-Kir. (2) Hawizeh district, watered and enclosed by the lower Karkheh and its distributaries before they drain into the Haur al Hawizeh. (3) The Shadegan (Fallahiyeh) district, watered by the lower distributaries and 'tail' of the Jarrahi (Marun) Rud. (4) The riverain strip along the lower reaches of the Karun, the Shatt al Arab, and the Bahmishir channel.

Of a total population of about 406,000 in 16,000 square miles a great part is concentrated in these four districts, in which the density ranges from 65 to over 104 to the square mile. They thus rank with the Tehran and Quchan–Meshed plains in density and size of population, but differ in the nature of their settlements. The rural population is widely disseminated in very small and rather temporary hamlets, composed in the marshlands and along the Shatt al Arab of light reed huts; elsewhere a large part of even the sedentary population still lived in tents, which were gradually giving way to mud huts, before the regime of Riza Shah, who endeavoured to suppress the use of tents.

Except for the creation of the oil-town of Abadan (*c.* 100,000), the maritime port of Khurramshahr (Mohammerah, 30,000), and the river port of Ahwaz (30,000), there are no large towns away from the plains fringing the foothills, where Dizful (50,000–60,000), Shushtar (20,000), and Ram Hormuz (10,000) have long existed as market centres for the Zagros tribes and entrepôts of the transit trade from the Gulf to central Persia. The new seaport of Bandar Shahpur has not developed and is likely to be supplanted completely by Khurramshahr. Tribal centres are generally small villages, the largest being Shadegan (2,000) for Fallahiyeh district, and in Hawizeh district Hawizeh and Susangird, which outstripped Hawizeh after a change of the Karkheh channel.

Race and Religion. Lurs from Pish-i-Kuh and Bakhtiari country visit the zone around Dizful, Shushtar, and Ram Hormuz, for winter

pasture, and have contributed a Lurish element to the permanent population. The citizens of Dizful and Shushtar are mostly a peculiar race speaking a strange Persian patois. Elsewhere the population is Arabic-speaking and largely derived from tribes which are known to have entered Khuzistan from the west. Sunni Islam is represented by a single tribe, the Bani Tamim, and Khurramshahr contains some Jews, Christians, and also Sabians. At Abadan there is a mixed population of Arabs, Lurs, and Persians, and a large European colony, mainly British.

Tribes. The greater part of the Arab population, whether sedentary, semi-settled, or nomadic, is tribally organized. In northern Khuzistan the two great tribes are the Al Kathir and Bani Lam. The *Al Kathir* are a semi-settled tribe who hold much land in the well-watered zone between the Karkheh and the Karun. The *Bani Lam* lands stretch in Persia from the Donan river on the Iraqi frontier to the Karkheh north of the Hawizeh district; they also own some lands east of the Karkheh. They contain both settled and nomadic elements, some of which used to migrate to the Tigris north of Amara in Iraq where other Bani Lam tribes own lands. The Hawizeh district contains three large tribes, the *Bani Salih* and *Bani Turuf*, both sedentary, and at the eastern end of the Karkheh loop the *Bani Tamim*, who used to be nomadic and ranged east to Ahwaz. In the south-west the *Muhaisin* hold the banks of the Shatt al Arab, Abadan island, and the lower reaches of the Karun. Before the deposition of the Shaikh of Mohammerah (Khurramshahr) by Riza Shah they were the overlords of all southern Khuzistan, a position from which they had ousted the Chaab in the nineteenth century. The *Chaab* (Kab, or Chab al Gubban) are sedentary, and the core of their territory is the irrigated Shadegan district on the lower Jarrahi. To the west and north they have as neighbours the semi-nomadic *Bavieh*, who range from the Karun to the Jarrahi, and to the east the smaller Al Khamis group, also semi-nomadic.

Most semi-settled tribes keep horned cattle and cultivate cereals or rice. Some also keep sheep or camels and own date-groves, or work in the date-groves. This causes a complicated time-table of seasonal movements. Thus the Muhaisin leave the Shatt al Arab for their grain lands on the Karun in November, return to fertilize their date-palms in February, move again to reap their cereals in May and their dates in July and August. The Bani Lam, Bani Salih, Bavieh, and Chaab were formerly noted camel-breeders, though the demand for these has probably declined with the expansion of motor transport.

But none of these tribes are true desert beduin in the technical sense.[1] Fuller details of the Arab tribes are given in the table below.

The northern fringe of Khuzistan was visited each winter by the Sagwand around Dizful and Shush, the Papi north of Dizful, the Bairanawand in the foothills of Pul-i-Zal 30 miles north-west of Dizful, and the Haft Lang Bakhtiari tribes round Shushtar and Ram Hormuz (pp. 370, 373). The *Amla*, a small Luri tribe, is settled near Shush.

Northern District

Tribe	*Sections*	*Families*	*Location*	*Remarks*
AL KATHIR	..	4,600	N. Khuzistan, from Karkheh to Karun (Shatait).	Settled; own many cattle; lived in tents and villages; some marsh-men; intermarry with Persians.
	Bait Saad	2,000	From Karkheh to Diz.	
	Bait Karim	1,900	From Diz to Shatait.	Two main sections at variance. Have absorbed some Bani Lam.
ANAFIJA (NAFIJA)	..	600	N. Khuzistan. R. bank of Karun from Band-i-Kir to Wais.	Semi-settled. Dependent on Al Kathir. Formerly powerful, now diminished.
SALAMAT	..	200	N. Khuzistan. E. of Ab-i-Gargar and NE. of Band-i-Kir, towards foothills.	Semi-settled; camels, cattle, sheep.
BANI LAM	..	5,700	N. Khuzistan W. of Shaur and Karkheh	Chenanah nomadic; Sarkhah and Khasraj semi-nomadic; Abdul Khan settled, and often regarded as separate tribe. Many sections of Al Kathir and other tribes also originated as Bani Lam. Tent dwellers. Some speak Persian.
	Abdul Khan	1,300	Between Karkheh and Shaur	
	Khasraj	1,050	Along and W. of Karkheh, some to Tigris in summer.	
	Chenanah Doraisat	780	Winter between Karkheh, Hawizeh, and Duwairij. Summer Tigris.	
	Chenanah Sanawat	970		
	Sarkhah	850	Along Karkheh with Chenaneh.	

Hawizeh District

BANI SALIH	..	2,100	Hawizeh; centre Shuwaib.	Halaf are marsh-men; Hamudi nomadic; rest cultivators.
	Halaf	800		Live in huts, cultivate, and keep stock.
	Hamudi	400		
SHERAFEH	..	900	Hawizeh, east of Bani Salih.	..
	Bait Rizij	450		
	Bait Shahab	450		
BANI TURUF	..	8,000	..	Settled. Grow rice and keep cattle. Live in huts.
	Bait Said	4,625	Northern Hawizeh, centres Bustan (Bisaitin) in W. and Susangird in E.	
	Bait Saiyeh	3,375		

[1] See B.R. 524, *Iraq and the Persian Gulf*, p. 339.

Tribe	*Sections*	*Families*	*Location*	*Remarks*
BANI TAMIM (B. MALIK)	(Sixteen)	2,250	Eastern Hawizeh east to Ahwaz and S. to Qajariyeh on Karun.	Nomadic and semi-nomadic. Summer on Karun. Visit Shatt al Arab for date harvest, where own palm groves. Sunnis.
BANI HARDAN	..	500	E. of Hawizeh and N. of Ahwaz, between Karkheh and Karun.	Nomadic and semi-nomadic.
Shadegan and Karun Districts				
MUHAISIN	(Seventeen)	4,900	Karun below Qajariyeh, Shatt al Arab, Khor Bahmishir.	Settled. See text above.
BAVIEH	(Sixteen)	2,320	Between Karun and Jarrahi S. of Band-i-Kir confluence.	Nomadic and sedentary. Tents, and villages on Karun. Raise cereals and stock.
CHAAB	..	..	Fallahiyeh district of lower Jarrahi; centre Shadegan (Fallahiyeh)	Semi-settled, raise cereals, dates, and rice, cattle and sheep. Many marshmen. Rivals of Muhaisin, see text.
	Dris (Asachrah)	1,640		
	Albu Ghubaish	1,720		
	Khanafirah	2,490		
AL KHAMIS	..	830	Between Fallahiyeh district and Ram Hormuz NW. of R. Jarrahi.	Mostly settled. Live in reed huts.
HAMAID	..	750	Karun, S. and E. of Band-i-Kir confluence. On R. Jarrahi.	Mostly settled cultivators, allied to Bavieh. Were tent dwellers.
	Bait Awamir			
	Bait Muwajid			

South-western Inland Basins of Isfahan–Sirjan, Qum, and Ardistan–Yezd–Kirman (figs. 16, 19, 54)

This region, despite the desert character of a great part of the land surface, with some 1,745,000 inhabitants in about 75,000 square miles, contains about one-fifth of the population of Persia and two of its principal cities: Isfahan and Kirman. In distribution, as in race and way of life, this region is the most Persian part of western Persia, differing greatly both from the preponderantly tribal and Kurdish or Lurish Zagros and from the continuously populated basins of north-west Persia from Azerbaijan to Saveh with their Turkish-speaking inhabitants. The people are townsmen or peasants, large nomadic tribes being generally absent except on the flank of the Zagros in the extreme south-west and around the headwaters of the Zaindeh Rud in the north-west. Instead of seasonal migration, the oasis type of settlement prevails, generally dependent upon qanats for water-supply, or in favoured localities upon running streams.

Small towns or large villages with 2,000–20,000 inhabitants, surrounded by an area of cultivation, but widely spaced and separated by broad tracts of empty desert, are characteristic of the zone. In the Isfahan–Sirjan basin these conditions begin in the Gulpaigan district immediately south of the watershed of the Iraq (Sultanabad) basin, where Khunsar and Gulpaigan towns each have some 20,000 persons. In the east they are continued northward from the Ardistan–Yezd basin through the Qum–Masileh basin towards Tehran. The regular spacing of the settlements along the old Tehran–Kirman highway, particularly between Qum and Yezd, partly reflects the former system of posting-stations, though it is by no means the rule that a settlement developed around each station.

This general pattern is varied in two ways by the influence of high mountain ranges within the region. First is the growth of communities in open plains at the foot of or close to high mountains; where other circumstances are favourable several have formed large towns, such as Isfahan (205,000), Kirman (50,000), Kashan (45,000), and Yezd (60,000). The smaller towns along the Tehran–Kirman highway, such as Natanz (3,000), Ardistan (6,000), and Ardakan (15,000), are generally found in similar circumstances. By contrast, on the east, the low and narrow belt of mountains which divide the Qum, Ardistan, and Yezd basins from the Great Kavir waters very few settlements of any note.

The second variation is the development of locally dense village settlements in the high valleys of the isolated mountain ranges, usually in fairly close relation to a large town in the plain below. Thus the uplands of Kuhistan, centring on Shir Kuh south-west of Yezd, have nine large villages with a peasant population once estimated at 27,000; in summer these villages serve as the *yailaks* of the citizens of Yezd and then double or treble their population. A similar type of distribution occurs extensively in the high mountains surrounding Kirman. This district (fig. 54), both in plain and valley settlements, illustrates clearly the ability of the Persian peasant to make the most of the water which the snows and rains of high mountains provide; the drainage of a single mountain may be collected to feed one small hamlet. But here too the locally dense centres of habitation are separated by barren and empty tracts.

At the southern end of the two main basins the districts of Sirjan (Saidabad) and Rafsinjan (Bahramabad) provide populated areas in otherwise empty wastes. A rather old account gives the following details. In Sirjan plain, measuring some 80 miles by 70, there are



FIG. 54. *Villages of the Kirman district*

about 60 villages, while Sirjan town and environs has a population of about 9,000 and Shahr-i-Babak at the northern end 8,000–10,000. In Rafsinjan plain, measuring perhaps 80 miles by 20, a centre of cotton-growing, there are 90 villages with 60,000 inhabitants of whom Bahramabad, at the southern end, houses 15,000. The centres of population are widely dispersed, but local density occurs. Anar, a village in the north of Rafsinjan, has some 2,000 inhabitants and is surrounded within a radius of 4 miles by 27 hamlets containing 3,000 persons, each hamlet being supplied by a single qanat. Bafq, 50 miles north of Anar, marks the northern limit of settlement in the eastern part of the Kirman basin as it opens to the Great Kavir.

Throughout these basins the term village is elastic, and little reliance is to be placed in the symbol used in any map on a smaller scale than the 1: 250,000. Though isolated hamlets occur the tendency is towards such oasis settlements as Anar. Thus the 'town' of Ardistan is a cluster of villages divided into six parishes, and Mehriz (22 miles south of Yezd) consists of five settlements of up to 1,000 houses each at the centre of a cultivated area 5 miles in length.

Included within the Isfahan basin there is the populous and distinct Zagros region of Faridan, watered by the upper Zaindeh Rud and other smaller perennial streams draining north and then east towards Gulpaigan.

Race. The inhabitants are nearly all Persian-speaking, and include the residual colonies of the Parsis or Gabrs at Kirman and Yezd. In Faridan there are numerous villages of Armenians, who also inhabit the Julfa suburb of Isfahan, and Bakhtiari Lurs. The Georgians formerly settled with the Armenians have generally merged with the Persian-speaking population. In the extreme south Baluchis penetrate to the Rafsinjan and Sirjan depressions, and on the south-west the inner flank of the Zagros has a Turkish-speaking population of Qashqai tribesmen in addition to its Persian-speaking villagers. There are Jewish colonies in the larger towns.

Tribes. On the southern and eastern flanks of the Kirman basin there are small, tribal, nomadic or semi-nomadic, tent-dwelling communities of shepherds. These are in part the overflow of the Jaz Murian basin and contain Baluchi, Turkish, and Persian elements. The tribal units are small in size and form no large groups. In Sirjan there may be 5,000 families, of which the largest groups are the Afshars (1,000), Doraghars (2,000), and the Khurasani, but generally the tribes do not exceed 200 families. By contrast there is the *sardsir* of the Qashqai in the south-west, the most numerous and best

organized tribal confederation of Persia. In this region their western limit is the Zagros watershed; eastwards they reach to the Shahriza (Qumisheh)–Abadeh section of the Isfahan–Shiraz highway, Shahriza and Iqlid marking their northern and southern limits. Their centre is at Simarun (Semirum), 53 miles west of Abadeh (fig. 14).

Tribe	*Families*	*Location*
Shashbuluki	11,000	Abadeh and Iqlid (20 m. to S.); also Niriz basin.
Darashuli	8,000	From Shahriza S. to Simarun.
Rahimi	4,000	SW. of Shahriza.
Ikdir	700 (3,000)	Near Simarun; also Niriz basin.
Gallazan	600 (3,500)	N. of Simarun.

For the rest of the Qashqai, *see* p. 376.

Western Fringe of the Central Basins (figs. 16–19)

The settlements flanking the Great Kavir and Southern Lut on north and east have been described under the adjacent regions, which merge imperceptibly into the Central basins, but the western and southern flank is more conveniently described separately. In the north, from the latitude of Qum to that of Yezd, in the mountains dividing the south-western basins from the Great Kavir, settlements are few and sparse. In central Persia, in the quadrilateral of open hills which contains the districts of Jandaq, Khur, and Biabanak (Baiazeh, 32 miles south of Khur), a number of oasis villages draw water from wells and qanats and generally cultivate dates or pasture camels. Southward to Bafq at the northern end of the Kirman basin (p. 383) the country is empty except for posts on caravan routes. But on the eastern flank of the mountains dividing the Kirman basin from the southern Lut there are several well-populated districts in which settlements characteristic of Kirman continue on the Lut side of the watershed. From north to south these have as their centres the small towns of Ravar (8,000), Shah Dad (Khabis, 8,000), Rayin (fig. 54; 5,000), and Bam (13,000). The Bam district, with its riverain strip of cultivation measuring some 13 miles by 2 and a total population of over 20,000, recalls the riverain oases of Jiruft and Bampur (p. 391); but Bam is also the last commercial town on the old route through Persian Baluchistan to Quetta. South-east of Bam the district of Narmashir contains small scattered oases, especially round Rigan (60 miles from Bam), which is the limit of settlement both northwards to the Lut and south-east towards Bampur.

Race and Tribe. The settled population is generally akin to that of adjacent districts and hence mostly Persian-speaking; there are a

number of small nomadic tribes on the fringes of the Lut, sometimes of Arab origin, such as the Sarab Arabs between Nain and Anarak, and in Bam–Narmashir districts there are numerous Baluchis.

Northern Khurasan (fig. 12)

This part of the former province of Khurasan has been regarded as one of the more populous parts of Persia, and generally estimated to contain between 2 and 3 million inhabitants in an area of 52,000 square miles. But the administrative estimates of 1934 only give a total of about 881,000 for Northern Khurasan with another 200,000 in the Birjand–Qain region. Of this 881,000, however, two-thirds are crowded into the central part of the Atrek–Kashaf corridor and the mountain flanks to north and south, and render this area, with the Nishapur district on the southern flank of the Binalud range, one of the most populous parts of Persia. Density ranges from 65 persons a square mile in the west around Bujnurd to 104 in the Quchan and Meshed sectors. In the Binalud and Hazar Masjid mountains, settlements making the most of the permanent water ascend to about 5,500 feet, and the districts of Darreh Gaz and Kalat-i-Nadiri extend the populous zone northward almost to the Russian frontier. South and west of the Binalud ranges desert areas with less than 13 persons per square mile alternate with relatively populous districts, dependent on drainage from the regular lines of hills, though their density does not rise above 65. Thus the Dasht-i-Armutli north of Jajarm, the district from Isfarain to the Juvain and the central sector of the Kuh-i-Jaghatai range are desert. But one line of settlements follows the Juvain depression, a second skirts the northern flank of the Jaghatai, and a third, through the Sabzawar district, skirts its southern flank. South from Sabzawar to the Kuh-i-Surkh population is very thin, but south of the Kuh-i-Surkh are the well-inhabited regions of Turshiz and Turbat-i-Haidari, which thin out southwards to the deserts of the Bijistan Kavir and the salt rivers which feed it. On the south-east likewise population is compartmented in the plains and foothills of the Turbat-i-Shaikh Jam, Bakharz, and Khaf districts defined by the parallel ranges of Bizak, Bakharz and Ahangaran.

The general distinction between settlements north and south of the Binalud ranges is that the northern settlements draw their water from perennial streams and easily accessible wells and springs, whereas the southern districts depend upon the extensive use of qanats; use is, however, made of supplementary qanats in the Meshed plain. Even in Nishapur district, where the mountain villages have plenty of water,

the lowland settlements formerly possessed as many qanats as the districts of Turshiz, Turbat-i-Haidari, and Khaf together.

That tendency noticed in the western and northern inland basins for the creation of large towns as the centres of isolated oases hardly exists in northern Khurasan, where the distribution of water renders possible a more even spread of population. Irrespective of the method of water-supply, the village with its dependent hamlets is the unit of population. The size of villages varies considerably from 25 to 300 or 400 houses, but the average is taken as between 50 and 100 households. The following statistical information, though previous to the reign of Riza Shah, shows the relative distribution south of the Binalud ranges.

District	*Qanats*	*Villages*	*Houses*
Nishapur	483	371	14,600
Jaghatai-Juvain	..	65	2,500
Turshiz	147	131	11,070
Turbat-i-Haidari	254	217	11,600
Turbat-i-Shaikh Jam	..	50–60	5,000
Bakharz	..	50	4,000
Khaf	81	70	1,900

Meshed, with 176,000 inhabitants, the only large city, was created by religious as well as by economic and geographical factors. There are no towns of medium size, and only seven small towns of between 8,000 and 20,000 inhabitants: Bujnurd, Quchan, Shirwan, Nishapur, Sabzawar, Turshiz, and Turbat-i-Haidari, of which Sabzawar is the most isolated. Otherwise the characteristic local centres are large villages of 2,000–3,000 people.

Race. There is a remarkable variety of racial and linguistic elements, though physical features tend to cantonize them and to preserve the identity of isolated settlements. Turks, Kurds, and Persians or Tajiks are the main elements, and there are small groups of Baluchis, Afghan Timuris, and Hazaras.

Turks of the Turkoman tribes inhabit the Caspian plains of the lower Atrek and the foothills west of Sar-i-Kamish and the Kuh-i-Kurkhud. From the Russian frontier to the Kuh-i-Aleh and Kuh-i-Shah Jehan watersheds the Bujnurd and Quchan districts are inhabited by Kurds, with a minority of non-Turkoman Turks forming about one-fifth of the population of the Quchan-Shirwan sector; in the southern mountains these Turks tend to hold the upper valleys. There is also a sprinkling of Persians. Eastwards in the Meshed sector between the Hazar Masjid and Binalud watersheds the balance of Kurds, Turks, and Persians is more even; Kurds predominate around Radkan and Chinaran, but Persians generally hold the southern

mountains and the Meshed plain, though there are many mixed communities. East of Meshed to the Hari Rud, Baluchis and Timuris appear. North of the Hazar Masjid watershed the Darreh Gaz and Kalat-i-Nadiri districts are inhabited by Kurds and Turks.

The restriction of the Persian-speaking element is due to foreign conquest and the transplantation of tribes. But Persians have maintained themselves south of the Binalud ranges to the Juba Rud. Nishapur and Sabzawar districts are predominantly Persian, and this element continues westward from Mianabad in Isfarain to Jajarm on the borders of the Elburz district of Shahrud–Bustam (p. 364). Kurds and Turks, however, intrude from the north into the district between Bam and Safiabad and north of Madan, and the Jaghatai–Juvain population is Turkish.

South of the Kuh-i-Surkh and west of Kuh-i-Bakharz, the Persian element has been generally eliminated by Turks in Turbat-i-Haidari district and by folk of Arab descent in Turshiz district. Throughout this south-western region there is a sprinkling of Baluchis.

In the south-eastern districts of Turbat-i-Shaikh Jam, Bakharz, and Khaf Persian-speaking elements persist with a considerable admixture of Timuris and Hazaras.

Riza Shah moved a large number of Luri tribesmen to Khurasan, but there is no information about their location and manner of settlement or whether they have remained where they were settled.

The population is generally Shia by religion except for the Turkomans in the north-west, the Timuris and some of the Hazaras of the eastern border, and presumably the Baluchis.

Tribes and Nomads. Nomads are a minority in Khurasan, because there would be enough water to maintain the whole population as sedentary cultivators. But seasonal migration is necessary to secure pastures for stock-raising. Hence tribal nomads exist, though migrations are not extensive. A large part of the sedentary Kurds and Turks also retain tribal nomenclature, but the function of the tribe has been generally replaced by the village community. The nomadic elements before the regime of Riza Shah consisted of some sections of the Yamut and Guklan Turkomans, part of the Timuris and Hazaras, and Baluchis.

Tribe	*Sections*	*Families*	*Location*	*Remarks*
YAMUT	..	7,000	..	Turkoman; Riza Shah took away their *kibitkas* and settled the nomads. Sunnis.
	Kujuk	..	Gurgan plain and foothills S. of Gunbad-i-Kawus.	
	Ikdir	..	From Katul (30 m. ENE. of Asterabad) to Gunbad-i-Kawus.	..

Tribe	*Sections*	*Families*	*Location*	*Remarks*
	Qarachai	..	Near Gunbad-i-Kawus.	..
	Kanyakmaz	..	N. of Gunbad-i-Kawus.	..
	Jafarbai	..	W. of Gunbad-i-Kawus to coast.	Some Caspian sea folk and traders.
	Charpa	..	N. of Gunbad-i-Kawus to the frontier.	..
	Devenji	..	Between Gunbad-i-Kawus and Kuh-i-Kurkhud.	..
GUKLAN	..	2,000	From upper Gurgan to middle Atrek. W. of Kuh-i-Kurkhud.	Turkoman. Sedentary. Sunnis.
AMARLU	..	500	NW. of Nishapur in Marush plain.	Kurd. Sedentary.
SHADILLU	..	15,000	Bujnurd and Quchan.	Kurd. Sedentary.
ZAFARANLU	..	2,400	Shirwan district.	Kurd, included 2,600
		10,000	Quchan district	nomadic families.
KAIWANLU	..	..	Scattered through Darreh Gaz, Quchan, and Juvain.	Kurd, included 1,600 nomadic families.
HAZARA	Dezangi	2,000	Bujnurd, Shirwan, Darreh Gaz, Sarakhs, Kashaf, and Jam valleys.	Chehar Aimak, speak Persian. Mostly sedentary. Some Sunnis.
	Jaghur			
TIMURI	..	6,000	Jam, Bakharz, and Khaf.	Chehar Aimak, speak Persian, many nomads; mostly Sunnis.
QARAI	..	4,000	Turshiz and Turbat-i-Haidari.	Turks, sedentary.
GARILI	..	5,000	Jajarm, Juvain, Sabzawar; also Gurgan plain E. of Asterabad.	Turks, sedentary.
	Salar Khani	500	Khaf.	Baluchi, nomads.
	Ibrahim Khani	..	Turbat-i-Haidari.	,, ,,
	Zardad Khani	..	..	,, ,,
	Jan Begi	..	Sarakhs and Zurabad in summer.	,, ,,
	Murad Khani	100	..	,, ,,

Qain and Birjand Highlands and Eastern Flank of the Great Kavir (figs. 17, 21)

The bulk of the population lives in the hilly Kuhistan district which stretches for 60–70 miles west from the Ahangaran range to the edge of the plains and south for 100 miles south-south-east from Qain to about 40 miles south of Birjand (fig. 21). This scantily but regularly inhabited region forms the populated core of southern Khurasan with villages tucked away in intermontane plains, along the skirts of the hills, or in upland valleys. North of Qain the populated belt narrows to a maximum width of 20 miles and is mostly congregated in the districts of Juimand and Bijistan. Southward there is a similar

narrowing of the belt and a thinning out of the density of settlements until it ends at Neh. In the frontier lowlands east of the Ahangaran range there are very few villages, since qanat irrigation is made impossible by the precipitous slope of the ground. Westwards the wide plains reaching to the Great Kavir are deserted except for a string of widely separated oases containing large villages or small towns, such as Tabas and Dastgardun (50 miles to the north), which draw their water from the outer line of hills flanking the Great Kavir (fig. 17).

The whole region was estimated in 1934 to contain some 200,000 persons with a general density nowhere rising above 26 to the square mile. Earlier accounts attributed some 280 villages with 92,000 inhabitants to the central core. Of seven small towns two, Qain (4,000) and Birjand (10,000), are the centres of the most populous districts, while Bijistan, Juimand, Neh, Tabas, and Dastgardun, ranging from 3,000 to 8,000 and all in the least populous parts, illustrate on a small scale the tendency towards the formation of larger units under oasis conditions. Throughout the region settlement depends on qanats and wells, and nomadic elements are very few.

Race and Tribe. The population is predominantly Persian-speaking Tajik, but includes a large group of Arab descent speaking either Persian or a corrupt Arabic, particularly in the districts of Tabas, Firdaus (Tun), Juimand, Birjand, and in Arab Khaneh 20 miles south of Birjand. There are also scattered Baluchis. The few nomads include Arabs and Baluchis of Birjand who migrate to Seistan in late summer. Tribal organization is unimportant, but includes the Arab tribes of *Zangui* and *Ibn-i-Shaiban* in Tabas district, *Nakhi* formerly numbering 1,000 families with headquarters at Khusf 23 miles south-west of Birjand, and *Khuzaima* of Qain district, from which came the family of the former Amirs of Qain.

Other peculiarities of the region are the preservation of a Sunni community of Persian peasants, in the Sunnikhaneh district at the southern end of Kuh-i-Ahangaran around the eastern Tabas, and the presence of Ismaili communities in the Qain and Birjand districts.

Seistan (fig. 22)

South of Neh to the Kuh-i-Taftan, settlement is limited to the Helmand depression, within which it is confined to the small area of some 1,000 square miles directly irrigated by the Helmand delta, except for a few very isolated villages which skirt the hills forming the west flank of the depression. Pre-1914 estimates of the population vary between 130,000 and 200,000, but the figure given in

1934 was only 40,000. In either case the density in the delta must greatly exceed the average of 26 per square mile for this part of Persia. The sedentary population is gathered into large villages, several having from 1,000 to 3,000 inhabitants. Zabul (Nasratabad), the largest of these, is the capital. It is worth remarking that estimates of the former density of population in Seistan based on the number of ruined villages are exceedingly exaggerated and misleading, because the ruins represent successive settlements changed to conform to the vagaries of the delta channels or overwhelmed by sands (p. 117). The borders of the Hamun are visited by many nomads for seasonal grazing, both from south-east Persia and from western Afghanistan (except perhaps under the regime of Riza Shah).

Race and Tribes. There is considerable racial confusion, since the basin has collected elements from all parts of eastern Persia, Baluchistan, and Afghanistan, but Baluchis and Persian-speaking Tajiks preponderate over Arabs, Turks, and Brahuis. The marshes are inhabited by an amphibious tribe of fishermen and hunters called *Sayyad*, who live in reed huts and use canoes; they are probably the most ancient element. The population is tribally organized, though units are not generally large. A large part of the inhabitants are Sunnis, but the considerable Sarbandi tribe are Shias.

Tribe	*Sections*	*Families*	*Location*	*Remarks*
NAHRUI	..	400	Khwaja Ahmad and Jalilabad.	Baluchi.
TAUKHI	..	..	..	Leading Baluchi tribe.
	Saruni	450		
	Jamalzai	300		
	Gurgieh	400		
ZARAKZAI	..	300	N. of Hamun to Duruh oasis.	Baluchi, nomads.
MURRAI	..	100	Palegan Kuh.	Baluchi.
SINJARANI	..	..	..	Baluchi.
MUHAMMAD HASANI	..	800	Near Lutak.	Brahui.
	Yaghizai			
	Zerkai			
SARBANDI	..	3,000	Scattered, centre Daulatabad.	Persian.
SHAHREKI	..	1,000	..	Persian.
KHIMAR	..	250	..	Persian.
HERATI	..	100	..	Persian nomads.
SAYYAD	..	700	Hamun marshes.	See text; special dialect.

Persian Baluchistan (figs. 20, 57)

Ethnologically, Persian Baluchistan includes the Jaz Murian depression, Persian Makran, the Taftan (Sarhad) region, and the Mashkel lowlands. These regions, containing nearly 90,000 square

miles, are, with the exception of the Great Kavir and Southern Lut, the most thinly inhabited part of Persia; the density of the estimated population of 200,000 never rises above 26 per square mile, and the average is far less. The inhabitants are partly nomadic and partly settled in small oasis communities usually containing from 50 to 2,000 persons, and separated by great areas of plain or mountain deserted but for a few nomadic shepherds. There are, however, two districts, Jiruft–Rudbar at the north-western end of the Jaz Murian basin, and Bampur at the eastern end, where continuous settlement occurs. Jiruft and Bampur may each contain 10,000–12,000, and Rudbar 5,000–8,000 settled persons.

The Jiruft zone extends 25 miles along the Halil Rud with a width of 7–15 miles, below the confluence of the tributaries near Sabzawar. Rudbar district begins 10 miles farther south; the main oasis stretches away from the river for 25 miles with a width of 3–4 miles, and lower down where the river turns from south to east there is the Rigmati group of scattered settlements; the local capital Khanu lies 10 miles west of the right bank in a detached oasis. The Rigmati district of Rudbar is separated by over 160 miles of flat desert from the populated riverain belt of Bampur; midway this desert characteristically contains a single small permanent settlement, watered by the wells of Dalgan.

Along the Bampur river the inhabited zone is very narrow, seldom above 1 mile wide, stretching on the left bank for 12 miles below Bampur and on the right bank 18 miles eastwards past the large village and local capital of Iranshahr (Fahrej). There are a few scattered oases north and east of Iranshahr where the plain meets the foothills.

North of Jiruft the Jamal Bariz mountains contain settlements which continue the type of distribution found on the Kirman side of the watershed (p. 381). Even the bare plateau of Isfandaqeh on the west flank of Jiruft has permanent settlements watered by qanats. In the barren Rudian basin west of the Makran, oases are very few and their population is of semi-nomadic intermittent cultivators. Most notable are the local districts of Qulashgird, Rudian, where cultivation stretches 5–7 miles along the river-bed, and Birinti, which may contain 1,000 households.

In Makran proper, permanent settlements, dependent on wells and qanats, are limited to the belt of high valleys north and south of the main range, and are most numerous east of the Bashagird district. The largest in the east are Bint, Geh, and Qasrqand containing 400–500 families each and lying on broad terraces south of the main

range astride routes from the coast (p. 103); corresponding settlements are Fanuch in the centre, and Ramishk and Mask Hutan, each of 50–100 huts, on the north; these smaller settlements are more common. In the west the inaccessible Bashagird district has no settlements larger than Anguran with its 100 reed huts, the bulk of the population being nomadic or semi-nomadic; Bashagird has only an estimated 8,000 families in all.

In Taftan (Sarhad) the inhabitants of the highlands are very few, whether nomadic or settled, despite its coolness, and likewise in the Mashkel lowlands despite their reputed fertility. This lack is largely due to the uncontrolled tribal raiding which has been prevalent since the eighteenth century. The Sarhad population is estimated at 7,000–8,000 families, but there are no notable oases, only occasional patches of cultivated ground supporting such hamlets of 50–60 families as Bazman. In the Mashkel lowlands there are several small oases of 300–400 families such as Magas, Sib, and Dizak.

Race and Religion. Though the greater part of the inhabitants are Baluchi at least by speech, there are dark-skinned peoples speaking obscure Persian dialects in the remote valleys of Bashagird and Sarhad, and in the Mashkel district. In eastern Makran and the Sarhad there are various Indian elements such as the Brahuis, and the Jadgals in the coastal lowlands of Dashtiari. Sarhad was dominated in the nineteenth century by a clan of Kurdish origin now much dispersed. Nominally Sunni Islam predominates, but the inhabitants are more superstitious than religious.

Tribes. These call for little comment, because though tribes are numerous there is little tribal order or discipline, and no large confederations. Climatic factors enforce extreme dispersal of the nomadic population, so that tribes are small in size and spread over wide areas, and are commonly intermingled with alien clans in villages and encampments. The local clan is more important than the tribal group, though the Bashagird clans seem to have recognized a supreme chief in time of war. In Makran east of Bashagird the Hot Baluchi tribe predominates, but the Lashari Baluchi of the mountains between Bampur, Geh, and Qasrqand are apparently distinct. In the Dizak district of the Mashkel lowlands there are the Nusherwanis, a section of Rinds who emigrated from British Baluchistan, and in the Sarhad three tribes of importance, Reki, Ismailzai, and Damani. All Sarhad was once controlled by a vigorous Damani clan which numbered only 50 families. The settled Persian-speaking folk of Taftan and Dizak are grouped in small clans called Dehwar Kwashi (round Kwash)

and Arbabi; some of these live in tents though they are not nomadic.

Tribe	*Sections*	*Families*	*Location*
Reki	Natuzai	500–600	NE. of Kuh-i-Taftan; centre Ladis.
Ismailzai	(Eight)	400	NW. of Taftan ranges to latitude of Kuh-i-Malik Siah and Kuh-i-Malusan.
Damani	Yarahmadzai	250	S. of Taftan and W. to Bampur; centre Kwash.
	Gamshadzai	300–500	SE. of Taftan; centres Gusht, Sib, Jalk.

CHAPTER IX

ADMINISTRATION AND PUBLIC LIFE

The Constitution

Persia is a constitutional monarchy under a king whose title is Shahin Shah, the present ruler being Mohammed Riza Pahlevi, who succeeded to the throne on 16 September 1941 when his father abdicated; the crown is hereditary, provided that the mother of the heir is of Persian origin, though both these conditions have been evaded in the past. The country is governed under a constitution which was adopted by a National Assembly and accepted by the Shah on 30 December 1906 (p. 300); minor amendments were subsequently adopted. The Government and administration of the country are in the hands of a Cabinet, which is led by a Prime Minister and responsible to the *Majlis* or Parliament. The Cabinet consists as a rule of ten or twelve members, each responsible for the administration of a department of State, and one or more ministers without portfolio; Ministers must not be members of Parliament. The usual arrangement of ministries is as follows:

War	Finance
Foreign Affairs	Roads and Communications
Interior	Posts and Telegraphs
Education	Agriculture
Justice	Commerce, Industry, and Crafts
Health	

The Parliament or National Assembly consists in theory of two houses, an Upper House or Senate of sixty members, thirty appointed by the Shah and thirty elected, and a Lower House; but the Upper House has only once been convened, and otherwise the Lower House has functioned alone. According to the Constitution most financial measures need the approval only of the Lower House, but the approval of both is required for the transfer and sale of state property, the grant of concessions, modifications of the frontier, the conclusion of treaties and agreements with foreign Powers and foreigners, and the raising of loans, internal and external.

The Lower House consists of 136 elected members (who may be increased to 200); 131 represent territorial constituencies, 2 the Armenian community, and 1 represents each of the Jewish, Parsi,

and Nestorian communities. Members must be between the ages of 30 and 70; state employees, including Cabinet ministers, are disqualified from membership, and ex-members of the National Assembly are not permitted to take government employment until six months after their retirement from Parliament. The electorate consists of all male citizens of 21 years of age and upwards, excepting members of the armed forces and those who have forfeited civil rights. The elections are by secret ballot. There are no political parties and the choice therefore depends on personal preferences, though recently the socialist Tudeh organization has been busy in Azerbaijan and at Isfahan, and a second socialist group called Hamrahan has emerged.

The Lower House holds office for two years, when a general election is held. Legislation normally originates with a government department and is introduced jointly by the Prime Minister and the Minister directly responsible, though Bills may, according to the Constitution, be proposed by private members, if backed by at least 15 members. Bills are first examined by appropriate committees, of which there are eight, dealing with the budget, foreign affairs, financial legislation, military affairs, justice, education, economics, and petitions respectively; they are then considered by the House as a whole. To become law they must be passed by the House and have the approval of the Shah; the nominal supervision allowed in the Constitution to a body of Islamic clergy is not exercised.

Citizens. The law of nationality lays down that all persons born in the country and resident there beyond the age of 18, and all others with one or both parents of Persian birth, are Persian citizens; foreigners may be naturalized after five years residence in Persia. The Constitution secures to all Persians equal rights before the law and freedom from abitrary arrest; no man's house may be entered and no tax levied save in accordance with legal forms. Freedom of the press, including the publication of reports of parliamentary proceedings, is also guaranteed by the Constitution, and judicial proceedings are in public. Male citizens gain the suffrage, and are liable to conscription, at the age of 21.

The *Civil Service* is recruited mainly by qualifying examinations, and there is protection against arbitrary dismissal.

Ministry of the Interior

This Minister is responsible for general internal administration, including the appointment and control of provincial and sub-provincial

governors, the police, census, registration, conscription, and, if there is no separate Health Minister, for sanitary and medical services. The administration is highly centralized, devolving from Tehran through ten large provinces or *Ustans* (also *Astan*, *Ostan*), governed by *Ustandars*, to the provincial subdivisions. These Ustans have only existed since 1938, and their exact boundaries are uncertain and subject to revision; a summary is appended below. The lower divisions consist of 49 *shahristan* or districts, each governed by a *fermandar*, and numerous sub-districts or *bakhsh* under *bakhshdars*, again subdivided into parishes or *dehistan* under *dehdars*, which include the final human units of villages, *deh*, and towns, *qasaba*. The model for this system is the prefectural organization of France, though the distrust of local authority goes much farther than in France. Although a constitutional law of 1908 provided for the election of provincial, district, and local councils to assist the government officials, none of these has ever been brought into existence.

Provinces. The Ustans are known by numbers from One to Ten instead of by name. The object of the reorganization was said to be that the units of administration might better respond to the physical, economic, and geographical features of Persia. But where the arrangements depart widely from the old system (fig. 1) they seem to be extremely superficial and cut across all those features, particularly in Ustans I and II, which join together regions north and south of the Elburz barrier, and Ustan VI which links up the plains of Khuzistan, the central Zagros, and part of the Isfahan basin. The system has, however, the advantage of being based partly on the density of population; the former vast Azerbaijan province is now divided between two Ustans. Ustans VIII and IX, corresponding roughly to Khurasan and Kirman, are least changed. The Ustans are defined by the major towns which they include, as follows:

Ustan	*Towns*	*Former provinces*
I	Zenjan, Kazvin, Saveh, Sultanabad; Resht, Shahsavar	Khamseh, Kazvin, most of Hamadan; Gilan
II	Sari, Gurgan; Tehran, Samnan; Qum, Kashan	Mazanderan, Asterabad; Tehran, Samnan-Damghan; Kashan
III	Tabriz, Ardebil	North-eastern Azerbaijan
IV	Khoi, Rizaieh (Urmia), Mahabad, Maragheh, Bijar	Western and southern Azerbaijan; north-eastern fringe of Ardalan
V	Hamadan, Malayer; Senna, Kermanshah; Ilam, Shahabad	Western Hamadan, Ardalan, Kermanshah, north-western Luristan (Pusht-i-Kuh)
VI	Gulpaigan, Khurramabad, Ahwaz, Khurramshahr	Western .Isfahan; most of Luristan, Khuzistan

Ustan	*Towns*	*Former provinces*
VII	Abadeh, Shiraz; Behbehan, Bushire, Fasa, Lar	Fars, Laristan, SE. fringe of Khuzistan
VIII	Kirman, Bam, Bandar Abbas, Kwash, Zabul	Kirman, part of Laristan
IX	Bujnurd, Quchan, Meshed; Sabzawar, Turbat-i-Haidari; Gunabad, Birjand	Khurasan
X	Isfahan, Yezd	Isfahan, Yezd, southern tip of Samnan-Damghan

Police. The urban police forces with a strength of 22,300 men and 930 officers are subject to the Ministry of the Interior, and nominally subordinate to the local civil governors, though there is a Chief of Police in the larger towns. They are uniformed and often carry fire-arms. The Tehran force was originally organized by Swedish officers, and recently an American adviser has established a police training depot.

Outside the towns security depends upon the Security Guards or Gendarmerie (*Amnieh*), a semi-military organization, 18,000 men strong, formerly under the Ministry of War, and now under the Ministry of the Interior. Its organization consists of eight districts based on the Ustans, and under Riza Shah blockhouses were manned at strategic points on the roads. This system dates back to the Swedish Gendarmerie of before 1914, and has been criticized as insufficiently flexible. At present few posts are manned and security has declined or disappeared, but another American adviser is attempting to reform the force.

The *Registration* laws, which the police enforce, require all inhabitants, both Persian and foreign, to carry an identity book, which must be produced when travelling by train, or when removing from one place of residence to another, or when taking up new employment, &c. One purpose of this system is to prevent the evasion of the conscription law.

War-time Administration

Between 1941 and 1944 a great part of the executive power of the Persian government was vested in the American Economic Adviser Dr. Millspaugh (p. 476). His work, where it impinged upon Allied interests, was done through a Combined Supplies Committee, composed of British and American representatives. This in turn worked through a number of sub-committees for such matters, immediately affecting the Persian Government, as mining development,

industrial development, agricultural advice, medical advice, price stabilization, import licensing and import and export control, transport control, and the supply of cereals and bread. Appropriate Persian Ministers, directors of civil service departments, and heads of banks, sat on these boards, and provided the chairmen of five of them. On the Persian side, a supreme Economic Council of 24 members, 18 appointed by the Persian Government and 6 by co-optation, was also created. But with the suspension of Dr. Millspaugh's powers in 1944 these bodies lapsed so far as the Persian Government was concerned.

Armed Forces

The remodelling of the Persian army during the nineteenth century by European military missions (p. 286), its subsequent decline as a fighting force, and the reorganization effected by Riza Shah (p. 307) have been described. At present (1944) an American mission is again reorganizing the army.

In 1925 a new conscription law imposed 2 years' military service on all men at the age of 21. Those who had received a university education were exempted, and for students in secondary schools the period of service was reduced to 1 year; these exemptions were later restricted, but for the supporters of families service was limited to $4\frac{1}{2}$ months. The period of general liability for service now amounts to 25 years, 2 in the army, 4 in the army reserve, 14 in the first general reserve, and 5 in the supplementary reserve.

The army nominally consists of 10 divisions, each with an establishment of 5,000 men, except the two Tehran divisions which are 7,000 strong. The total paper strength, including all branches, is 80,000 men, of whom one-third always consists of recruits with less than 6 months' service. It is adequately armed by the small Persian armament factories and arsenals (p. 463), but badly clothed and equipped in other respects. Officers and N.C.O.s are provided by two training establishments at Tehran, staffed by officers who have been trained in France or Germany. Entry is from secondary schools. The former Staff College, which was expensive and inefficient, has been closed down on American advice.

General administration is in the hands of the Ministry of War, which is subordinate to the General Staff; the Chief of this is directly responsible to the Shah, who is the nominal head of the army.

The *Naval Forces* consisted in 1941 of the Royal Yacht, 2 sloops, 5 patrol vessels, 7 vedettes, and some auxiliary and harbour craft.

Most of these ships were built in Italy, where the original personnel was trained. The naval base was at Khurramshahr.

The *Air Force* in 1941 consisted of 5 aviation regiments with 280 aircraft, mostly of British manufacture. Since then many men have been transferred to the army and many machines taken over by the British, which are to be replaced by Oxford aircraft. Some pilots are being trained in Great Britain.

Justice

Like other Moslem countries Persia used to suffer from a legal dualism between the Moslem ecclesiastical law or *sharia*, administered in religious courts by Mujtahids, and the civil or common law, based on custom (*urf*) and legislation and dispensed by civil courts. But since the Constitution the religious code has been ousted by the civil even in matters of personal status, though there has been some assimilation of Islamic principles, and a system of modern law courts has been established on the French model.

Civil Courts. Minor Courts (*dadgah-i-bakhsh*) in villages and small towns correspond to the French *justices de paix* courts; they have jurisdiction over civil cases and petty offences involving suits up to 10,000 rials value or fines up to 1,200 rials or 2 months' imprisonment. Appeals lie to the District Courts. These, covering an area of one or more *shahristans*, are in the larger towns and correspond to the French courts of first instance. They deal with appeals from the Minor Courts, major misdemeanours, and with civil cases above 10,000 rials. Appeals lie to the Provincial High Courts. These, with an area roughly corresponding to one or more *ustans*, are situated at Tabriz, Tehran, Meshed, Kermanshah, Isfahan, Shiraz, Kirman, and Ahwaz. They deal with appeals from the lower courts, offences classed as crimes, and disputes between the examining magistrates and public prosecutors of the District Courts; they correspond to the French courts of appeal. Finally there is a supreme Court of Cassation or Appeal in eight sections, which hears appeals from the Provincial Courts and from special tribunals such as the Officials' Court (below). It also has original jurisdiction in cases affecting Ministers of State, and deals with disputes about the competence of civil and military courts, and of the Financial Tribunals (below).

Judges. The Minor Courts have a single magistrate each; in the District Courts there is a judge, deputy judge, and an examining magistrate; the bench of a Provincial Court consists of a President

and two Members, while the sections of the Appeal Court have each a President and Assessor.

Other Tribunals. These include Finance Tribunals of the Ministry of Finance, and temporary Military Courts for offences against public order in areas placed under military government. There is a single Religious Court at Tehran, though it seldom meets, administering the Islamic law or Sharia and composed of learned Mujtahids. The Officials' Court (*diwan-i-kaifar*) has general jurisdiction over offences such as misappropriation, bribery and extortion, committed by officials in the course of their duties; and special boards may be established for disputes between civil servants and ministers over their rights and status.

Some political offences are tried by the ordinary courts, but press offences in daily or periodical publications are tried by a criminal court with a special jury of five persons. Otherwise juries are not in regular use.

Law. All these secular courts administer the statute law, the fundamental law of the Constitution, and customary law in so far as it has not been codified or replaced by foreign codes. The Civil Code is based on Islamic laws with adaptations from the French code. It deals *inter alia* with ownership and endowments, contracts, wills and inheritance, marriage and divorce, guardianship; thus it has absorbed most functions of the Sharia law. The Penal Code is based on the French penal code, but is also influenced by the very different principles of Islamic law. The Commercial Code is also adapted from the French; lawyers regard it as defective, especially on Company law. The Civil and Criminal Codes of Procedure are also based on the French system. Special statutes deal with the civil service and the registration of lands and documents; both recently required revision. Thus Persian law is a collection rather than a blend of laws derived from different sources.

Rights of Foreigners. Extraterritoriality and consular courts were terminated in Persia by 1928 (p. 311), when the following rules were laid down for the arrest and trial of British subjects; similar rules apply to most other foreigners:

(*a*) The rules of international law will be followed by the Persian Government in all its relations with foreigners. (*b*) In all civil or commercial cases in which one of the parties is a foreigner, only written evidence will be admitted. (*c*) Foreigners are not to be tried by religious tribunals. (*d*) Foreigners will be sentenced to imprisonment only by a police court which designates imprisonment as an

alternative to fine. Such imprisonment shall not exceed 1 week. No sentence of corporal punishment shall be inflicted on foreigners. (*e*) No foreigner may be arrested or imprisoned without a warrant, save *flagrante delicto*, nor may he be kept imprisoned for more than 24 hours without being brought before a magistrate. No entry or search of foreigners' houses or offices may be undertaken without a warrant. (*f*) A foreigner arrested and imprisoned shall have the right to communicate with his consul. (*g*) Facilities for release on bail shall be granted save in cases of serious crime. (*h*) Trials will be held in public save in very exceptional cases. (*i*) Prisons are to fulfil certain necessary hygienic conditions. (*j*) In matters of succession, divorce, and personal status, non-Moslem British subjects in Persia shall have recourse to their own courts if they so wish. Moslem British subjects will be subject to Persian religious courts 'till the question is definitely settled'. (*k*) British subjects are not liable to civil arrest, except where there is a serious risk that distraint would not be effective.

Education

The proper title of the Minister of Education is Minister of Sciences, Religious Endowments, and Fine Arts. His functions thus have wide scope and include, besides schools and colleges, the provision or supervision of libraries, museums, reading-rooms, archaeological investigation, and also *waqf* endowments. He also has charge of schools for Persian citizens in foreign countries. For educational administration Persia is divided into thirty-three districts each under the direction of an official of the ministry.

Origins and Development. Until the twentieth century most Persian education centred on religion. The rudiments were taught by Mulla's schools or *Maqtabs* in towns and villages, and higher education was generally limited to the *Madrasas* or theological colleges. But Persia was ahead of many Moslem countries in that education was based not only on the Koran but also on the classical Persian literature, which despite the illiteracy of the masses was widely known by recitation.

Modern European education was introduced by the founding of the Dar al Fonun College in 1852 and the establishment of the first Persian Ministry of Science and Arts in 1855 (p. 296). In 1862 a translation bureau attached to the court of the Shah undertook the translation of European books into Persian, and in 1873 a Royal Library was formed. Four more modern schools and colleges were founded between 1873 and 1886, and in 1897 the first girls' school

was opened near Kirman. But the present educational system really dates from the creation of the 'society for the establishment of national schools' in 1897, later known as the 'education council' (*Anjuman Maaref*). Its efforts resulted in the opening of numerous elementary and secondary schools, some of which were free, including some boarding-schools. Perhaps the most notable influence in the introduction of modern education came from two great missionary schools, the American Mission College founded at Tehran in 1872 and the Anglican Stuart Memorial College founded at Isfahan in 1904.

The Constitution of 1906 voiced the interests of education by insisting on the freedom to study sciences, arts, and crafts, 'save those forbidden by the religious law', the freedom to publish books 'except those inimical to the Faith', and also established the principle which still governs Persian education: 'that the foundation of schools at the expense of the government . . . and compulsory instruction must be regulated by the ministry of science and arts, and all schools and colleges must be under the supreme control . . . of that ministry'. In 1911 a modern Ministry of Education was established, which together with Anjuman Maaref had 128 elementary schools, 2 secondary schools, and 3 colleges under its supervision. Its budget was doubled in 1919, and the number of schools of all types rose steadily to 612 in 1921.

The large-scale expansion of education and the creation of a unified system was due to the regime of Riza Shah, which proceeded apace with the founding of state elementary, secondary and higher schools, teachers' training colleges, and technical schools and colleges of all sorts, culminating in the foundation of a modern university at Tehran. The following figures show the rate of growth:

	Schools	*Pupils*
1921 . . .	612	55,000
1937 . . .	4,939	273,680
1940 . . .	8,327	496,960

The principal conscious influence in Persian education is French. The elementary and secondary schools correspond to the French *écoles primaires* and *lycées*, and there is the same centralization of control and curriculum. Since 1928 there has been considerable interference with and assimilation of private schools (which are known as 'national' schools), and by 1940 the gradual absorption of all foreign schools was complete except those intended solely for the children of foreigners. This exclusion of all direct European influence upon the educational system is a retrograde action which may be rescinded.

The most recent legislation in 1943 envisaged the gradual establishment of universal free education, with the Government defraying the whole cost of the state schools and contributing to the support of private schools other than religious establishments. At present, though the level of education is rising steadily amongst the people, there is still a majority of illiterates even amongst the young.

The School System

Some kindergartens exist for children from 4 to 7 years of age. Except for a model school at Tehran they are private schools, though supervised by the Ministry.

Elementary education is free and in theory compulsory for children of both sexes from 7 to 13 years of age. It is provided in towns and villages by private and state elementary schools, which are steadily superseding the Mullas' schools or Maqtab (p. 404). In the schools, some of which are mixed, there are six classes or grades, and one year is normally spent in each. The course culminates in a leaving certificate, which qualifies for admission to a secondary school or to clerical employment. Uniforms of grey flannel were introduced in 1935; holidays are long, since the school year lasts only 170 or 200 days according to the region. Moreover, attendance is poor, reaching barely 50 per cent. of the child population in towns and much less in villages. State hostels exist for children from tribal areas, who thus go to school with the children of townsfolk and peasants.

Secondary education is neither free nor compulsory, and is less easily available, though fees are frequently remitted to promising pupils on various grounds. It consists of two 3-year courses, each terminated by a certificate, the lower giving admission to the professional and technical schools and to the lower grades of the civil service, while the higher admits to the University of Tehran and to the secondary teachers' training college.

Both elementary and secondary schools are well equipped, at least at their opening, with modern furniture and apparatus, libraries, and maps.

Syllabus. In the elementary schools the subjects include, for boys, Persian and Arabic languages, history and geography of Persia, Islamic scripture, and mathematics, while girls substitute sewing and drawing for some of these. A few rural schools also teach elementary agriculture, and some elementary technical schools teach handicrafts such as carpet-weaving and cabinet-making. Uniform text-books are provided and published by the Ministry of Education.

In the secondary schools the first three years are spent on languages, history, geography, mathematics, and physical science, which for boys includes some physics, chemistry, and more advanced mathematics, while the girls substitute domestic science, child welfare, hygiene, and sewing. In the second three years there is some specialization, mainly between arts and science: arts include languages, history, geography, and philosophy; science includes mathematics, physics, and chemistry together with one foreign language. For girls an alternative, more domestic, two-year course has been introduced, including handicrafts, child welfare, and domestic economy.

Technical and Professional Schools. These provide an alternative to the scholastic secondary courses; several are not controlled by the Ministry of Education, but are ancillary to other ministries or to the industrial development of Persia. There is a general Industrial School, preparing students for the industrial faculty of Tehran University, schools of dyeing annexed to the textile industry, schools of carpet-making and design and of the minor arts and crafts traditional in Persia. There is a veterinary and an agricultural college at Karaj, and other institutes sponsored by the Ministries of War, Communications, and the Interior for their purposes. The Anglo-Iranian Oil Company also has an institute for instruction in oil production. A School of Commerce and Economics and an Academy of Music, however, are under the Ministry of Education; the latter provides both elementary and secondary education with musical specialization in the second part of the secondary course.

Other Schools. Many maqtabs or Mullas' schools survive in villages, but are being replaced by state elementary schools; the establishment of new maqtabs is forbidden in villages where state schools exist; some maqtabs have been modernized or otherwise assimilated to state schools, and others have been rendered at least clean and hygienic. Though the schools are numerous (2,935 in 1936) they are small and teach an ever shrinking percentage of the population.

The former foreign schools have all been taken over by the Ministry of Education, except for the Russian, Iraqi, and Anglo-Iranian Oil Company's schools which cater for foreign children. The Jewish schools of the Alliance Israélite remain as private schools, since they are not reckoned as foreign.

Adult education has been provided on a large scale since 1936 by a regular system of evening classes. The course lasts two years, and aims generally at teaching the three R's and some simple knowledge

of Persian history, geography, and literature. In 1940–1941, 2,133 classes were attended by over 157,000 persons, mostly ranging in age from under 18 to 45, though some 2,800 were over 55. About one-quarter were farmers and peasants. The army also provides adult education for its conscripts.

Higher Education

Tehran University was founded by a special Act in 1934, and about half the necessary buildings were completed by 1941. There are seven faculties—arts, divinity, law, fine arts, science, medicine, and industry—each with a faculty library of about 15,000 volumes. The purpose is to provide trained men for government service, the professions, especially teaching and medicine, and industry. Control is exercised by a principal, a general board, and faculty boards. Students pay fees, though some are admitted free, and there are hostels for boarders. The medical course takes 6 years, the industrial 4, and the remainder mostly 3 years; graduates are qualified for the third grade of the civil service. Some professors and lecturers are foreigners, and most have been trained abroad. In 1944 students numbered about 4,000, of whom half read law or medicine.

The policy of sending students abroad with government aid is actively maintained, an average of 50 a year being sent between 1922 and 1938 to universities in Europe and America and also to the American University at Beirut in the Lebanon.

Teachers for secondary schools are trained by the Higher Teachers College at Tehran, a partly residential institution with its own buildings and playing fields, which is combined with the arts and science faculties of the university. There are no fees, and admission is by the higher secondary certificate, though many graduates also attend.

Elementary teachers are provided by 36 training colleges scattered through Persia and nearly all established since 1934. Admission in theory is by the higher secondary certificate—though in fact the lower certificate is accepted.

The *madrasas* or Islamic seminaries still continue to provide the traditional Islamic education in Moslem theology and law, Arabic language and literature. They are small and numerous, not all being of the same grade. Some of the better have been combined with the Divinity faculty of the university. Though formerly independent of state control, they are now supervised to some extent by the Ministry of Education.

Summary

The following table for 1936 gives the only detailed statistical information about the schools of Persia. By 1940 the number of state elementary schools had increased to 1,316 out of 2,150, and the number of state secondary schools and higher schools to 200, while the foreign secondary schools had become state schools.

Type	*Number*	*Students*		*Teachers*	
		Boys	*Girls*	*Men*	*Women*
Kindergarten	23	1,555		79	
Maqtabs	2,935	41,459	14,186	1,858	1,372
State Elementary	982	113,439		3,799	
Private Elementary	402	64,406		2,347	
Total Elementary	1,384	133,480	44,365	4,337	1,809
State Secondary	63	7,620		516	
Private and Foreign Secondary	112	7,915		721	
Total Secondary	175	12,595	2,940	957	280
Religious Colleges	353	2,935		305	
Teachers' Schools	11	697		62	
Technical Schools	10	1,216		108	
Higher Schools	5	312		52	
University Faculties	5	1,311		151	
Total of all kinds	4,901	257,051		11,370	

Archaeology and Folk-lore

In 1924 legislation prohibited the export, shipment, or removal from Persia of antique manuscripts, paintings, tiles, metals, sculptures, coins, embroideries, textiles, mosaics, ceramics, bas-reliefs, and other objects of historical and national interest. This was intended to stop at the source the gradual loss of all kinds of relics from which Persia had long suffered. Hitherto Persia had been a paradise for the foreign as well as the pecuniary-minded native excavator. Also in 1924 archaeological research, which had hitherto been uncontrolled, was regularized; no excavation can now be carried out without the permission of the Department of Antiquities.

In 1925 *Anjuman Athar-i-Melli*, or the 'Society of National Monuments and Antiquities', was established for the preservation of all national, historical, and artistic monuments. This has done useful work in repairing old mosques, historical buildings and ruins, but much still remains to be done.

In 1937 research was encouraged into the folk-lore, origins, and modes of life of the different tribes, sects, and peoples of Persia. An Institute of Anthropology was formed, and the results of its labours are published or made available in the Museum of Anthropology and Ethnography opened at Tehran in 1936.

In 1936 'Farhangestan Iran', an institute for 'preserving and developing the Persian language', was organized. Its main purpose is the adoption of Persian words for the modern technical expressions which have gradually crept into the Persian language. Over-zealous enthusiasts have pressed for the replacement of many Arabic words, which have been in use for hundreds of years, by Persian equivalents, but hitherto without much success.

Waqf

This is a form of charitable endowment peculiar to Moslem lands. A man may make over his property as a trust in perpetuity for the benefit either of a religious institution such as a mosque, madrasa, or school, or of particular persons including his own relations for a certain period, with eventual reversion to a religious foundation. Waqf endowments are usually of land, and inalienable except by judicial authority. They are usually administered by boards of trustees, but their great number and value, and the wealth of the institutions which depend on them, have excited government intervention. Hence the waqf of shrines and mosques are now administered by the Ministry of Education and devoted to charitable and educational objects under its supervision. The Persian civil code also has altered the law regarding waqf in some respects. In particular a waqf which makes the testator himself the sole beneficiary is null and void. The code also seems to have enlarged the conditions under which waqf may be sold, as e.g. in cases of disputes between the beneficiaries which may lead to violence or to the destruction of the property.

CHAPTER X

PUBLIC HEALTH AND DISEASE

PUBLIC HEALTH

PUBLISHED information regarding health conditions in Persia is very scanty and incomplete. Vital statistics for the country as a whole do not exist. Until recently, at any rate, there was no compulsory notification of cases of infectious diseases, and even if there had been there was no qualified medical personnel in many parts of the country whose notifications could have been relied on. The causes of death are not known with any accuracy, even in Tehran, where death certificates were introduced by the municipality in 1922. Nearly all corpses are taken to the public washers of the dead, who are forbidden to deal with bodies unless accompanied by death certificates. These are collected by the washers, but all do not indicate the cause of death. The poor do not seek medical advice when it is clear that there is no hope of recovery. In such cases the medical officer of the district will give a certificate when there is no suspicion of crime, but he may be quite unable to state accurately the cause of death, since the religious law forbids post-mortem examinations. The certificate is therefore in many cases nothing more than a permit to carry out the last rites.

Dr. A. R. Neligan (1926), with many years' experience of medical work in Persia, wrote:

'The efficiency of the health services of a country depends on a regular supply of properly trained medical officers. Medical education in Persia, in spite of years of experience and expense, is, it must be candidly stated, of a very low standard. A State diploma has been in existence for some 40 years. The medical school is at Tehran; it is very poorly equipped and the teaching is largely theoretical. No fees are charged. There is a long list of so-called professors, two (the lecturers on surgery and bacteriology) are French, the others are Persians, some of whom have French diplomas. The two Europeans have no say in the management of the school. Dissection is not permitted by the religious law. Hospital attendance is not compulsory. The young diplomés prefer to remain in Tehran or in one of the larger towns. There is a great need of well-trained doctors, especially in the country districts, and there is no source of supply of men adequately equipped, in the modern sense of the word, for quarantine work, for special posts during epidemics, for the newly organized and

enlarged army, or as municipal and provincial health officers. The difficulties of the public health authorities at Tehran in dealing with emergencies or in obtaining accurate information may well be imagined.'

Public Health Administration

In 1904 the Persian Sanitary Council was created in accordance with a provision of the International Sanitary Convention of Paris of 1903. The main object of its founders was to lessen the risk of transmission of infectious diseases, notably plague and cholera, into and through Persia. The council became the chief public health authority of the country. Its members included twelve Persian doctors; representatives of the Ministry of Foreign Affairs, the Ministry of the Interior, the Customs Administration and the Police, all medical men; two foreign professors of the School of Medicine; and doctors of the foreign legations. In addition there were an unspecified number of honorary members, without votes. Up to 1921 the Sanitary Council was attached to the Ministry of the Interior; it was then transferred to the Ministry of Education, and subsequently to the Prime Minister's Department. The council met once a month, and more often during epidemics. Its functions were to advise the Persian Government on all questions of public health; to keep itself informed of the incidence of epidemic diseases and to inaugurate measures for the control of infection; to organize and supervise the sanitary defence of the frontiers; to receive and collate reports dealing with public health; to arrange for public vaccination; and to supervise the importation and distribution of narcotic drugs. In 1925 the President of the Sanitary Council became the Director of Public Health Services, and there is now a regular Ministry of Health.

A scheme for health services for the larger towns was elaborated in 1919, but except in the capital little came of it. In Tehran the principal medical officer of health was given five assistants in 1917, one for each quarter of the city. When the Tehran municipality was reorganized in 1921 a medical service was formed. Several treatment centres for poor patients were opened: six for general diseases, one for women's diseases, one for venereal diseases, and a dental clinic. A municipal hospital with 100 beds was also opened. Tehran also had a lunatic asylum, a poor-house, an orphanage, and a crèche for foundlings, all administered by the municipality.

A number of medical officers of health have been appointed for the provinces. Neligan wrote of them in 1926 that they had had a moderate clinical training but no special teaching in sanitation or

bacteriology, no laboratories to which to refer, and no disinfecting apparatus, or, indeed, supplies of drugs; and that some had left their posts as their salaries had not been paid.

Medical Practice

A law of 1911 made it obligatory for all students of medicine to take the state diploma of the Government Medical School. Previously permits to practise were given to apprentices of Persian doctors and to assistants trained in the various foreign hospitals, and for many years after 1911 such 'authorized' doctors formed the bulk of the medical profession. More recently a number of Persian doctors have taken European degrees; almost all of them are to be found in Tehran.

Persian practice is still chiefly medical; there is little surgery. Only in towns are there a few surgeons who extract cataract and cut for stone. Irregular practitioners therefore thrive; barbers cup, bleed, extract teeth, do arm-to-arm vaccination, and perform circumcision; bath attendants undertake massage; there is a great demand for written charms, the writing of which is washed off the paper by water which is then drunk.

Hospitals

Persia was badly supplied with hospitals until about 1930. Foreign hospitals provided most of the beds. In Tehran the Government Hospital of nominally 90 beds was reorganized by British medical officers between 1919 and 1923. The British Government and the Anglo-Iranian Oil Company provided medical stores and equipment. Foreign medical work in the capital is represented by the American Mission Hospital, 55 beds, the Russian Hospital, and the British Legation Dispensary. The British Church Missionary Society has hospitals at Shiraz, Kirman, Isfahan, and Yezd. There are American Mission Hospitals at Meshed, Resht, Hamadan, Kermanshah, and Tabriz.

Riza Shah showed considerable interest in the improvement of hospitals and health services. A notable new creation was the Riza Shah hospital at Meshed with 150 beds and departments for pathology, dermatology, gynaecology, and bacteriology; this was under the guidance of two German doctors. Well-equipped hospitals were built in all the larger provincial towns, though detailed information is lacking, and a dispensary service for the whole country was initiated. To counter the lack of trained doctors the Faculty of Medicine at Tehran University has received every encouragement, while a medical college

attached to the Meshed hospital trains dressers and assistants for work in village dispensaries. But all too often the new hospitals lack men capable of using their equipment.

Medical Department of the Anglo-Iranian Oil Company

The well-equipped medical department of the Anglo-Iranian Oil Company does not confine its attention to the welfare of its employees and their families. Very large numbers of the tribal and peasant population in the oilfields and southern areas avail themselves of the facilities afforded by the Company's hospitals and dispensaries. The Company's medical officers have also made important contributions to our knowledge of local diseases and their causation.

In 1937 the medical staff consisted of a chief medical officer, 3 surgeons, a pathologist, an ophthalmic surgeon, 18 medical officers, and 2 dentists. There was a nursing staff of 2 matrons, 15 sisters, and 6 nurses. In addition there were a chief medical storekeeper, 3 medical secretaries and storekeepers, 3 health inspectors, 1 X-ray assistant, and 2 laboratory assistants.

The two main hospitals are at Abadan (120 beds) and Masjid-i-Sulaiman (60 beds). There are also isolation hospitals in the same two places, 28 beds in Abadan and 22 in the oilfields area. A new Abadan hospital was under construction in 1937. There are in addition some 14 dispensaries conveniently placed throughout the Company's area of operations. In 1937 no fewer than 64,876 non-employees (148,719 attendances) received treatment at the Company's medical institutions.

Pasteur Institute

The Pasteur Institute of Tehran was opened in 1921 with a French Director. In spite of indifferent accommodation and very insufficient funds it has done admirable work. The manufacture of vaccines, including smallpox vaccine, is undertaken; laboratory investigations are carried out for medical officers and private practitioners; human and animal diseases are studied; and lectures on bacteriology are given to students of the School of Medicine during their final year's study.

Water-supplies

The water-supply of some towns is from wells. This is the case in Isfahan and Resht. A part of Meshed has a piped water-supply; but in most cases, including Tehran, water is brought by *qanats* from

distant underground springs and then distributed in open channels. This water is drunk as well as used for all domestic purposes and irrigation. Clothes are even washed in these open channels, and since for the Mussulman running water is pure, water-borne infections must be almost inevitable.

Quarantine Services

The geographical position of Persia renders her vulnerable to attack by such epidemic diseases as plague and cholera, and the efficiency of her sanitary defence on land and sea frontiers is a matter of more than local concern. The land frontiers are long, but fortunately crossed easily at a limited number of points; elsewhere arid plains and mountains constitute an effective barrier to the spread of epidemic diseases from across the frontier.

The Persian Gulf maritime Quarantine Service is the most efficient and has functioned well in the past. For a long time the Government of India loaned officers of the Indian Medical Service to the Persian Government to take charge of quarantine work on the Persian Gulf. The Chief Quarantine Officer with two assistants resides in Bushire. The quarantine station is on an island about 2 miles north of the town, where there is accommodation for all classes of passengers and a disinfecting plant. Nearly all ships call at Bushire, so that quarantine work here is much heavier than at the other ports. There is no harbour, and ships have to anchor about 7 miles out. Passengers from ship to the quarantine station are transported in local dhows. There are also quarantine stations at Khurramshahr, Bandar Abbas, Lingeh, and Jask, each of which has a disinfecting plant and some accommodation for passengers, though the buildings at most are in various states of disrepair. There are few facilities at any of the Persian Gulf stations for the isolation and treatment of the sick. When cases of infectious disease have occurred in the past, arrangements have had to be improvised. The quarantine officers had no responsibility for, nor control over, the sanitary conditions of the ports. One of the chief difficulties of the Quarantine Service was the control of *cabotage* along the long coastline. In former years the inhabitants on the other side of the Gulf commonly fled in small craft to the Persian side whenever plague appeared among them. This required vigilance on the part of customs and other officials.

On the Caspian Sea quarantine stations were built in 1912 at Enzeli (Pahlevi) and Astara. The latter has since been destroyed. The Enzeli station persists, but is little used now as a quarantine station.

There are medical officers at both these ports who inspect ships on arrival. The service is under the direct control of the Sanitary Council.

On the Russo-Persian land-frontier sanitary posts have been improvised as the need has arisen, notably at Julfa. Similar improvisations were made along the trans-Caspian land-frontier. The places usually selected for sanitary posts were opposite Ashqabad, Kaakha, and Sarakhs.

No sanitary control of traffic has been found necessary along the British Baluchistan frontier. Neither plague nor cholera is endemic in British Baluchistan.

There is no quarantine or sanitary post along the Turko-Persian frontier. On the Iraqi-Persian frontier the Kermanshah–Baghdad road crosses the frontier near Qasr-i-Shirin. This is the most important pilgrim road out of Persia, for it leads through Baghdad to the Shia holy cities of Najaf and Karbala whither numerous corpses are taken for burial. This transit of corpses is controlled by a medical officer in Kermanshah. If the corpse bears a certificate that it has been interred for at least three years, or if it be completely desiccated, it is allowed to proceed. There are no permanent sanitary posts or medical officers at Qasr-i-Shirin, but in times of need a quarantine station has been improvised there. The effective control over the pilgrim traffic exercised by the Iraqi Government is a valuable safeguard for Persia.

The well-equipped sanitary services of the Anglo-Iranian Oil Company safeguard the southern end of the western frontier.

DISEASE

Plague

In the history of plague the references to Persia are very infrequent. From 1829 to 1833 plague was present in the Caspian Sea provinces and in the province of Khurasan. Thereafter there is no mention of plague till 1877, when it reappeared in the same localities but did not persist. In 1904 there was a small outbreak in Laristan which quickly died out; infection was imported through Lingeh. In 1905 a mysterious outbreak of plague occurred among the lake-dwellers of the Helmand in Seistan, when some 1,400 deaths were reported. There was much speculation at the time as to the manner in which infection reached this inaccessible spot. It was even suggested that

wild duck had fed on dead rats and had brought infected fleas on them in their migration from Astrakhan, where plague had been epidemic. Since then plague has appeared only in the Persian Gulf ports. In Khurramshahr plague was reported in 1917 and again in 1923, when it was responsible for 71 cases and 45 deaths; from Khurramshahr plague spread to Abadan, where 481 cases and 409 deaths occurred. In 1924 Khurramshahr reported 152 cases and 115 deaths, Abadan 233 cases, and Bandar Abbas 12 cases and 7 deaths. Since then Persia has been free from plague.

Persistent measures are taken by the medical department of the Anglo-Iranian Oil Company to reduce the rat population of Abadan by trapping, poison, and structural improvements designed to diminish the shelter afforded to rats. Rats caught and rats found dead are examined for signs of plague infection. Rat destruction is also carried out on barges and river-craft as well as in the pipe-line pumping-stations.

In Abadan *Rattus norvegicus*, the brown rat, is four times more numerous than the long-tailed black rat *Rattus rattus*. The black rat of Abadan is not so domesticated as it is in many parts of the East. It frequents the gardens and the river front, and only moves to the bungalow area when food outside is getting scarce.

The systematic examination of rat-fleas is also carried out in Abadan. *Xenopsylla cheopsis*, the most efficient transmitter of plague infection, is the predominant species of flea found on both brown and black rats. *X. astia* is also common and *Ctenocephalus canis*, *C. felis*, and *Nosopsyllus sarinus* are found.

There are said to be no brown rats on the central plateau of Persia, but there are house and field mice and jerboas (p. 210). In Khurasan there is a marmot resembling the Manchurian tarabagan. It has been identified as *Citellus fulvus parthianus*. Marmots are responsible for keeping plague infection alive in many parts of the world.

Cholera

Cholera is not endemic in Persia, but the history of this disease in Persia is much more eventful than that of plague. Between 1820 and 1903 seven great epidemics are recorded. In 1821 cholera appeared in the Persian Gulf. Infection passed through Shiraz to Isfahan, and the disease prevailed in the centre of the country for two years. Thence it passed through the Caspian provinces to Russia. In 1829 cholera was brought in from India through Afghanistan. The epidemic that followed spread to Russia, Germany, England, and

France. In 1846 infection once more was introduced through Afghanistan and once more European epidemics resulted. In 1851 cholera reappeared in Persia and lasted several years, but did not cross the frontiers. In 1869 pilgrims returning from Mecca through Iraq brought cholera with them and Persia suffered considerably. In 1890 the Persian Gulf ports were infected and cholera spread all over the country and reached Europe two years later by way of the Caspian ports. The last great epidemic was in 1903. Mecca was the starting-point of this epidemic also. Infection reached Persia by the Persian Gulf ports and by the land route through Qasr-i-Shirin. The disease spread all over the country. The number of deaths it caused in Persia is unknown, but in Tehran some 70,000 persons are said to have died in the three and a half months during which the epidemic persisted there. This epidemic spread to Russia and reached Germany and Austria in 1905.

Less severe epidemics have occurred since. In 1917 cholera caused 344 cases and 188 deaths in the province of Mazanderan and 311 cases and 214 deaths in Khurasan. Pilgrims carried infection to Meshed, where 214 persons died from cholera. In 1918 more outbreaks occurred in the north. In both these years infection was introduced from Russia, but the disease was not very virulent. In 1923 cholera was epidemic in Iraq, but the action taken by the Iraqi health authorities protected Persia. No one was allowed to pass the emergency quarantine station at Qasr-i-Shirin unless a certificate of anti-cholera inoculation was produced. The transport of corpses to Karbala was stopped. Cholera did, however, appear at Abadan, where there were 992 deaths, and at Masjid-i-Sulaiman. In 1924 the Anglo-Iranian Oil Company completed its piped water-supply for Abadan and epidemics of cholera are unlikely to recur there. No cholera has been reported from Persia since 1931.

Typhus Fever and Relapsing Fever

Louse-borne typhus fever appears to be endemic all over Persia, but large-scale epidemics have been rare. The pandemic which marked the closing stages of the War of 1914–1918 and the early post-war years did not spare Persia. Here there had been two years of drought and famine and the poorer classes were all heavily infested with lice, with a consequent heavy death-roll.

Mortality statistics are difficult to interpret because many Persian doctors used the same word *haspeh* (spotted) to signify both typhus fever and typhoid fever. In 1918 the Sanitary Council recommended

that two different words should be used: the Arabic words are *motbegheh*, typhoid, and *mohregheh*, typhus.

The number of cases and deaths from typhus fever reported in Persia during four recent years were: *1935*, 619 and 181; *1936*, 202 and 59; *1937*, 116 and 18; *1938*, 16 and 1.

Relapsing fever is endemic in the north-west provinces, but cases are usually not numerous. There was, however, a severe outbreak in 1924–1925 in the Khurasan province and adjacent districts. Such evidence as there is indicates that the infection was louse-borne, though the tick *Argas persicus*, which is capable of transmitting certain forms of relapsing fever, is found in roadside caravansarais.

Small-pox

Small-pox is endemic in Persia. It was formerly very common and very fatal, but since the inauguration of the public vaccination service in 1911 there has been a marked improvement. Since 1922 all the vaccine used has been prepared and distributed by the Tehran Pasteur Institute.

Cases and deaths attributed to small-pox during four recent years for the whole of Persia have been: *1935*, 91 and 29; *1936*, 84 and 24; *1937*, 34 and 0; *1938*, 25 and 6. These figures are much lower than the numbers of cases and deaths reported from Tehran alone twenty years ago. The small-pox death-rates per 100,000 population for Tehran were: *1935*, 1·6; *1936*, 2·6; *1937*, nil; *1938*, nil.

Malaria

Malaria is by far the most important cause of ill health, and indirectly of death, in Persia. That this should be so in the Caspian provinces is not surprising. All climatic and other geographical conditions favourable to excessive mosquito production are there present. Food is cheap and abundant, but the inhabitants of these provinces are anaemic and of distressed appearance. Neligan in 1926 found that all children under 10 years of age in their high summer quarters had enlarged spleens, as had 60 per cent. of such children at Mahmudabad, a village on the coast reputed to be particularly healthy (p. 150).

That there should be much malaria in central Persia with its low rainfall is more surprising. The central desert basins of the Great Kavir and Southern Lut are free from malaria, but everywhere else, in mountains, valleys, and plains, there are highly malarious districts.

Water storage, irrigation methods, and the nature of the rivers and swamps provide the explanation.

There is much malaria in Khurasan. In the Urmia basin malaria was formerly mild and not very prevalent, but after the invasion of Persia by the Turks in the War of 1914–1918 it became much more common and more pernicious in type. There is much malaria in the western districts of Ardalan, Kermanshah, Luristan, and Hamadan. The rice-growing areas in the Marivan district of Ardalan have a very bad reputation. It is also severe in the low-lying country along the rivers of Khuzistan, but the towns of Ahwaz, Shushtar, and Dizful suffer but little. There are malarial areas in the central provinces of Isfahan, Yezd, and Kirman, and in Fars, but very little malaria in either Seistan or Persian Makran. The Gulf towns are heavily infected.

In the Tehran district very few of the indigenous population escape malaria. Fresh infections begin to appear in May and cases are most numerous in July, August, and September. All three forms of malaria occur, but quartan infections, *Plasmodium malariae*, are uncommon. The great increase in the number of cases in August and September is almost entirely due to *P. falciparum*, subtertian malaria.

Published reports of special malaria investigations in Persia are not numerous. Beklemishev and Gontaeva (1943) report the results of a survey carried out by them in 1941 in the north-west of the country. With Tabriz as their base they worked round Lake Urmia and through Mianeh, Zenjan, Kazvin, Resht, and Pahlevi. On the uplands, from 3,000 to 6,000 feet, with mountains up to 13,000 feet, there are orchards and vineyards under perennial irrigation, and wheat and rice irrigated twice a year. The anopheline fauna includes *Anopheles superpictus*, *A. maculipennis maculipennis*, *A. maculipennis sacharovi*, and *A. bifurcatus*. Specific treatment of malaria is only available to the wealthier classes. The intensity of the disease is a function of altitude. In the towns on the plateau there is little malaria, all available water from the streams being directed into irrigation channels in which the flow is intermittent. In towns in mountain valleys there is constant and abundant water and relatively little arable land. The lavish use of water provides numerous mosquito breeding-places and a considerable amount of malaria results. The Caspian coastal area, with its sub-tropical climate, numerous rivers, streams and swamps, and rice cultivation, presents conditions very different from those on the plateau. In the coastal area *A. maculipennis* and *A. hyrcanus* are the predominant malaria vectors; *A. superpictus* does not occur.

There appears to have been a marked decrease in recent years, attributed to the stocking of streams and other collections of water with the larvivorous fish *Gambusia* in 1936.

Lindberg (1941) found no evidence of malaria in the Caspian provinces at heights over 6,500 feet, but in the ravines and valleys of the lower wooded mountains the population suffered severely from malaria during the summer; *A. superpictus* is the probable vector. In vast clearings where rice, tobacco, sugar-cane, cotton, wheat, and vegetables are cultivated *A. maculipennis*, *A. elutus*, and *A. superpictus* are the vectors. Nearer the coast the distribution of malaria is patchy. The most severely infected localities are in the west of Mazanderan; then comes Gilan and the east of Mazanderan. Malaria is most feebly endemic in the Gurgan province, most of which is geographically part of the Turkoman steppe. The transmission season of malaria is from May or June to the end of September.

In Luristan malaria transmission is most active in May and June and in October and November. All three forms of malaria occur here also, but subtertian (*P. falciparum*) infections are much the most frequent. Lindberg states that malaria is hyperendemic in Bushire. One-third of the patients treated in the hospital there in 1938 were suffering from malaria. He found *A. multicolor* breeding in Bushire during his visit in mid-February, but no adult anophelines.

Zadéh (1944) reported the results of observations made in 1934 and 1935 in the neighbourhood of the Iraq (Sultanabad) salt-lake, in the town of Khurramabad, and in the Caspian provinces of Gurgan and Mazanderan. In the two former localities *A. maculipennis* and *A. superpictus* were identified. Near the Iraq salt-lake the spleen rates of five villages varied from 32 to 53 per cent. in early summer. Parasites were found in 36 of 224 bloods examined: *P. falciparum* 16, *P. malariae* 17, *P. vivax* 1, and mixed infections 2. In Khurramabad the spleen rate of 286 children was 65·5 per cent. and the parasite rate 30 per cent., in the autumn. Of the positive blood-smears 80 per cent. contained *P. falciparum*, 10 per cent. *P. malariae*, and 8 per cent. *P. vivax*. In the Caspian provinces of Gurgan and Mazanderan *A. maculipennis* and *A. pseudopictus* were found breeding in rice-fields in late spring. *A. superpictus* was abundant in parts of Mazanderan, but *A. hyrcanus* and *A. bifurcatus*, though found, were not numerous. Spleen rates increased from east to west from 32 to 63 per cent., and parasite rates from 5·7 to 20·9 per cent.

The annual reports of the Medical Department of the Anglo-Iranian Oil Company contain detailed and interesting accounts of

malaria research and anti-malarial work systematically carried out in the area of its operations. Chief attention is given to the elimination of mosquito-breeding and the destruction of immigrant adult mosquitoes, with the object of effecting a reduction of anopheline density sufficient to minimize transmission. Experience has shown that it is necessary in some places to extend the area of larvicidal operations for several miles around the human habitations it is designed to protect. Oils have proved more effective than other larvicides in local conditions.

A. superpictus is the most important vector of malaria in the area of the Company's operations. It breeds in almost any collection of clear water, either natural or man-made, showing much less discrimination than it does in other parts of the world. It breeds from mid-February to mid-November, tolerates a wide range of temperature, is extremely adaptive, and is only controlled by regular and intensive use of larvicides wherever collections of reasonably clear water remain long enough to enable it to pass the aquatic stages. Permanent abolition of its main breeding-places is not feasible. The range of flight of this mosquito is 4 miles or more.

A. stephensi, next in importance, breeds from May to October, both inclusive. It is the predominant anopheline in August and September, seems to thrive on heat, and is an efficient vector of malaria. It breeds in stagnant pools or in such small collections of water as boulder holes in an otherwise dry, rocky, stream-bed.

A. elutus is an efficient vector of malaria but infrequent in this area, where it has not been found breeding. Its range of flight is very great. Adult specimens have been caught in all months from September to March, but never in the five other months, and never in great numbers.

A. pulcherrimus, a vector of doubtful local importance, is fairly abundant in June and again in September. Its larvae, never abundant, are found in association with those of *A. d'thali*, *A. stephensi*, or *A. superpictus*.

A. d'thali is found in greatest numbers in the summer months. It frequents human habitations, but does not bite man with the eagerness displayed by the four species mentioned above. It may possibly transmit malaria.

A. sergenti is very rare and consequently of negligible local importance in malaria transmission.

A. apoci is not uncommon in summer and autumn. It rarely enters houses and is probably unimportant. *A. turkhudi*, *A. hyrcanus*, and *A. bifurcatus* are found, but they are all rare.

The following table shows the percentage of the Company's employees which suffered from malaria during each of four years. In the oilfield areas and at the pipe-line stations the personnel all live in Company houses or in villages over which the Company's medical and health department has full authority. In the three other areas, Abadan, Khanaqin, and Kermanshah, particularly the last two, a large number of employees live in local townships which are outside the jurisdiction of the department. These facts are reflected in the figures. The anti-malaria campaign in the oilfield areas started in full in 1934.

Percentage of Employees off duty through Malaria

	1934	*1935*	*1936*	*1937*
Abadan	45·8	37·4	67·1	39·0
Oilfields areas . . .	45·3	27·8	19·2	16·9
Pipe-line stations . . .	13·8	10·3	16·7	15·4
Khanaqin Oil Co. . .	29·0	16·2	47·4	29·2
Kermanshah Petroleum Co. .	..	41·8	64·8	61·6

Venereal Diseases

Both syphilis and gonorrhoea are very widespread throughout Persia, but are somewhat more prevalent in towns than in country districts. Syphilis appears to be of a milder type than in the West. The cardiovascular system and the nervous system are attacked with much less frequency than in Europe. General paralysis is very uncommon and aneurism is rare. Hereditary syphilis is curiously infrequent. Gonorrhoea is the cause of much sterility.

Leishmaniasis

The visceral form of leishmaniasis, kala azar, has not been reported from Persia, but the cutaneous form, oriental sore, caused by *Leishmania tropica*, is extremely prevalent in some places, though absent from others. In Tehran, Isfahan, and Meshed, for example, very few Persians escape infection. In Tabriz and in the whole of the north-western corner of the country the disease is unknown. The cause of this irregular distribution of the disease has not been explained. Sandflies which convey the infection are said to be ubiquitous. Dogs are the important reservoir of infection of *L. tropica*; street dogs with ulcers on the nose, lips, or eyelids, caused by this parasite, are frequently seen. Human infections occur most often in the autumn. The disease is not dangerous to life, but the ulcers, nearly always on exposed parts of the body, may cause much disfigurement.



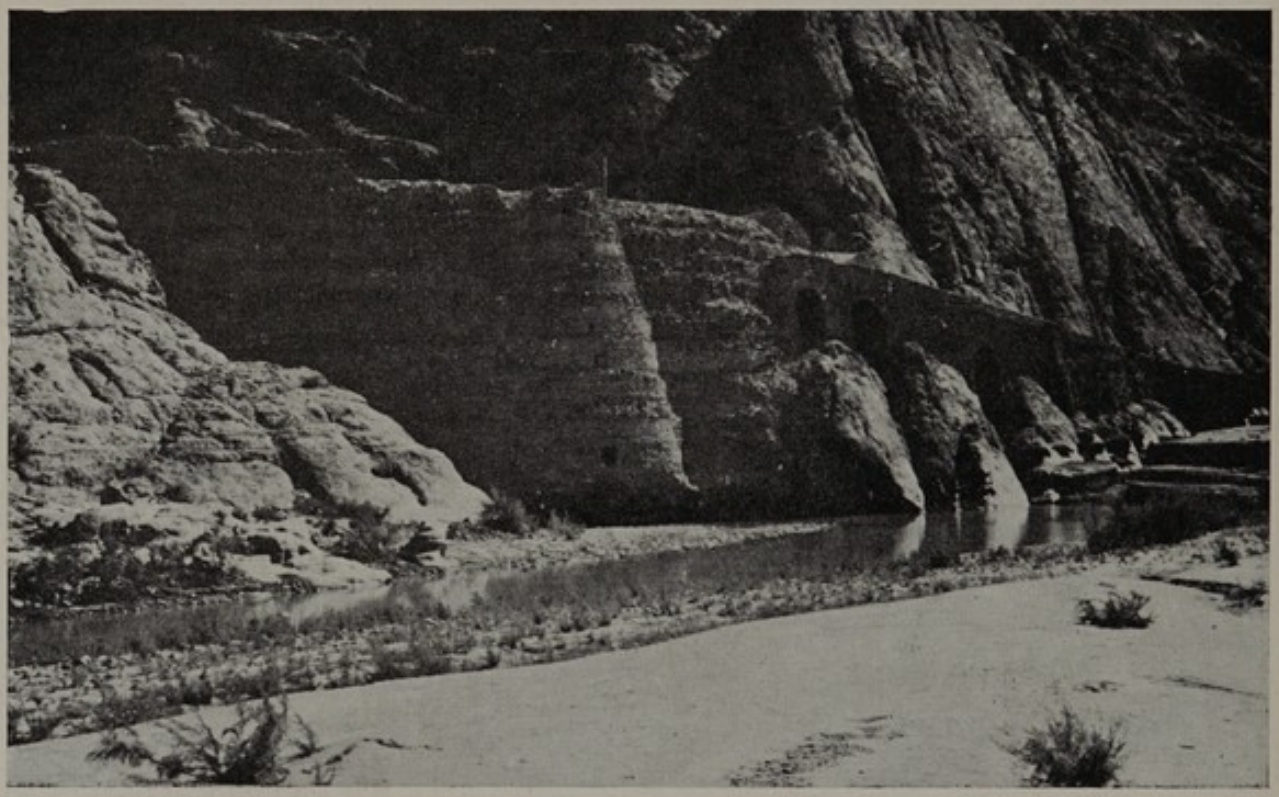
222. *The ancient dam at Shushtar*



223. *The watermills and Gargar channel at Shushtar*



224. *The Faizabad dam under repair*



225. *The Safawid dam near Saveh*

Tuberculosis

Tuberculosis is a common disease in Persian towns and is frequently seen in villages as well as among wandering tribes. Overcrowding in the towns, lack of ventilation in houses, the use of wadded quilts which are never washed and pass from one person to another, and debility caused by underfeeding and malaria, are factors more than sufficient to explain a high incidence of pulmonary tuberculosis. Persian resistance to the disease is small. Bone and joint tuberculosis is likewise said to be common.

Leprosy

Leprosy is reported from the provinces of Khurasan, Azerbaijan, Gilan, and Kermanshah, and from Ardalan, but the disease does not appear to be very prevalent. Little appears to have been done to control its spread, but there is no evidence of increasing prevalence. In Khurasan and Azerbaijan advanced cases are segregated in villages, though they are not the most infectious. There they cultivate the land and receive an allowance of corn from the Government.

Typhoid and Paratyphoid Fevers

Typhoid and paratyphoid fevers are widespread, but are not responsible for as much sickness among the indigenous population as contaminated water-supplies and absence of sanitation would entitle one to expect. Immunity acquired during childhood may be the explanation. The incidence of these diseases among European residents has also been low since efficient inoculation has been available. The number of cases and deaths attributed to typhoid and paratyphoid fevers in Persia during three years was: *1936*, 2,811 and 330; *1937*, 1,904 and 188; *1938*, 1,277 and 74. Notifications are admittedly very incomplete

Dysentery

Amoebic dysentery is endemic and cases are numerous. Cases of bacillary dysentery (Flexner type) have been reported from Tehran and no doubt occur elsewhere. The recorded statistics make no differentiation of the forms of the disease. Cases and deaths notified were: *1936*, 10,412 and 640; *1937*, 7,034 and 428; *1938*, 3,864 and 143.

Other Infectious Diseases

Trachoma is very prevalent and causes much suffering and blindness, as in neighbouring countries.

Cases of measles, scarlet fever, and diphtheria are recorded each year, but their prevalence does not appear to be excessive. Undulant fever has been reported from Azerbaijan. During 6 months 14 cases were diagnosed in the Russian Hospital at Tehran (1933). The disease probably occurs elsewhere. All cases were of the *melitensis* type, and infection is probably acquired by eating cheese made from sheep's and goat's milk. An investigation in Azerbaijan showed that the blood of 3·2 per cent. of goats and sheep gave positive agglutination reactions with *Brucella melitensis*.

Sprue occurs in Persia; foreigners provide most of the cases.

Persia suffered very severely from the influenza pandemic of 1918–1919. It caused a mortality ranging from 1 to 10 per cent. of the population in the towns, and even higher rates were recorded in rural areas.

Cattle plague and anthrax are also widely prevalent, and in some years large numbers of livestock succumb. Human skin infections with anthrax (malignant pustule) are very common in some rural areas. Glanders was also rife among the horses of Tehran, and human infections, all rapidly fatal, were not uncommon.

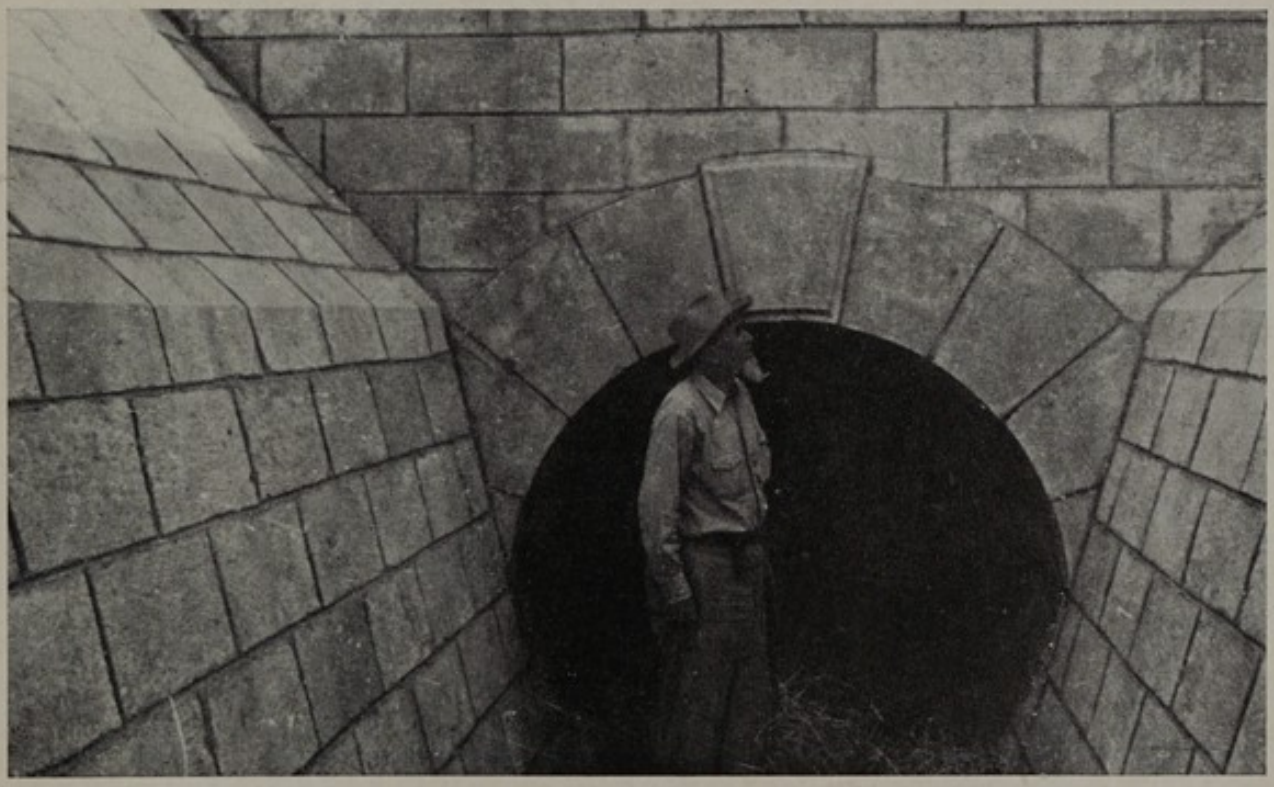
Drug Addiction

Opium addicts were, and probably are, extremely numerous in all ranks of society. In 1914 the Municipality of Tehran estimated the number of opium smokers in the city as 25,000. In other towns the habit was relatively more prevalent. Opium eating was also widespread. The abuse of opium has been, however, generally recognized as a national calamity. Unfortunately opium cultivation was a considerable source of revenue, and the quality of Persian opium was high. Hashish addicts also are numerous in the province of Khurasan and among the dervish fraternity.

The Government has made efforts to control the traffic in narcotic drugs, particularly the distribution and sale of opium, which is a government monopoly. Suppression of these habits presents great difficulties, but they are said to be decreasing.



226. *The Burujird aqueduct under construction*



227. *The Marun water-tunnel*



228. *Lines of qanat mounds*



229. *Windlass and shaft for excavating a qanat*

CHAPTER XI

AGRICULTURE, STOCKBREEDING, AND INDUSTRY

In the following account irrigation and land tenure are described before the methods of cultivation and the crops, because they condition the whole state of agriculture.

It is clear that the country could be made more productive than it is at present. The first step on the road to improvement would be the development of irrigation and water storage, the second the introduction of improved methods of cultivation, and the third the reform of land tenure. In recent years some progress has been made but much remains undone. An agricultural school and a model farm, the first of several in different parts of the country, were opened at Tehran in 1924 and there are now an agricultural and a veterinary college at Karaj. Exhibitions have been held from time to time. There is now a Ministry of Agriculture and its officers issue illustrated pamphlets to the peasantry, and have made a beginning in the huge task of exterminating locusts and other plant pests and diseases. There is also an Irrigation department and plans have been announced for irrigation and for afforestation; but it is improbable that these will be translated into action in the near future.

Irrigation

According to the vague estimates customary in Persia not more than 35 per cent. of the cultivated land depends upon irrigation, the larger part being watered by rainfall alone. Nevertheless irrigated lands are the mainstay of agricultural production, since unirrigated lands vary enormously in their annual yield and are generally confined to the least profitable crops and to winter crops alone. Persian irrigation is and always has been piecemeal and local because of the lack of large rivers in central Persia. It is only in Khuzistan, watered by the Karun and Karkheh, that there was in ancient and Abbasid times a system of canals dependent upon large barrages, which perished gradually in the disturbed times that followed the Mongol invasions of the thirteenth and fourteenth centuries A.D. In the rest of Persia irrigation has always depended upon three methods: qanats, direct-flow channels derived from rivers, and wells. These are described

in more detail below. Of the three types the qanat is now the most extensive, being reckoned to supply about 70 per cent. of the irrigated area. Qanats preponderate in the eastern parts of the North-Western provinces, in the south-western Inland Basins, and in Khurasan. Wells and qanats are the principal source of water in eastern Fars, Laristan, and Makran. Free-flow channels predominate in the Zagros and Elburz, Azerbaijan, Khuzistan, and Seistan.

Whichever type is the source of supply, the method of distribution to the land varies little. The water is delivered into a main channel from which a complex of narrow runnels carries it to the cultivated plots. These runnels are arranged in three ways. On level lands they are either set close together, dividing the plots into long narrow basins (photo. 234), or else spaced more widely as border dykes (photo. 235), by which means less land is wasted on the runnels themselves, a more usefully shaped plot is secured, and the seed bed is easier to level. The narrow basin is however the commoner arrangement. Thirdly, on terraced hill-slopes the water is brought down from level to level by a main runnel which is stopped by large stones; thus water is used economically and erosion is checked (photo. 237).

The amount of water required is usually reckoned at the rate of 1 cusec (cubic foot per second) for 100 acres of winter (cereal) crops, or 1 cusec for 52 acres of summer crops. A similar reckoning is 1 cumec (cubic metre a second) for 1,000–1,400 hectares (2,500–3,500 acres). Three waterings spread over 100 days are usually given to winter crops.

Qanats

The simplest method of securing water is by means of the underground channels known as *qanats* in most of the country and as *karez* in the east. Qanats are of considerable antiquity and they have changed very little with the passage of the centuries. The description of them given by Polybius (*c.* 100 B.C.) is still true to-day.

They are constructed by professional labourers (*moghanis*), who use the following method. Experimental borings are made until a spring is tapped in gently sloping ground higher than the fields to be irrigated. Then a 'mother-well' (*madar chah*) is sunk to below the level of the subsoil water-table, a depth of from 200 to 900 feet. After that the labourers begin at the other end and dig a trench (*haranj*) usually at a gradient of 1 in 2,500 or 1 in 1,500, in the direction of the spring. As they go farther, the cutting becomes a tunnel (*qanat*). Standard dimensions for this are 2 ft. 6 in. wide and 4 ft. 2 in. high,

giving a cross-section of just over 10 square feet. Circular pits and shafts are opened from above at distances of from 20 to 150 yards, and the excavated soil is drawn up to the surface and heaped round their mouths (photo. 228). The spacing increases with their depth, partly because the substratum through which the qanat passes is more compact than that near its mouth. When a soft stratum is encountered, the tunnel is lined with flagstones or with burnt bricks. In time it reaches the spring, and the water flows down the nicely calculated slope to the fields. In some places lateral tunnels tap other water-bearing strata. The shafts are subsequently used to keep the gallery clear and free from obstruction.

Occasionally the moghanis begin tunnelling from the bottom of the mother-well, using the subsoil water-flow to show the slope. Working parties normally comprise four men, two working below ground and two at the surface with a windlass (photo. 229). The whole process may take up to three years to complete.

The larger villages with a considerable extent of cultivable soil are usually the apex of a number of lines of qanats converging from the nearest mountain foot (figs. 53, 54). These lines are from a few hundred yards to several miles long, and the succession of piles of earth resembles a series of gigantic molehills. The qanats themselves, moreover, are liable to be blocked or choked and new ones are built parallel to the old. The earth round the tops of the old shafts is washed away by the rain, and the shafts may become dangerous to unwary men or animals.

The amount of water furnished by a qanat varies with the amount supplied by natural seepage and with the skill of its constructor, but a good qanat will discharge 4 cubic feet per second, enough water to turn a mill. On emerging from underground the stream usually passes through the village and is used for drinking, for washing clothes, or for receiving refuse. After this it is led into the irrigation ditches.

Wells

The crude mechanisms which are used to raise water from wells or rivers usually consist of skin buckets drawn up by a rope passing over a wooden roller, and emptied into a duct which fills an irrigation channel (photo. 231). The motive power is provided usually by oxen, singly or in teams, one animal for each bucket; if the drive-way is protected by a penthouse they can work all day long. The skin holds about 3 gallons, which may be raised as much as 50 feet, and one animal hoist can water about half an acre a day. Land watered by

these lifts is called *dhul*. Counterpoised beams are also used to lift buckets from wells (photo. 230).

A few artesian wells have recently been successfully sunk, as at Shariar near Tehran.

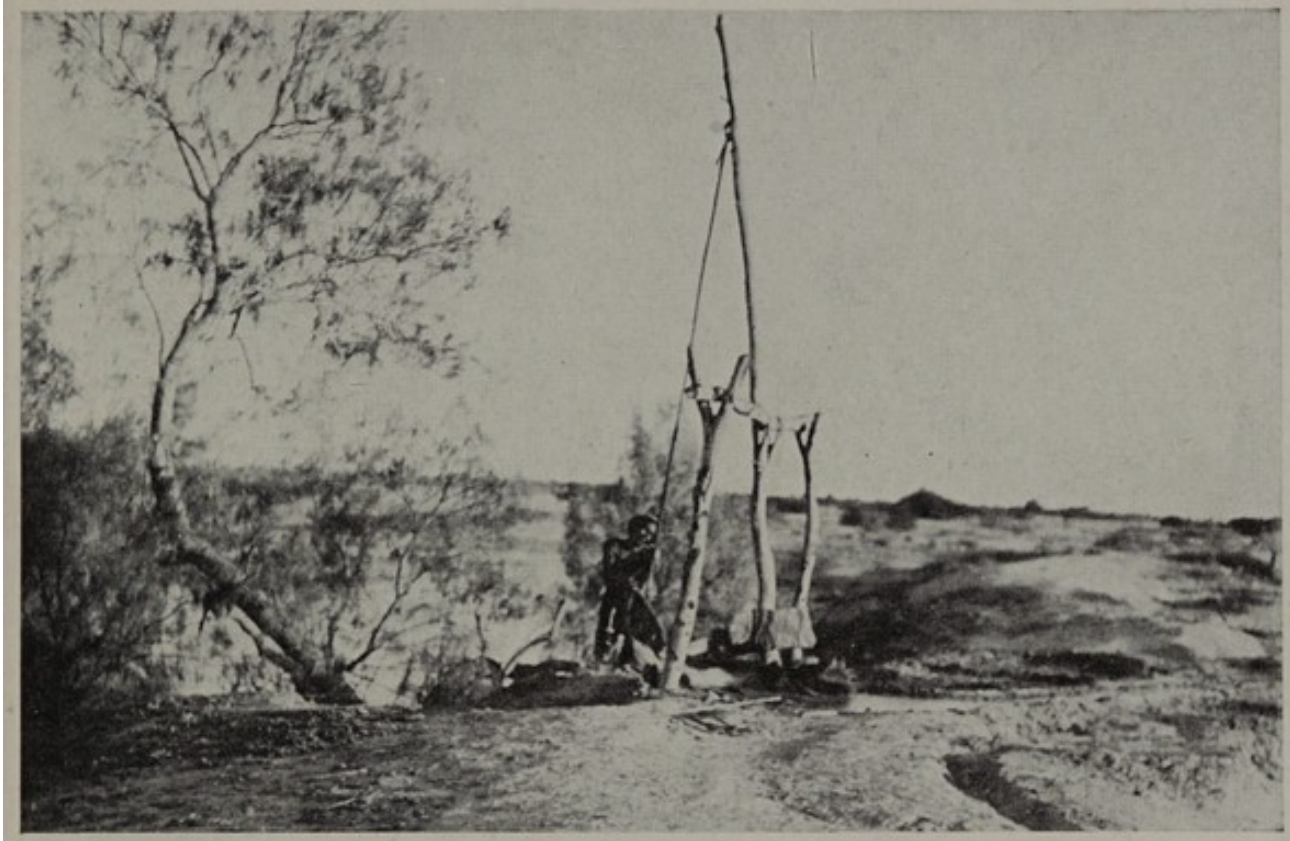
Free-flow Channels

Methods are crude and wasteful. Generally water is drawn off from rivers without the use of regulators and without regard for the interest of cultivators lower down stream. There is also excessive duplication of main ditches: each village has its own ditch, and as many as four may derive from a river within a space of 20 feet. They are seldom lined and their courses tend to be irregular; wastage by seepage and evaporation may exceed 50 per cent. (photo. 233).

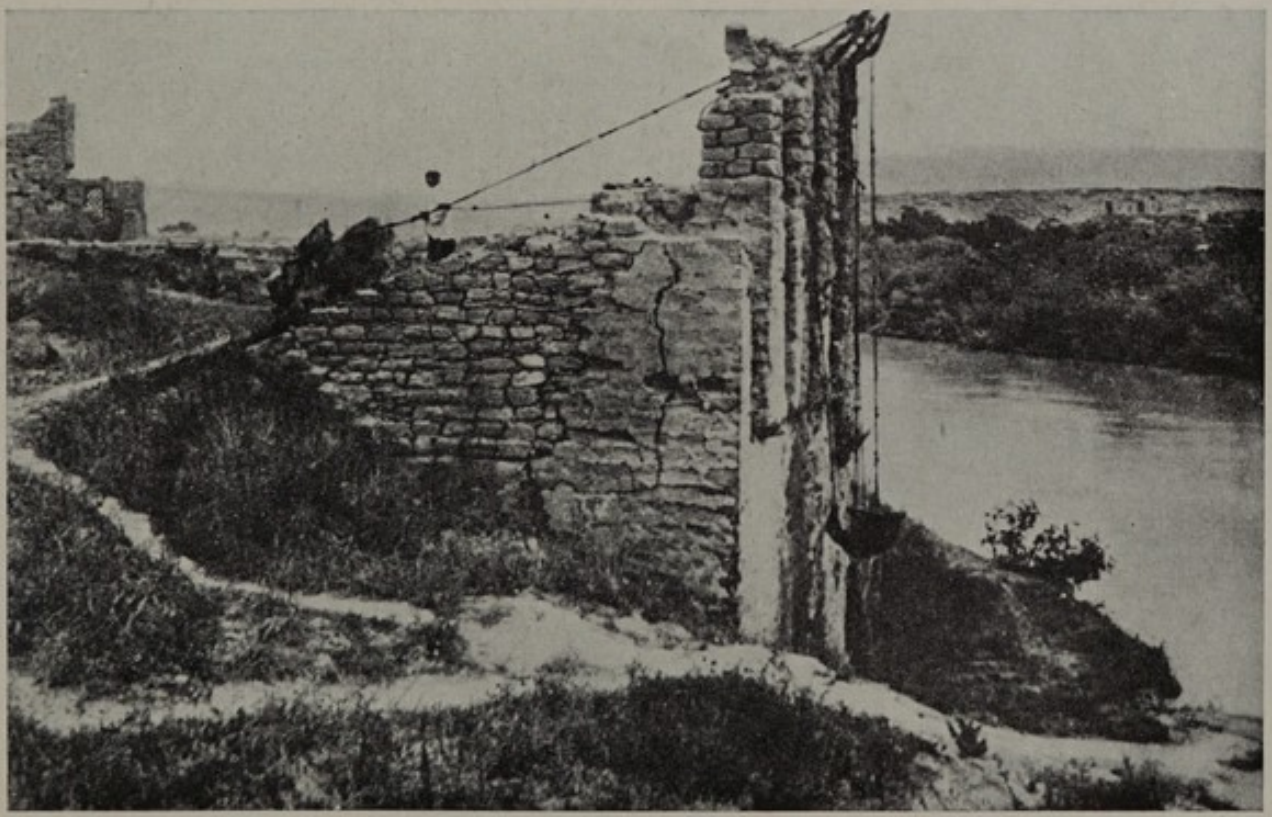
There are no large barrages for river control, but a few dams survive from earlier ages or have been rebuilt in a more modest form, such as the Band Amir on the Rud Pulvar in the Niriz basin, the Saveh dam now in process of reconstruction (photo. 225; p. 430), and the works on the Karun at Shushtar (p. 431). The Band-i-Seistan on the Helmand river is a brushwood construction which is swept away in the flood season and rebuilt annually. This method is also used in Khuzistan and elsewhere, but the smaller dams are sometimes plain banks of consolidated earth. Usually permanent dams or weirs in Persia are built of stone and concrete by simple methods and hand labour. Dimensions are not large; the Faizabad dam on the Rud Kur is characteristic (photo. 224); few attain the size of the Saveh dam. Larger works are needed only in Khuzistan because, except for the Safid Rud and the Helmand, the rivers of central Persia discharge no more than 140 to 350 cubic feet a second. Aqueducts and tunnels are used where necessary, and are built with manual labour and by Persian methods derived from the building of qanats and bridges. The Burujird aqueduct (photo. 226) is a fairly ambitious work, but the remote cultivators of Seistan and of the southern Zagros are skilful at building apparently frail but effective structures of timber (photo. 232).

Land watered by free-flow channels is called *fariab*. The most notable districts are the Urmia basin, the Kermanshah–Mahidasht plains, the Veramin plain south of Tehran, the Zaindeh Rud above Isfahan, the cultivated parts of the Shiraz and Niriz basins, northern Khuzistan between Shushtar and Dizful, the Seistan basin, and the Jiruft plain in the Jaz Murian basin.

The Shushtar Dams. There are records of the construction of irrigation canals at Susa (*mod.* Shush) on the Karkheh in the first



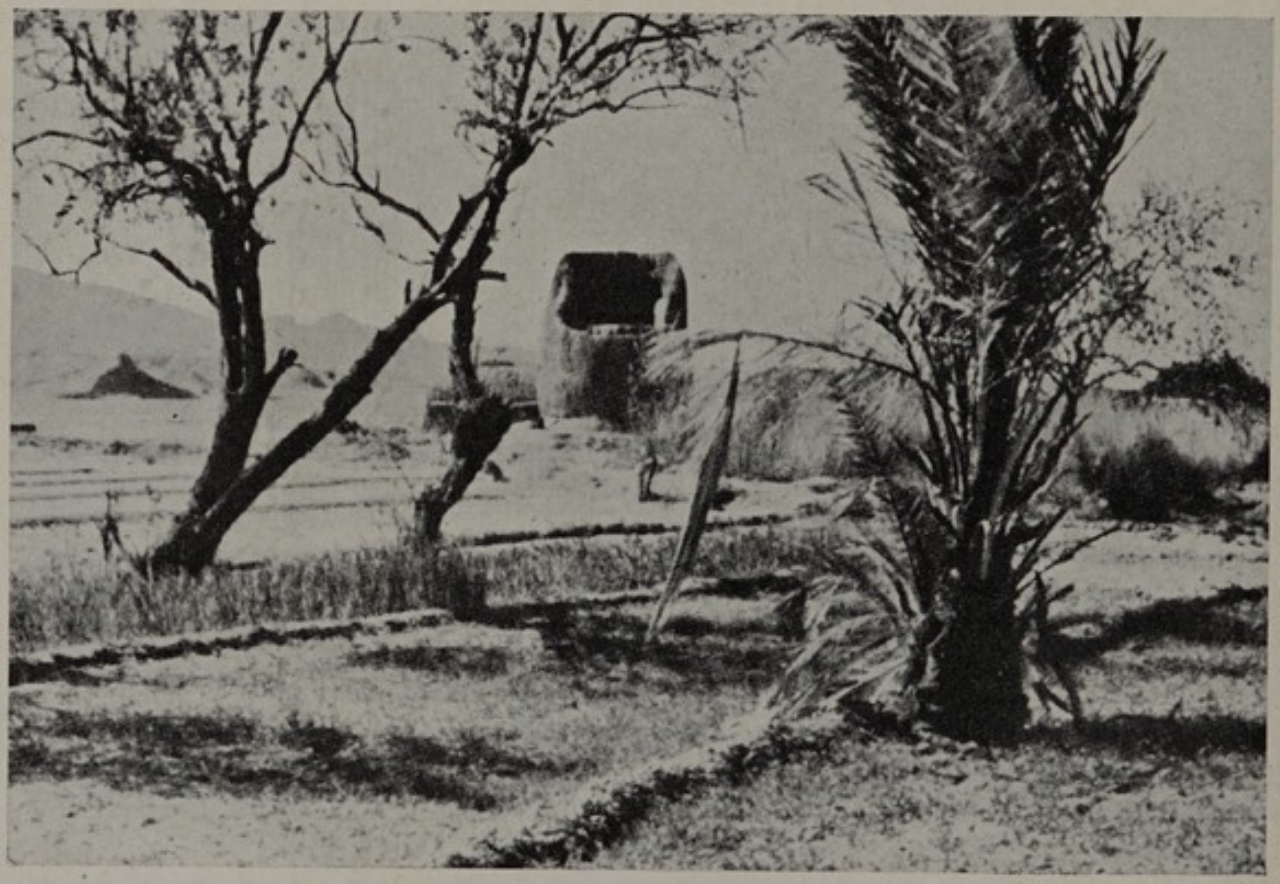
230. *Counterpoised water-lift*



231. *Ox-drawn water-lift*



232. *Wooden aqueduct*



233. *Irrigation channel in Jandaq oasis*

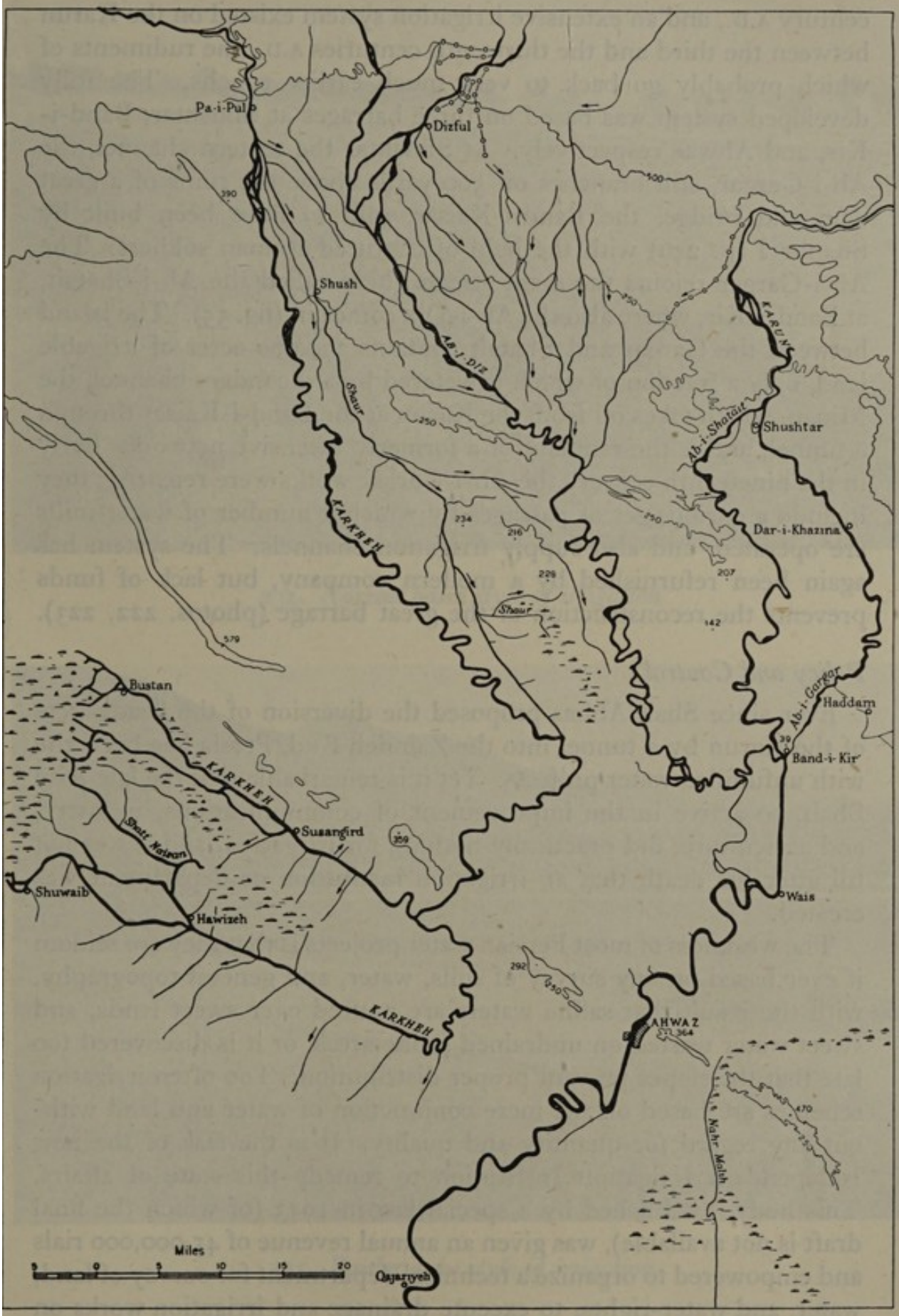


FIG. 55. *The river system of northern and central Khuzistan*

century A.D., and an extensive irrigation system existed on the Karun between the third and the thirteenth centuries A.D., the rudiments of which probably go back to very much earlier epochs. The fully developed system was based on three barrages at Shushtar, Band-i-Kir, and Ahwaz respectively. At Shushtar the eastern channel, the Ab-i-Gargar, still branches off 500 yards above the ruins of a great dam and bridge, the Band-i-Kaisar, said to have been built by Shapur I (p. 246) with the help of captured Roman soldiers. The Ab-i-Gargar rejoins the main stream, here called the Ab-i-Shatait, at Band-i-Kir, where also the Ab-i-Diz comes in (fig. 55). The island between the Gargar and Shatait contains 370,000 acres of irrigable land, only a fraction of which is watered by a secondary channel, the Minau, which takes off from the Karun at the Band-i-Kaisar through a tunnel, and is the remnant of a formerly extensive network. Early in the nineteenth century the Ab-i-Gargar works were repaired; they include a curious set of passages by which a number of water-mills are operated, and also supply irrigation channels. The system has again been refurnished by a modern company, but lack of funds prevents the reconstruction of the great barrage (photos. 222, 223).

Policy and Control

Ever since Shah Abbas proposed the diversion of the headwaters of the Karun by a tunnel into the Zaindeh Rud, Persia has been rife with unfulfilled water projects. Yet it is remarkable that the late Riza Shah, so active in the improvement of communications, industry, and agriculture, did practically nothing for irrigation, and it was not till after his death that an irrigation institution or department was created.

The weakness of most Persian water projects is that they are seldom if ever based on any survey of soils, water, and general topography, with the result that saline waters are poured over sweet lands, and sweet water wasted on undrained saline areas, or it is discovered too late that the slopes prevent proper distribution. Too often irrigation schemes are based on the mere conjunction of water and land without any regard for quantity and quality. It is the task of the new Independent Irrigation Institution to remedy this state of affairs. This body, established by a special law in 1943 (of which the final draft is not available), was given an annual revenue of 45,000,000 rials and empowered to organize a technical department for survey of land, water, and water-rights, to execute drainage and irrigation works on its own account, and to assist land-holders in developing private



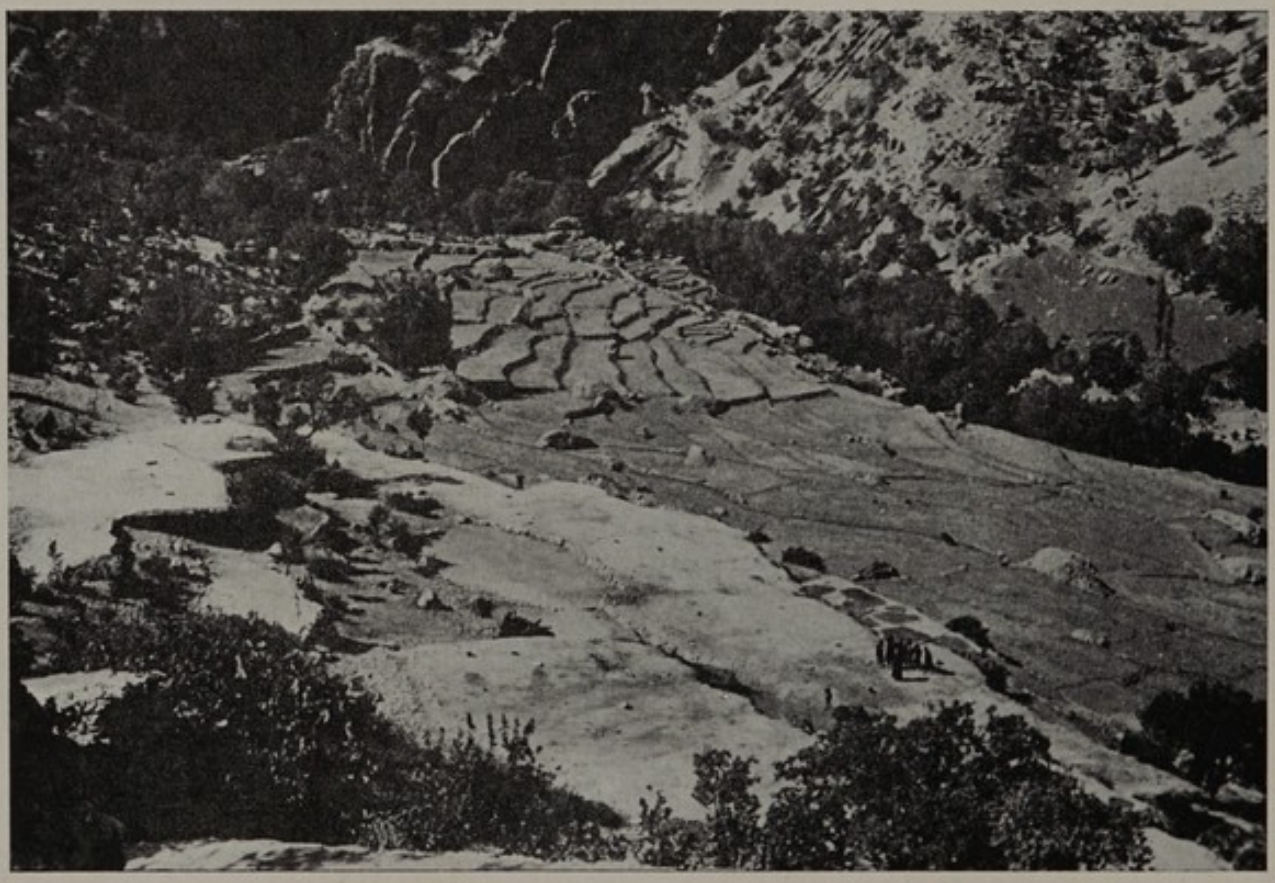
234. *Narrow basin style of irrigation*



235. *Border dyke style of irrigation*



236. *Walled field*



237. *Terraced fields in the Zagros*

schemes, either by carrying out the whole or part of the work at the landholder's expense, or by providing free technical advice. The Institution also has general supervision over the irrigation works of the whole country; it can establish local boards of land-holders and water-owners for the maintenance of existing works, to be paid for by local water rates, and has compulsory powers to effect repairs on the request of a minority of the local owners.

Water-rights are a form of private property and are exceedingly complicated. Usually the lease of water is based on very varied combinations of spring, summer, and winter rights, and each plot of irrigated ground has a water-right attached to it. The ownership of single sources of water may be divided between different persons, thus complicating the problems of division, control, and reorganization. The most that can usually be done to control distribution is to provide a ditch-rider to oversee the distribution and to ensure that the downstream holders are not totally neglected.

Finance. It has been urged that the Irrigation Institution has been burdened at the outset with too ambitious a programme while provided with very inadequate funds, and that it should be limited to technical studies and the accumulation of information about water-rights, while the execution of works should be entrusted to private companies with the co-operation of the agricultural banks. In the past this method has proved the most certain way of securing the completion of schemes and of enlisting the full support of local owners and their capital. At Samnan and Kermanshah recent schemes involving 800,000 rials each were thus organized and despite difficulties made substantial profits.

The inadequacy of the funds at the disposal of the Institution is shown by the fact that it is generally estimated that the total cost of irrigation works in relation to the area irrigated varied in 1943 between 800 and 1,600 rials an acre; the actual cost of excavating earth canals had then risen from 2–2·3 to 5–7 rials a cubic yard.

Projects. The table at the top of page 430 summarizes a recent and fairly reliable estimate of the maximum possible increase of lands irrigated by direct flow, exclusive of the use of great barrages and of qanat systems.

The great possibilities of Khuzistan and the comparative lack of untapped supplies of water in Khurasan are notable. The practicability of such grandiose schemes, however, depends upon the availability of agricultural labour. Generally Persia is not short of landless labourers, but their distribution is irregular; particularly in Khuzistan,

Province	*Acreage*	*Rivers*
Azerbaijan	371,000	Aras, Qizil Uzun, Qara Su, Urmia streams.
Kazvin and Tehran	124,000	Karaj, Talaghan, Lar.
Ardalan and Kermanshah	198,000	Sirwan, Alwand, Karkheh tributaries.
Isfahan and Fars	247,000	Zaindeh Rud, Karun, Kur, Mand, Shahpur.
Khuzistan	1,235,000	Karun-Karkheh system, Hindian, Jarrahi.
Kirman and Seistan	247,000	Helmand, Bampur, Halil Rud, Sarbaz.
Khurasan and Gurgan	148,000	Kashaf Rud, Atrek, Gurgan.
Total	2,570,000	

where possibilities are greatest, it is difficult to convert the semi-settled population into regular cultivators. The same authority suggested as a practical measure the following programme, which involved the construction mostly of low diversion dams and direct intakes on the smaller rivers, and of only a few moderate sized dams of 60–100 feet in height.

Province	*Acres*
Azerbaijan	14,800
Tehran	32,100
Hamadan, Iraq, Burujird	24,700
Ardalan	19,800
Kermanshah	27,200
Isfahan	49,400
Fars	49,400
Khuzistan	148,300
Kirman and Seistan	111,200
Khurasan and Gurgan	14,800
Total	491,700

Schemes recently initiated or planned include the following:

Tehran. The diversion of the Lar river, which drains to the Caspian, by a dam, tunnel and pipes, mainly for the supply of Tehran city but also to supplement the Jaji Rud which waters the Veramin plain. An English firm is undertaking preliminary surveys. It was also proposed to improve the distribution of the Jaji Rud waters by combining the over-numerous main dykes and by raising the head of water with a diversion dam.

Saveh. The repairing of the Safawid dam (p. 426) on the Qara Chai would create a reservoir of 706,296,000 cubic feet capacity, enough for the irrigation of 5,000 acres.

Isfahan. It is proposed to divert water from the Karun system to the Zaindeh Rud and to build a storage dam on the latter near Kuh-i Rang, which would also provide power for a hydro-electric plant.

Fars. The diversion is planned of the Sheshir tributary to the Shiraz basin by building a storage dam at Sultanabad village and a canal or qanat 21¾ miles long, mainly for the use of Shiraz city.

Khuzistan. At Hamidiya on the Karkheh 20 miles north-west of Ahwaz a battery of oil-pumps used during the war was to be replaced by free-flow channels, assisted by a diversion dam built across the river channel where it had a width of 450 feet (fig. 55).

At Shushtar it was proposed to improve the flow of the existing channels by a low-water diversion dam to be built across the Ab-i-Shatait branch of the Karun.

At Behbehan a tunnel 4–5 miles long, at a maximum depth of 125 feet, has been built to bring water from higher up the Marun; a diversion dam may be needed as the slope of the tunnel (1:2,000) may prove insufficient. This is expected to water 12,360 acres of winter crops and 7,400 acres of summer crops (photo. 227).

On the Shaur river which rises near Shush and can provide a discharge of 318 cusecs, two masonry barrages have been built recently. The upper barrage at Khairabad was expected to provide water for some 8,000 acres by canals, of which one was to be 12 miles long with a maximum depth of 15 feet. The second barrage near Sayid Kalih, where the river dissipates in marshes, feeds a canal 35 miles long which takes water to the neighbourhood of Ahwaz.

Land Tenure

There is no detailed information available about types of land tenure and their distribution in Persia. There are five main forms of ownership and possession. *Khalisa* lands are Crown property, generally leased out in large blocks to wealthy persons who sublet, sometimes through several intermediaries, to the small-holding cultivators. Royal confiscations through past centuries have greatly extended the area of *khalisa* lands; though Riza Shah sold a considerable amount to private persons, he himself confiscated large areas of tribal lands, some of which are now being reclaimed by the tribal leaders. *Tiul* lands are Crown lands granted in a kind of feudal tenure in return for certain services, e.g. to tribal leaders in return for the protection of the frontier, or to officers of the court instead of pay. *Milkiat* is full private ownership in accordance with Islamic law. *Waqf* lands are those held in trust either for groups of persons (*waqf khvass*) or for religious and educational purposes (*waqf amm*, p. 407). *Khurdeh malik* is the communal ownership of lands by the village community.

Most of the cultivated lands of Persia are held by the first four forms of tenure, and communal lands though not uncommon are certainly in a minority. Thus, whatever the legal form of ownership, Persian agriculture and the whole structure of village life is dominated by the landlord. Land is the traditional investment and only too many landlords are absentees, living at Tehran or in the provincial capitals. It is not uncommon for as many as thirty villages to be owned by a single man. Landlords are generally as ignorant and conservative in agricultural matters as their tenants (p. 434), and unable to realize that improved conditions among the peasants will increase their own profits. Many would sooner own two villages where the farming is bad than one where it is good. Those who have started agricultural industries, such as vegetable oil factories, have been hindered by the hostility of their fellow landowners. Most will only expend capital on the extension of irrigation, while land is burdened with rents too high for the peasants to effect any improvements of their own.

Communally owned lands, *khurdeh malik*, tend to be subdivided by inheritance into fractions too small to be economic. Though the families often make sensible arrangements for the regrouping of the units, they are generally without the means of capital expenditure.

The codification of the civil law, and the legislation of Riza Shah, have somewhat modified the legal forms, but have done nothing to change the essential fact that Persian agriculture is dominated by the great landed proprietor.

Agriculture

General

Despite the expansion of the oilfields and the recent establishment of light industries, Persia remains preponderantly an agricultural country. Directly or indirectly most of the population draws its income from the land. Cultivation is on a small scale and is largely in the hands of tenants and labourers, whose reward consists of a share of the crops calculated according to a variety of systems. In the greater part of Persia there are neither large farms nor extensive tracts of cultivation. The oasis character of Persian topography reasserts itself in agriculture as in human settlement, and the small cultivated areas of valley and plain are generally separated by tracts of desert. The crop system is somewhat more complicated than in the adjacent Arab lands. Cereals, fruit-trees, and a variety of garden

crops are combined where water permits, and the supplementary maintenance of small flocks of sheep is rendered possible by the extensive seasonal pasture provided by the ubiquitous deserts. Generally there is a distinction between summer (*saifi*) and winter (*shitwi*) crops; the latter may be either irrigated (*fariab* or *dhul*) or unirrigated (*daimi*). Summer crops are necessarily all irrigated except in the Caspian lands. Though irrigated crops are reckoned at only 35 per cent. of the total production they include the best farmed and most productive lands in Persia.

Agriculture labours under the burdens common to adjacent lands: greed and shortsighted policy of landlords, primitive methods, ignorance and excessive conservatism of peasants, discouragement of improvements and initiative by the share-cropping system, and the depressing economic influence of moneylenders and commercial hoarders. The immense distances, the bad communications, and the lack of transport, particularly by water, are a special hindrance, which checks the development of profitable commercial 'cash' crops and retains an unduly large proportion of the land under the less profitable production of cereals and other 'subsistence' crops, which can be eaten when they cannot be sold. Few agricultural regions are within easy reach of markets, and the development of fertile areas tends to be limited to the needs of the nearest large town. With all these difficulties added to the harsh climate and the arduous work of finding and fetching water, it is remarkable with what persistence the Persian peasant continues to make the desert blossom, and what a variety of crops he cultivates in addition to the basic cereals.

The total acreage under cultivation, including gardens, orchards and date-groves, is not known, but the average acreage under cereals including rice from 1936 to 1941 was 6,374,000, to which at least another 400,000 acres can be added for cotton and sugar-beet. This represents only a fraction of the cultivated area, because shifting cultivation is common for unirrigated crops and various systems of fallow for irrigated crops. The limiting factor is not so much the amount of land as of water, and to a lesser degree of labour, though Persia is not short of agricultural labour in proportion to her needs.

Crops include a great variety of food and commercial plants when all specialities are included, but the individual cultivator, when he rises above subsistence level, is usually concerned with at most four elements: (1) a basic cereal, either wheat, barley or rice, (2) a commercial crop, the commonest being cotton, sugar-beet, tobacco, and opium poppy, (3) a selection of fruit or nut trees, with the apricot,

vine, mulberry, and walnut, or in southern Persia the date palm, pre-eminent, (4) vegetables and annual fruits such as cucumbers, melons and gourds.

Self-sufficiency. Persia is generally self-supporting in foodstuffs, except for tea and sugar, and in years of good harvest produces a surplus of cereals, rice, and dried fruit for export. Of industrial crops, there is normally a valuable export of cotton and opium, and a small export of oil seeds, while the tobacco crop is adequate for internal needs.

Methods

Agricultural tools are primitive in design (photos. 238–241). The plough is a simple wooden prong tipped with iron and without a curving ploughshare or mouldboards. The furrow is thus shallow and narrow, and the plough tends to slide round the roots of perennial weeds and scrub. It is drawn by an ox or pair of oxen or even a donkey. A harrow in common use consists of a log or roller slipped over the plough. The only other ordinary cultivating tools are a light mattock for weeding and a long-handled spade mainly used for digging irrigation ditches and runnels. Reaping is done by hand-sickles, and threshing by the threshing-plough of the Middle East, which consists of a wooden frame holding a set of rollers fitted with iron blades; this is drawn by oxen or donkeys and chops up the stalks. The ear is winnowed by casting into the air with a five-pronged fork. The use of tractors and other mechanical instruments is greatly restricted by the narrow units into which irrigated fields are divided, though they can be profitably employed on the large-scale cultivation of unirrigated lands. Plots and fields are small and are often hedged or walled for protection against animals (photos. 35, 41, 236, 242, 243, 246, 247).

Irrigated lands, whether of the 'narrow basin', 'border dyke', or 'terraced' type (p. 424), are first watered in autumn from the runnels to soften the ground before ploughing. They may be cross-ploughed and rolled with the harrow before the sowing, which is usually done broadcast. Water distribution during the growing season is simple; a few spadefuls of earth change the water from runnel to runnel and release it from the runnels to flow across the plots. The harvest season varies greatly according to altitude and latitude; winter-sown cereals may be harvested in April or May and spring-sown cereals from June to August.

Despite the inadequate rainfall, *daimi* farming—the cultivation of winter cereals without irrigation—is practised throughout western



238. *Harvesting wheat with sickle*



239. *Ox-drawn plough*



240. *Winnowing*



241. *Threshing machine*

and northern Persia, and even in the plains and valleys of the southern Zagros foothills and outer ranges, although the southern limit of prudent *daimi* is reckoned to be about the latitude of Ahwaz. Daimi crops are generally very speculative, except in favoured parts such as the Bujnurd and Quchan districts of Khurasan. In the south there may be one good crop out of three, and conditions of tenancy and pay are accordingly adjusted in favour of the cultivator. The Arabs of Khuzistan often prefer the lighter labour and chance profits of daimi crops to the harder toil of irrigation. They are skilful in choosing suitable ground by following the line of old watercourses and noting the nature of the local weeds. The light Persian plough is not unsuited to this work and reproduces to a certain extent the conditions of true 'dry farming'.

Since dung is commonly used as fuel, natural manure is seldom available, except where sheep are pastured on fallow land, and where cattle are kept in byres, as in Gilan, or where pigeon-towers (photo. 247) manure gardens. Instead, a variable fallow system is in use, one third or one half of the land being left idle. But where water is scarce fallow is disregarded, half the land being sown with a spring and half with a winter crop (*du bikar*). In the Kermanshah plains *daimi* lands are left fallow in alternate years, while irrigated lands bear *saifi* and *shitwi* crops in alternate years. In the Farrashband district of southern Fars neither manure nor fallow is used, and the yield gradually drops from 30–40-fold on new land to 10–12-fold on old land. It should be added that the use of chemical fertilisers has been introduced on a limited scale, the total annual import before 1941 being about 15,000 tons.

Tenants and Labourers

Most lands, except *khurdeh malik* (p. 431), are farmed by small holders on a system of share-cropping. Generally the two parties share the produce according to the number of the five items of production which they provide: land, water, seed, oxen, and labour (including instruments). This practice is modified by local custom and such factors as the incidence of taxation. The following exceptions illustrate the differences. In parts of north-west Persia the landlord takes one third when he provides land and water (*si kut*) or two thirds when he provides land, water, oxen, and seed (*sikut-i-makus*), while from unirrigated land he receives only the traditional fifth (*panj yak*). In Kermanshah, the peasant providing labour and seed and the landlord paying for reaping, the division is equal (*nisf-i-kari*);

where the landlord provides only land the peasant receives five sixths (*dah-u-du*). In southern Persia the division by thirds is common, but in Kazerun district the landowner may receive only one tenth from winter sowings, while the tenant pays all expenses, including taxation; the cost of reaping, if not borne by the tenant, is reckoned at 20 per cent. and threshing at 2–4 per cent. Special crops here have their own conditions. For opium the peasant provides only labour, excluding the special task of incisions (p. 445), yet the harvest may be shared equally. All these shares may be in kind or in cash equivalents, while leases may be at will of the landowners or subject to the prescriptive rights of the villagers.

Irrigated garden lands are leased on different conditions from ploughlands. A cash rent is usually paid for the land and water, but the tenants may have a prescriptive right to their tenancies and own the vines and fruit trees. New gardens pay no rent until yielding crops. Rents may be based on area or on the number of trees, e.g. at the rate of 6 rials per 100 vines for tenants with prescriptive rights or 50 rials per 100 vines for those without such rights.

The amount of land cultivated by a peasant, whatever his status, is traditionally reckoned as the amount which can be managed by one pair of oxen. This unit (*juft* or *gau*) is expressed, not as a fixed area, but in terms of seed or produce, either as the area needed for 1,000 lb. of wheat seed and 600 or 1,000 lb. of barley seed, or as the area which will produce ten *kharvar*, about 60 cwt., of cereals. The equipment needed by the highest class of cultivator includes:

Pair of oxen and one donkey.
Two ploughs, shaft and yoke.
One thresher and harrow.
Two or three spades.
Two thousand pounds of cereal seed.

All this probably costs about 30,000 rials at 1943 prices, a not inconsiderable capital which helps to explain the variety of tenancies. The peasant possessed of this capital, say about £230, and of a prescriptive right to his tenancy, is known as *gauband* in north-west Persia. Below him come the poorer *khushknishin*. They have no land rights, but may take up tenancies on less favourable terms, or may become labourers either for gaubands farming more than one gau or for landlords farming their own land. They also include specialized craftsmen needed in the village, such as the carpenter, blacksmith, and shoemaker, the shepherds, the miller (as distinct from

the mill-owner), and the *pakar* or overseer who watches the crops of the whole village. These are mostly paid by traditional percentages of the harvest, or sometimes by cash for piecework; the miller usually has the use of the mill one day a week. The village headman, who is generally paid from the landowners' share, is responsible with the *pakar* for organizing communal labour, such as the cleaning of irrigation ditches, for which they summon so many men per *juft* or *gau*. Even the more favoured tenants could barely subsist on the crop-share of their *gau* if they did not supplement this by the produce of sheep, fruit trees, gardens, domestic crafts, and casual labour.

Khurasan. The foregoing account refers mainly to western Persia. In Khurasan conditions are similar though terms vary. In a typical village, described in 1910, the land and water were owned by an absentee merchant. His tenants provided seed and labour, and the harvest was shared equally both from irrigated and unirrigated lands. There were ten holdings averaging 94 acres of ploughland each, and about one third was irrigated by a qanat. Garden ground was limited to 1½ acres. The headman was paid in cash by the landlord, and the overseer, here called *dashtban*, was paid partly in cash and partly in kind. There were few landless peasantry, and the villagers supplemented their crop-share by sheep, goats and fowls.

Caspian Provinces. Peasants generally rent as many *jarib*, here a unit of about 2·6 acres, as there are working members of the family; hence the plots are extremely small. Leases, where not prescriptive and hereditary, are short (1–2 years) or intermediate (8–10 years). Rents are based on the principle of fifths in Mazanderan, and in Gilan vary between one third and one half of the produce; in the latter case it is reckoned that 5 per cent. is kept for seed, 22 per cent. is eaten, and the remainder sold.

Soils

The general character of the soil cover has already been described (p. 188). An early writer stated that the Persian soils are very good and capable of producing almost anything, whereas a more modern account says that 'most of the soils are more fertile than the crops indicate'. There is a total lack of detailed and extensive soil studies. The cultivated soils of central Persia are, however, known to be generally deep and often to contain a mixture of gravel, sand and clay, with abundant lime and a deficiency of humus. The deltaic soils of Khuzistan tend to be heavier, with clays and loams predominating. Similar soils are also known in central Persia; in the districts of Saveh

and Burujird silt loams lie over gravel, and in the Niriz basin heavy clay occurs in the Marvdasht plain of the lower Rud Kur.

The chief problem is salinity, accentuated by bad drainage of irrigated lands, whereby subsoil salts rise to the surface. Many irrigation schemes ignorantly initiated on salt-impregnated lands have failed for lack of preliminary soil studies, which are essential for success. The character of the water also needs study, since many rivers are saline. Often, however, saline lands can be cleansed by washing and kept sweet for long periods by adequate drainage.

A recent investigation on lands 20 miles north-west of Ahwaz showed the presence in excessive amounts in different plots of sodium chloride (0·9%), calcium sulphate (0·9%), and calcium chloride (0·5%) respectively, and small quantities of magnesium chloride. The subsoils tended to be freer from the salts but to show an increase in alkalinity due to decreasing permeability to water. The distribution of surface salts was very irregular, so that large scattered patches failed to produce any vegetable growth. Such barren patches consisted of very hard soils which when wet became so sticky and airless as to prevent plant life, whereas crops grew well above a gypsum-veined subsoil with a permeable layer of firm sand below.

Pests

No detailed information is available concerning pests. The worst in central Persia is the locust, the control of which is the most necessary improvement in Persian agriculture. Cereal crops suffer severely from the *sunneh* insect (p. 439), and in Khuzistan dates suffer from a variety of pests, described in the handbook of *Iraq and the Persian Gulf*, B.R. 524, p. 465.

The Crops

Though a considerable variety of crops is grown in Persia, most are grown only on a small scale, and Persian agriculture is properly based on four subsistence crops, wheat, barley, rice, and dates, and four commercial crops, cotton, sugar-beet, tobacco, and opium. Fruit-trees of all sorts, grown under garden conditions, considerably supplement the supply of foodstuffs. Since holdings are small, and the unit of production is a very small plot, the change-over from crop to crop, and the growing of a variety of crops, is easy. Thus a five-acre holding in Gilan is recorded where rice, wheat, barley, cotton, sugar-cane, and broad beans were all grown in one season. Such cases are rare, but Persia is certainly remarkable in the Middle East

in that the growing of mixed crops, or of main subsistence crops supplemented by several subsidiaries, is fairly common, particularly in the better irrigated regions.

The following table indicates the relative importance of the principal cereals and sugar-beet for 1942–44 and of cotton (1942 only). The figures for the quinquennium 1936–41 were about 6 per cent. higher for plantation and 16–20 per cent. higher for the yield of wheat and barley, but much the same for rice.

Crop	*Acreage*	*Average annual production in tons*
Wheat	3,953,000	1,400,000
Barley	1,482,000	600,000
Rice	642,000	340,000
Cotton	232,300	..
Sugar-beet	74,000	55,000

Cereals

Wheat. This is the principal Persian cereal, being grown for flour throughout Persia wherever there is arable land, though the most notable wheat districts are the Quchan-Meshed plains in Khurasan, the Urmia, Hamadan and other basins in the north-western provinces, the Mahidasht and Kermanshah plains in Kermanshah, the Chehar Mahal and Faridan districts in Isfahan, the Shiraz and Niriz basins in Fars, and the better watered districts of Kirman. Wheat is normally sown in the autumn, grown either as an irrigated or as a dry crop (*daimi*), and harvested in the spring, except on high intermontane plains, where it is sown in spring, irrigated, and harvested in summer. Three or four irrigations in a season seem to be the rule for winter wheat. Production figures for 1942–44 indicate an average yield of 806 lb. to the acre, whereas some earlier figures suggest the rather improbable figure of 1,400 lb. an acre, as against 300–500 lb. in Iraq, 1,000 lb. in Australia, and 2,000 lb. in Great Britain. In Khuzistan it is reckoned that 60–70 lb. of seed an acre is needed for unirrigated land, and 80–90 for irrigated land, with expected yields in a good year of 700–900 lb. per acre. There is no information available about varieties. Wheat is seriously affected by the *sûn* or *sunneh* grub (*eurygaster integriceps*), which feeds on the stems and later attacks the ear. Effective control is possible in Persian conditions by manual collection, beating the stalks so that the grubs fall into a bag.

Barley. This, the second cereal in importance, is grown wherever wheat is grown and in the same manner. It is generally used to

adulterate wheat flour for bread, at the rate of 10 per cent. in a normal year; a proportion may be cut green for fodder. The price is generally three-quarters that of wheat, though the yield is somewhat higher, averaging 896 lb. an acre according to the 1942–44 figures. The grains of Persian barleys are somewhat larger than those of Indian kinds, and they mature about three weeks before wheat, thus escaping the worst ravages of the sunneh pest.

Rice. This is the principal crop of the Caspian provinces, but it is also grown on a small scale in many parts of Persia wherever there is sufficient water, notably in Kermanshah, in the Shiraz basin, along the Zaindeh Rud, and in Khuzistan (photos. 242, 243, 245).

The main reason for its concentration in Gilan is climatic, not so much because the climate is highly suitable as that the amount and the distribution of the rainfall do not permit the successful growth of wheat. Rice was not grown in ancient times, but it was well established by the tenth century, when its presence was recorded by the Arab geographers.

The usual methods of cultivation are employed. In winter or early spring the dry fields are ploughed, often with the aid of hired labourers from the mountains. At the end of April the fields are flooded to a depth of 12 or 15 inches, and they are then ploughed twice more to turn them into lakes of liquid mud. The seed is sown in May, sometimes in nurseries, sometimes directly into the fields. This sowing is done by the women, who also thin out the growing plants by treading the surplus ones into the mud; but the harvesting, four months later, is done by the men with sickles, who generally leave about a foot of stubble. The paddy is first threshed by the trampling of oxen and then placed in a sort of closed granary, which is heated by a fire beneath. After four or five days' drying, the rice is taken out and then husked with a grindstone. This stone has a hollow with a diameter of about 4 ft. 6 in., and the husking is done by means of a wooden tilt-hammer driven by a water-wheel.

The fields are left fallow only at long and irregular intervals, but animal manure is sometimes used. This difference from common Persian practice is due to the local custom of keeping cattle in byres.

The average yield according to the 1942–44 figures was 1,209 lb. of husked rice an acre or according to other figures 1,500 lb., the richest fields being those watered by the Safid Rud.

Millet or *Sorghum.* There are two kinds of this spring cereal called *zurat* and *alam.* The former is used to adulterate wheat and for feeding to poultry. The latter is smaller and darker. Only small quantities

are grown, though during the war when seeds of maize and spring wheats were scarce large quantities of sorghum were made available from Iraq.

Other cereals. Oats and rye are not grown, but there is a little spring-sown maize.

Fibres and Oil Seeds

Cotton. This is the principal commercial crop, grown in irrigated areas of Azerbaijan, Tehran, Mazanderan, Kermanshah, Fars, Khuzistan, Kirman, and Khurasan. From 1937 to 1941 the acreage varied between 371,000 and 494,000, but dropped in 1942 to 232,000. Normally up to 21,000 tons of raw cotton are exported annually and 11,000–12,000 retained for Persian needs, but the reduced acreage of 1942, coupled with a harvest 20 per cent. below normal, resulted in a deficit. The upper limit of cultivation is about 5,000 feet, and the crop might be greatly increased in Khuzistan, where climate and soil are suitable and there is plenty of water. Three grades are grown: *Filestani*, with a staple of 36 mm., in Khurasan and the north-western provinces, accounts for 45 per cent. of the total; *American* short staple (24–30 mm.), grown mostly in the Caspian provinces, provides 30 per cent.; and the *Persian* short staple (18–21 mm.), which is more hardy and resistant to diseases than the two imported kinds, provides the remainder, being generally grown in all other areas.

Silk. Silk is one of the ancient Persian products, but from 1864 onwards silkworms were attacked by a disease, and production decreased alarmingly. In 1891, however, silkworm eggs were imported from Bursa in Turkey, and, with the exception of a setback during the war of 1914–18, output has steadily grown since then, and now averages about 500 tons annually, of which half is exported.

Mulberry trees are common in many parts of the country, but they are most numerous in Gilan, where they can be grown concurrently with rice. As a rule the silkworms are the property of the landlord, who gives the peasant farmer one third of the dried cocoons as recompense for his labour.

In April the cultivators take the silkworm eggs, attach them to sheets of paper, and wear them beneath their clothes. After three days the eggs are hatched and the caterpillars are transferred to a platform (*tilambar*) covered with a thatched shed and raised about 5 feet from the ground. Here they are fed on large quantities of mulberry leaves, alternately eating greedily for 7–10 days and reposing in torpor for 1–2 days. After some forty days they are fat, full,

and almost transparent, and they tend to climb up branches placed vertically inside the shed and to spin their cocoons. This goes on for ten days, during which time the tilambar is sealed. After this it is opened and its roof is found to be covered with cocoons. Some of these are retained for breeding purposes, but most of them are removed. The chrysalides are killed by exposure to the sun or by immersion in boiling water, and the silk is unravelled and wound off on reels.

Jute. Jute is indigenous to Mazanderan, but production is not even large enough for the country's needs.

Alfalfa, to which the climate is suited, has recently been introduced on a small scale, and might prove a valuable addition to the list of Persian crops, especially as a cattle food.

Oil-seeds. In 1940, 108,260 tons of cotton seeds were produced. Other seeds are grown sporadically throughout Persia, with the following average annual totals: linseed 1,500 tons, sesame 3,500 tons, castor-oil 3,500 tons, poppy 1,500 tons.

Fruit

Isfahan, Shiraz, and the north-western provinces are the great fruit centres, the Caspian lowlands being less important, but orchards and clumps of trees are found in very many other parts. The chief fruits are apricots, grapes, and dates, though most temperate fruits are also grown. Raisins, figs, dates, apricots, and peaches are dried in the sun and form an appreciable part of the national diet (photos. 35, 78).

Apricots. There are seven known kinds of apricot, six sweet and one bitter, and all of them grow to a large size; many travellers consider them the finest in the world. Apricot orchards are generally sown with clover. The fruit is not picked, but allowed to fall into the clover, which very often prevents it from being bruised.

Grapes. More than thirty varieties are grown, some for dessert fruit, some for drying or pickling, and others for making wine. The best eating grape is the Ascari, which is small and of a light golden colour. The *kishmish* grape is dried to make sultanas, and others to make raisins. The fresh grapes of Shiraz are sometimes packed in cotton-wool and sent to India. Vineyards are usually on terraced slopes, but in Hamadan the vines are grown on the edges of deep trenches. The snow fills these trenches in winter and preserves the roots, while the plants themselves are protected with earth.

For the making of wine flat earthen pans and large earthenware jars are used, barrel-shaped, and holding about 35 gallons. First the

grapes are trodden out in the flat pans. Then, together with their stalks and skins, they are put into the jars and left to ferment for two and a half days. The stalks and skins form a cake on top of the juice. This is broken with a stick and the whole mass is stirred together. The stirring is repeated every four or five hours for five days, after

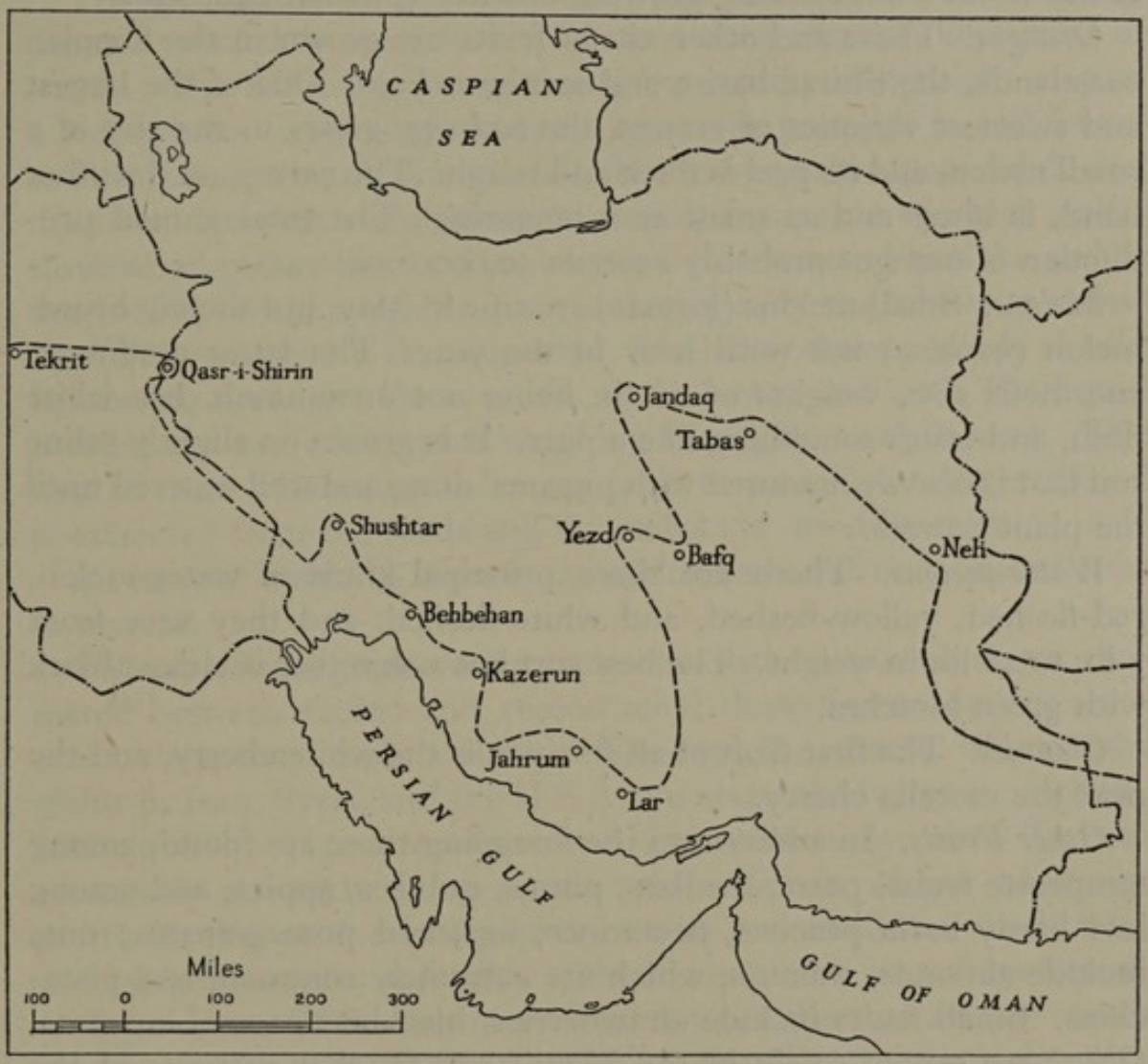


FIG. 56. *Northern limits of date cultivation*

which the cake is removed, and the process is repeated until by the twenty-fourth day the wine is ready to be transferred to glass jars or carboys (*qarabeh*) for maturing. It should be laid down for at least five years, and will go on improving for another five. Inferior types are made with less care and in a shorter time.

Dates. Dates are a staple food in southern Persia and along the Gulf coast as well as being eaten as a luxury elsewhere. Fig. 56 shows the northern limit of date cultivation, and south of that limit they can be ripened at altitudes of up to 4,000 feet, though sometimes damaged by frost at the northern limits. It is estimated that there

are some 10,000,000 date palms (*Phoenix dactylifera*) altogether,[1] 5,000,000 of them in south-east Persia, where the Minab district is a great centre of production, and 3,750,000 of them on the Persian side of the Shatt al Arab. Production for 1937–38 was officially estimated at 130,900 tons, less than half the production of Iraq, which is the world's largest date-growing country (photos. 248, 249).

Oranges. These and other citrus fruits are grown in the Caspian coastlands, the Shiraz basin, and southern Fars. One of the largest and sweetest varieties of orange, the *badreng*, grows to the size of a small melon, and its peel is thick and rough. The *narenj*, on the other hand, is bitter and as small as a tangerine. The total annual production of oranges probably exceeds 20,000 tons.

Melons. Small melons (*germak*) are ripe in May, but the big brown melon (*karbiza*) not until later in the year. The latter attains an enormous size, weights of 70 lb. being not uncommon, has white flesh, and tastes something like a pear. It is grown on slightly saline soil that is heavily manured with pigeons' dung and well watered until the plant flowers.

Water-melons. There are three principal kinds of water-melon, red-fleshed, yellow-fleshed, and white-fleshed, and they vary from 3 lb. to 28 lb. in weight. The best sort has a skin that is almost black with green blotches.

Cherries. The first fruit of all to ripen is the white cherry, and the next the morella cherry.

Other Fruits. In addition to the foregoing there are found, among temperate fruits, pears, medlars, plums, quinces, apples, and among less hardy sorts peaches, nectarines, figs, and pomegranates; nuts include almonds, walnuts, which are extremely common, and pistachios. Small fruits include strawberries, blackberries, and currants. *Olives* are grown solely in the Manjil and Rudbar districts of the Elburz, with an average production of 2,500 tons.

Commercial Food-crops and Drugs

Opium. The white poppy has been grown in Yezd from very remote times, but the opium produced from it was for domestic consumption only. After 1864, however, opium growing was extended to counterbalance the decline of the silk trade (p. 441). The chief areas of cultivation are Isfahan, Yezd, Shiraz, Niriz, and southern Fars, Kirman, Khurasan, Burujird, Hamadan, and Kermanshah. Output

[1] A full account of date production is given in *Iraq and the Persian Gulf* (B.R. 524), pp. 457–459.

of opium is now restricted by international agreement, and in 1937 it was estimated at 518,000 lb. At every stage from preliminary permission for planting to final sale by registered retailer it is carefully controlled by the government, and there is an excise duty as well as an export tax (p. 486).

The seeds are sown in November. The young plants are carefully thinned until they are a foot apart, and the ground is kept clear of weeds. The following spring they grow rapidly to a height of 3 or 4 feet (photo. 244). Early in June, when the poppy is in full flower and the petals are just about to fall, the seed-vessels are scored during the afternoon with a small three-bladed knife, one cut of which makes three small gashes $\frac{1}{2}$ in. or $\frac{3}{4}$ in. long and $\frac{1}{8}$ in. apart. From the gashes drops of opium exude, which are collected early the following morning. The operation is then repeated. If a heavy shower of rain should fall during the night, the opium is washed away and lost. The liquid is dried and made into cakes weighing from $\frac{3}{4}$ lb. to $1\frac{1}{2}$ lb. each. The best of them contain up to 12 per cent. of morphine. Vegetable oil is extracted from the seeds and the stalks are dried for fuel.

An inferior variety is sown in the spring and takes only four months to mature.

Tobacco. Some 30,000 acres are grown with an annual output estimated between 12,000 and 16,000 tons; these figures do not seem exact, since they imply a yield of 896–1195 lb. an acre, whereas the yields in Iraq, Syria, and the U.S.A. are respectively 672 lb., 758 lb., and 1,018 lb. Cigarette tobacco of kinds commonly called Turkish are chiefly grown in Gilan (4,000 tons). Pipe or *chibuk* tobacco is grown in the north-western provinces (7,000 tons) and *tombak* for water-pipes (*kalyan*) in Isfahan and other southern areas (2,500 tons).

Sugar-Beet. This crop is a recent introduction which was much encouraged by Riza Shah in order to decrease the dependence of Persia upon foreign sources for her sugar supply. Production is principally in the north-western provinces, Khurasan, Isfahan, Fars, and Khuzistan. The crop depends very largely upon transport facilities and is likely to be permanent only where these are good or where refineries are local (p. 459). The crop is sown from February to May and harvested from October to December according to district. It is grown by irrigation, but methods are bad, seedlings are often inadequately thinned or left unthinned and also unweeded, and the flooding of the beds is often followed by scalding. Production averages 2 to $2\frac{1}{2}$ tons an acre, and the sugar content is low (14–15%); the acreage rose from 62,000 in 1936–41 to 74,000 in 1942–44.

Cane Sugar. Cane sugar is one of the oldest of Persian agricultural products, but its growth was neglected for centuries. Since 1870 it has been grown only in the Caspian coastlands and in Khuzistan. The latter is the more suitable climatically, but cultivation on a large scale still awaits the proper development of the waters of the Karun.

In the Caspian region there are two kinds of sugar. *Indi Lale* is grown from seed and gives a syrup about the consistency of molasses of grapes. *Shehar Lale*, the more important, is propagated from the stems of the previous year's canes. The earth is dug over with a spade, roughly levelled with a mattock, and then ploughed. Planting begins a few days after the vernal equinox. The stems are cut into sections, each containing two nodes, and these are planted at intervals of about 6 inches. Earth is then drawn over them with a hoe. A month later shoots have appeared to a height of 12 inches, and they are thinned out with a kind of toothed bill-hook. This process is repeated every ten days for the next six or seven weeks. Harvest comes eight months after planting, i.e. at the end of November. The canes are cut close to the ground with the bill-hook, and they are then stacked in the middle of the field for a few days.

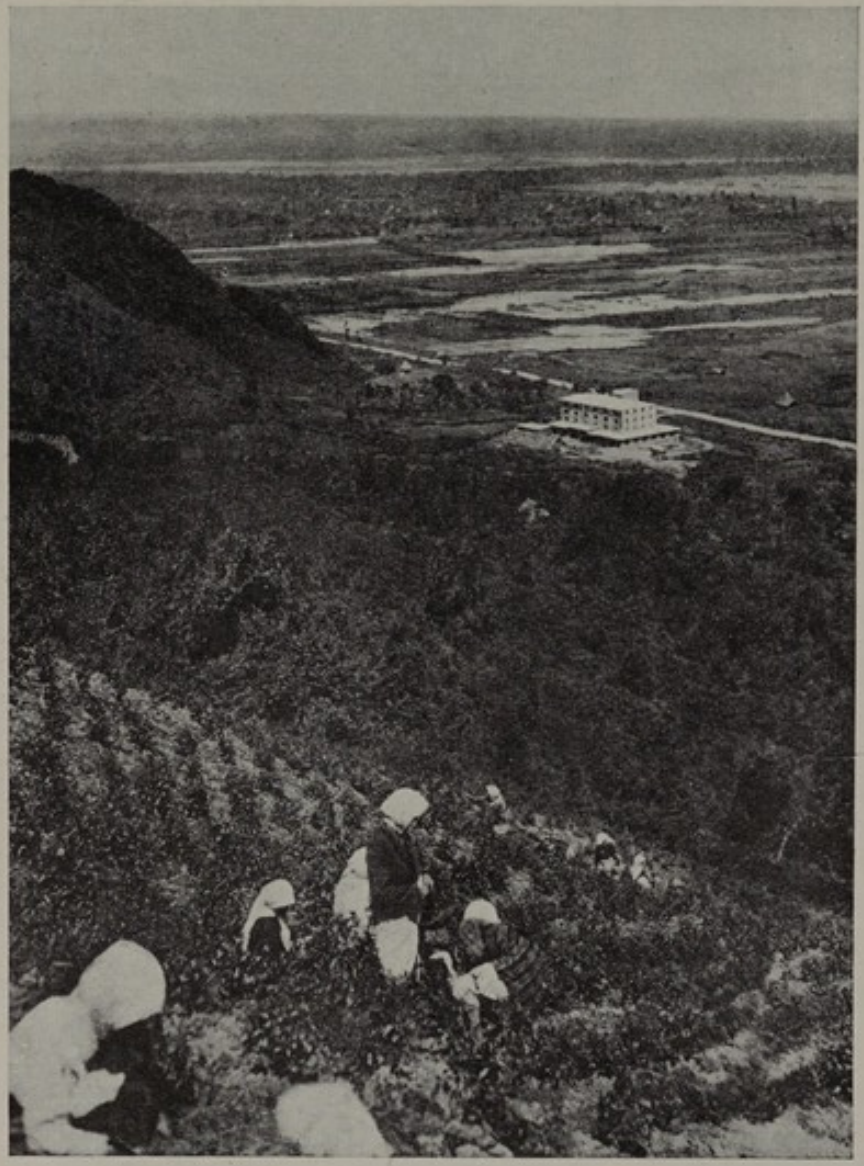
Tea. This crop was introduced before 1914 and later encouraged by the regime of Riza Shah, when Chinese experts started new plantations at Lahijan. It is grown on the lower foothills adjoining the Caspian plain, mainly in Gilan, where heat, moisture and drainage are adequate. Acreage at present is less than 10,000, and the annual yield about 600 tons. Plants are raised from seed, planted out when 2–3 years old, and first picked in their fifth year, tea being picked in spring and autumn twice every 10 days from strong plantations. The finest tea comes from Lahijan and the spring pickings are reckoned superior (photo. 243).

Gums and Medicinal Plants

These wild products are a speciality of Persia, valuable for export. Gum tragacanth, the exudation of the *astragalus* bush, is collected in the hill country from Kirman to Kermanshah, and gum arabic near Shiraz and elsewhere. In 1937–38 the former had an estimated production of 3,270 tons. Gum ammoniac, galbanum, and sagapenum are produced in Khurasan and near Isfahan and Shiraz, as also are opopanax, sarcocol, colocynth, and scammony. Asafoetida is extracted from a desert plant that grows round Birjand and Tabas and in Persian Baluchistan. Liquorice grows wild in many regions.



242. *Rice field near Resht*



243. *Tea crop and tea factory, with rice fields below*



244. *Opium poppy ripening for seed*



245. *Rice harvest in a village of the southern Zagros*

Vegetable Dyes

Indigo comes from the south-west, particularly from Luristan and near Shushtar and Dizful. It is sown in the middle of March and cut 120 days later, when it is about 5 feet high. Forty days later still it is cut again. *Henna* (*Lawsonia inermis*) is principally cultivated near Kirman and Bam.

Other vegetable dyes come from madder roots (in Kirman), saffron (near Qain), and gall-nuts (from the Zagros). In recent years the production of all colouring plants has suffered from the competition of aniline dyes.

Grasses

Lucerne and other grasses are grown or allowed to grow on low-lying ground. These are at their best in April, since later they are scorched by the summer sun. They are seldom gathered in spring, however, but are picked as required later in the year. By this method they naturally lose much of their nutritive value.

Vegetables

The usual vegetables of temperate climates are found. They are both winter and spring crops, and they include broad beans, French beans, beetroots, and pumpkins. Spinach, onions, tomatoes, and green-rooted carrots are also common. Cucumbers are short and thick but make very good eating. Lettuces, cabbages, turnips, and aubergines grow to great sizes. Potatoes, known as 'Malcolm's plums' (*alu-i-Malkam*), introduced by Sir John Malcolm at the beginning of the last century, are now much grown in the towns. During the present war they replaced sugar-beet as a farm crop in districts where transport was bad. Peas are mainly a winter crop. Peas and beans are also grown as farm crops.

Livestock

Little definite information is available about livestock, and the figures quoted below from an official census of livestock are probably incomplete as well as inexact. Yet sheep and goats provide the nomadic and semi-nomadic tribesmen of Persia with the basic means of existence and considerably supplement the income of the peasant cultivators. The larger animals provide the peasants with the power to drive their ploughs and, away from the main routes where the motor-lorry disputes their importance, with the principal means of

transport. Wool is also the raw material of the carpet industry and commerce. But very little seems to have been done to improve stock-keeping in Persia, and the Government seems generally to suffer from the delusion common to the Middle East, that it is necessary at all costs, including extermination, to transform the nomadic tribesmen into cultivators. Yet Persia needs an increase of meat, wool, and milk foods to improve the standard of living far more than an increase in cereal production, and nothing can alter the climatic fact that in the central and southern Zagros there are extensive seasonal ranges of pasture for large flocks in areas where sedentary livestock could never be maintained, and cultivation is precarious or impossible.

Sheep and Goats

The stock-raising methods of the tribesmen are naturally primitive, though not haphazard. Three months after the Persian New Year (20 March) the rams are separated from the ewes and fed until ready for mating. At the rising of the Libra constellation (*c.* 23 September) they are turned into the flocks so that the ewes bear about the New Year. The lambs are kept in separate flocks according to age. Sheep and all other livestock are sent out daily to graze, usually on a fresh area, and coralled at night for fear of wild animals and raiding tribesmen; they are watered regularly, since water is often at a distance from the day's pasturage. The ewes are milked in the early morning, and shearing is done either according to need or twice a year, about the third week of May and at the rising of the Libra. A great part of the tribal flocks are owned by the tribal leaders and their relations; many tribesmen act as shepherds in return for a share in the produce and the lambs; a flock of 300 sheep is common (photo. 251). The seasonal migrations following the vegetation are very extensive in the central and southern Zagros (p. 337), where the limiting factors are the width of the strip of vegetation along the migration routes, and the spacing of the water supplies. In Kurdistan the migrations are local in distance, but the seasonal range in altitude is considerable; often the lack of water makes it necessary to graze certain pastures unduly early before the melting snow has disappeared. In hot weather the sheep stick their noses under each others tails, apparently to secure some shade.

In agricultural districts all flocks are looked after by the village herdsmen, drawn from the landless class and paid by a variety of forms. Sometimes the shepherd retains all the increase of the flocks

above their original number while providing the owner with fixed quantities of the milk products from each animal, e.g. 3 lb. (half a *man*) of clarified butter (*raughan*, *ghi*) for a ewe and 6 lb. for a goat annually. Or the milk products and the surplus progeny may be shared equally. The village herdsmen, who include oxherds, cowherds, shepherds and lambers, also have a right to a certain amount of cereals for each unit (*juft*) of the village land (p. 436). The village pastures are owned either by the landlord or by the community; often landlords make no charge for the use of the pastures, but flocks coming from other villages must pay, e.g. 7–15 rials a head for pasturage.

Milk foods, wool or hair, and meat are the staple products of sheep and goats, meat being the least important; lambskins are also an item of commercial value. Goats' hair is used for tentage, and the cloth is said to last for 20 years. Sheep's wool is used for blankets, rugs, and clothing; also from 7,000 to 10,000 tons of raw wool are exported annually. In 1937 there were 13,711,000 sheep and 6,999,000 goats in Persia.

Cattle

In 1937 there were 1,508,000 oxen, presumably including bulls and bullocks, and 1,406,000 cows. They are seldom of good quality and are principally used as plough animals. Except in localities such as Tehran and Abadan, where there is a special demand for dairy products, milk production is incidental, though their milk is more valued than their meat. Out of a herd of thirty-five native cows maintained for milking at Abadan the average lactation period was four months, and twelve cows usually gave a total of not more than 35 pints daily. Lucerne is a readily available cattle food.

Horses and Mules

Three types of horse are found in different regions, the Turkoman in the north (photo. 150), the Arab in the south, and the Persian almost everywhere. The last-named was originally a cross between the first two. The Turkoman is hardier than the Arab, but not so fast.

Persian mules, although of no great size, are exceptionally sturdy. They can carry 320–390 lb. at a steady $3\frac{1}{2}$ or 4 miles per hour for 25 or 30 miles a day, and live for 20–30 years. The chief breeding grounds are in Fars near Shiraz and Kazerun, the Bakhtiari country, Luristan especially Pish-i-Kuh, and Kurdistan, where the Kalhurs used to breed large numbers. Among the Bakhtiaris mares and donkey stallions are kept exclusively for breeding, the latter being

neither used for burden nor allowed to mix with their own species. The Bakhtiaris also buy young stock in December at Dizful from the Pish-i-Kuh Lurs and sell later at Isfahan. The official figures for 1937 were 52,466 mules, 143,000 horses, and 162,000 mares.

Donkeys

The donkey is a common beast of burden for both tribesmen and peasantry, and it is also used to draw a plough. The best can carry 200 lb. burden; donkeys were estimated at 1,145,000 in 1944.

Camels

The camel is a beast of burden throughout most of central, eastern, and southern Persia, where the Qashqai are noted for their camel herds. The Khurasan camel is celebrated for its strength. It has very long hair and bears cold or exposure far better than the ordinary Arab or Persian camel. The normal load of the two last is 320 lb., of the former 600–700 lb. The best animals are a cross between the Bactrian (two-humped) camel and the Arab (one-humped), the first cross being the best. The camel is a more delicate beast than is commonly supposed and requires careful handling. The estimated number of camels in 1944 was 68,000.

Poultry

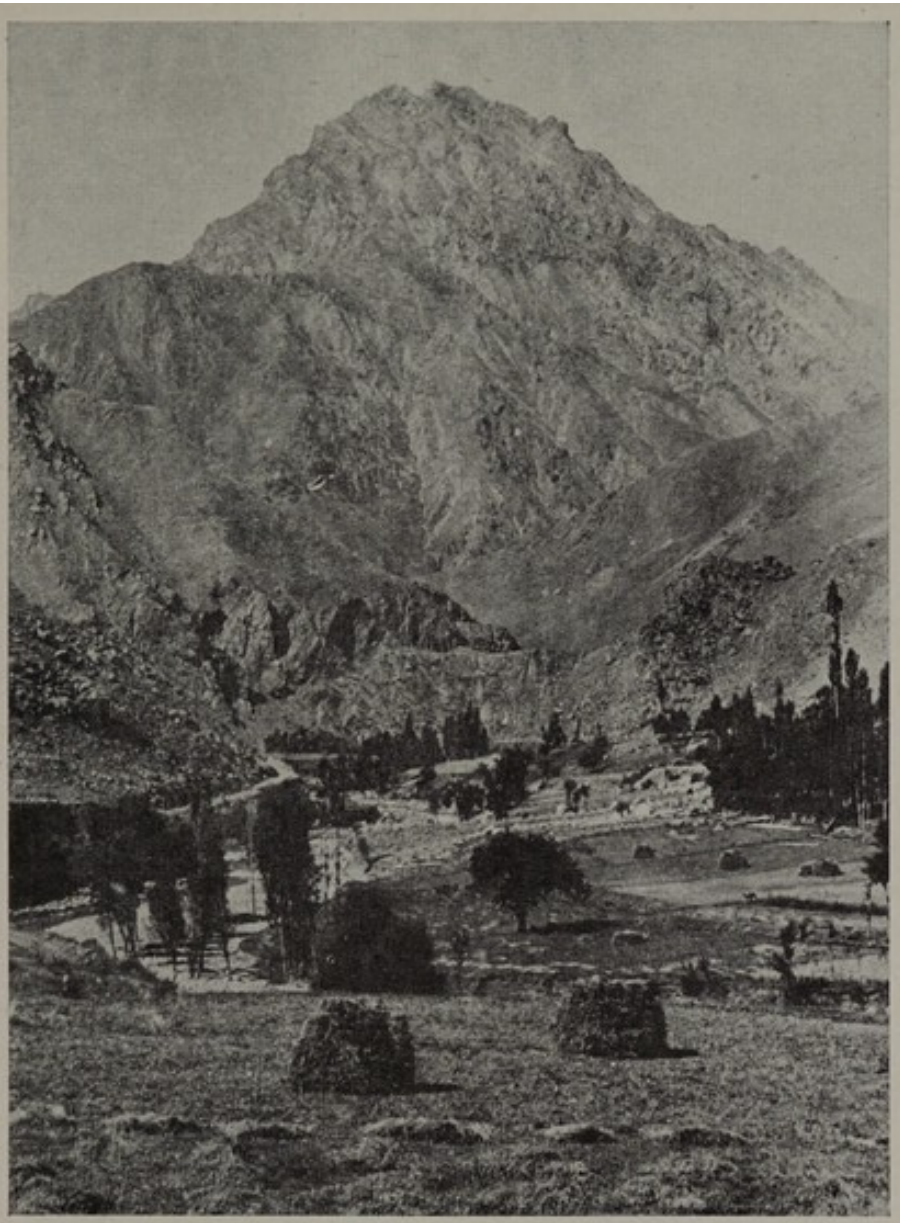
Each peasant usually keeps a few fowls, rather lacking in plumpness. Turkeys are found in Mazanderan.

The Regions

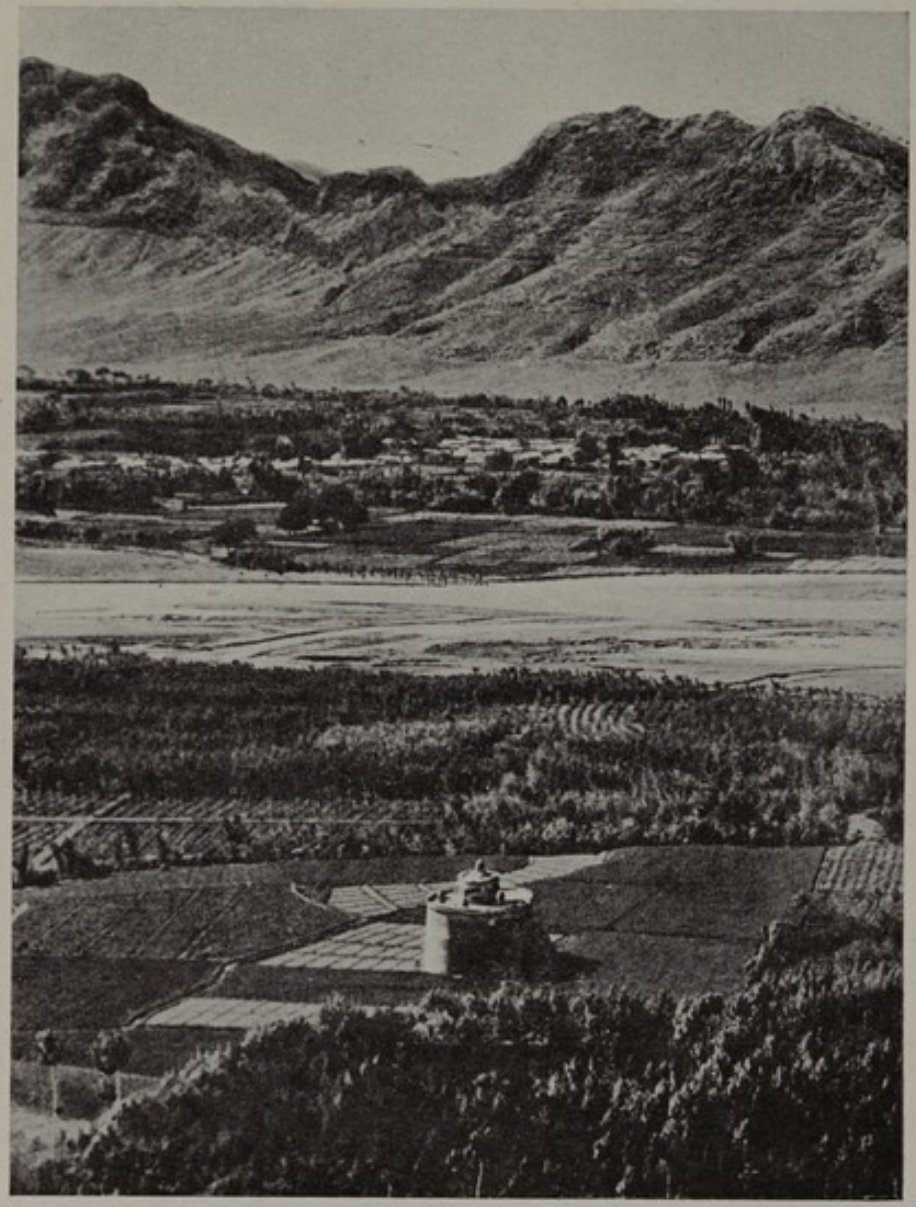
The following summary of irrigation methods and crops describes both past and present crops in order to indicate the capabilities of the different regions. The same order is followed as in the regional account of the Distribution of Population to which this is a companion.

The Caspian Coastlands and Elburz Ranges

With their heavy rainfall Gilan and Mazanderan are the most productive regions of Persia, but irrigation is necessary in the drier plains of Asterabad province and south of the Elburz ranges. The largest areas cleared of forest for cultivation are the Resht and Tunakabun districts. In Mazanderan there are also numerous small clearings scattered through the forests. Methods of clearing are primitive and stands of large trees and bush survive within the fields; bracken thrives and is too deep-rooted to be dislodged by native tools.



246. *Strip cultivation in a valley of the southern Elburz*



247. *Mixed cultivation along the Zaindeh Rud; pigeon tower in foreground*



248. *Date palms of Mask Hutan oases in the Jaz Murian basin*



249. *Cultivation beneath palms in an oasis of Makran*

Rice is the dominant crop, and tea a speciality; cotton, sugar cane, opium, flax, and in Gilan tobacco, are also grown widely. In the uplands wheat, barley, and beans appear. Fruit trees are numerous, including many citrus sorts as well as hardy kinds; there are many mulberries, since this has been a great area for silk culture. Vines grow very strongly. Olive-groves occur near Rudbar and Manjil in the hills. Hemp and hops grow wild in Gilan.

The only large agricultural area on the southern flank of the Elburz is the Tehran and Veramin plain, watered by free-flow channels and qanats, where there is considerable production of cereals.

The mountain ranges provide extensive grazing for sheep, goats, and also horses, of which Mazanderan provides nearly one third of the Persian total.

The North-Western Provinces

The valleys and basins of this relatively well-watered region contain the largest area of production in Persia. The most fertile districts of Azerbaijan, such as the well-cultivated plain of Urmia, are watered by free-flow, but in the eastern districts of Kazvin, Iraq (Sultanabad), and Saveh, where streams are few or dry up in summer, irrigated crops depend also on qanats (fig. 53). *Daimi* cultivation is possible everywhere, and predominates in Kazvin, and also in the Bijar district of the upper Qizil Uzun.

Azerbaijan ranks with the Quchan-Meshed district for cereal production, and most of the other valuable crops of Persia, including rice, tobacco, cotton, and sugar-beet, are grown in the irrigated areas of the whole region. There is extensive garden and orchard cultivation round towns and villages; fruits are limited in colder districts like Ardebil to hardier sorts such as vines, apples, pears, cherries, and plums; almonds, apricots, and pistachios appear at Kazvin and figs and pomegranates at Saveh.

On the high plateaux and hill country very large numbers of sheep and goats are bred, and in Kurdish districts horses, ponies, and formerly camels.

The Northern Zagros

All the more open valleys of Ardalan and Kermanshah provinces of Kurdistan are cultivated by free-flow irrigation derived from mountain streams, and there is a prosperous mixed agriculture with considerable surplus production of cereals in the wide intermontane plains of Kermanshah, Malayer and Burujird. Rice and peas come

next, and other products include tobacco, cotton, opium, castor-oil, indigo, and, among foodstuffs, maize and clover. Garden crops, fruits, and walnuts for local consumption are numerous. Specialities include the grapes of Karind and figs of Rijab.

Stock-raising of sheep for wool rivals wheat production in importance, and large numbers of mules and horses are bred for transport.

Central and Southern Zagros

South of the Gamasiab plains cultivation is very sporadic in the High Zagros and mainly confined to such pockets as the Alishtar and Simarun plains and the Fahlian valley (photos. 35, 41, 42). In the Pusht-i-Kuh foothills and the Bakhtiari *garmsir* between Dizful and Ram Hormuz, and in the outer ranges of the Shahpur and Mand basin, there are several fertile districts where cultivation depends on irrigation of all types together with speculative daimi crops. But the only important agricultural regions are in the Shiraz and Niriz basins. Generally cereals predominate in the smaller pockets, but opium, tobacco, cotton, rice, and maize are grown in the Kazerun district and in the Shiraz and Niriz basins, where sugar-beet has recently been an extensive crop. Fruit growing is considerable in the Shiraz basin, including apricots, vines, and oranges, which latter recur southwards at Kazerun, Furg, and Jahrum. Specialities of Shiraz include the *khullar* grape and rose-water. Date palms become a principal source of food in Laristan, with cereals, tobacco, and citrus fruits grown beneath them as in Makran. In the central Zagros the acorn harvest plays a part in rural economy (photo. 250).

Sheep and goats abound in all the pastoral regions of the Zagros, and camels also in southern Fars.

The South-western Lowlands (fig. 55)

Only a tiny part of the water supply of this region is at present used and cultivation is confined to riverain strips, watered by free-flow channels and by water-lifts, particularly along the Diz and Karun above Band-i-Qir, the Shatt al Arab and Karun below Ahwaz, and the marshy tracts (Hawizeh and Shadegan–Fallahiyeh districts) formed by the Karkheh and lower Jarrahi. Cereals predominate on the drier lands, rice in the marshy areas, and dates along the banks of Abadan island. Sugar-beet is a recent introduction. Beans, tobacco and cotton are subsidiary; linseed and sesame have been grown, but sugar-cane seems to be seldom cultivated. In the Ram Hormuz district



250. *Acorn harvest in the central Zagros*



251. *Flock of sheep in the Zagros*



252. *Spinning cotton by hand*



253. *Water-driven mill for grinding corn*

fruits include citrus kinds, grapes, peaches and almonds as well as dates.

In the coastal district of Dashtistan irrigation is by wells, but the crops are similar to those of Khuzistan; garden crops include onions, melons and cucumbers.

Khuzistan is a great pastoral region, and livestock include sheep and goats in large numbers, and camels.

The South-western Inland Basins (fig. 54)

These districts depend mainly upon irrigation from streams such as the Zaindeh Rud in the western districts bordering the Zagros, and also in the east on free-flow irrigation from smaller streams descending from the internal ranges, but in the broader central plains of Sirjan, Bahramabad and Kirman the qanat predominates. The oasis character of cultivation is very marked and crops vary greatly from district to district. Cereals are grown extensively, though some districts such as Yezd and Kashan are deficient. Cotton is a long established crop in Qum, Bahramabad, and Sirjan districts. Rice, lucerne, opium, and oil seeds are minor crops in Isfahan district. Finer fruits and nuts such as walnuts and pistachios are extensively grown round towns. In the north at Kashan and Natanz mulberry plantations are a remnant of the former silk culture. Other local products include gum tragacanth, asafoetida, and madder in Bahramabad district.

Grazing is less extensive in these districts than elsewhere, except on the Zagros flank and on the high ranges around Kirman.

Northern Khurasan

The Quchan-Meshed valley is one of the principal granaries of Persia, while there are fine orchards and vineyards round the towns and villages; crops are either *daimi* or irrigated by free-flow channels from streams and springs in the west, and channels, qanats, and wells in the east. The well-watered hill valleys of the Hazar Masjid and Binalud ranges are noted for their plantations of fruits and nut-trees, while in the Kalat and Darreh Gaz plateaux cereal production is combined with mixed crops such as rice, cotton, lucerne, melons, and cucumbers. In all the populated tracts south of the Binalud ranges cereal production dependent on qanats preponderates, though there are many orchards, and in Juvain dry cultivation of cereals used greatly to exceed irrigated crops; subsidiary crops generally include cotton and opium, with rice at Nishapur, tobacco at Turshiz, silk at

Turbat-i-Haidari, Juvain, and Sabzawar, where also castor-oil was grown. Sugar-beet has been replacing some of these. The wild rhubarb of Nishapur is a local speciality.

The principal grazing areas are the districts south of the Binalud ranges and particularly the border lowlands.

The Eastern Upland Rim and Lowlands

The central vales of the Qain and Birjand highlands are well watered by qanats, springs and wells, and contain many widely separated plantations in which cereals, fruit-trees (grapes, figs, pears, mulberries), and nuts predominate. Small quantities of opium, tobacco, cotton, millet, and indigo are grown; the western oases of Tabas and Firdaus produce dates and oranges and subsidiary crops of opium and tobacco, and in the Bijistan oasis cereals are extensive. Wild products include saffron near Qain and asafoetida near Tabas.

In the Sarhad district cultivation is limited to a very few valleys, where fruit-trees and cereals are grown, and stock-keeping is the main source of food.

In the oases of the Mashkel lowlands such as Jalk, which covers 4 square miles, cereals and beans are grown under date-palms, but the delta of the Helmand, irrigated by free-flow channels, is the only important agricultural district of south-east Persia. Here good crops are secured of cereals, peas, beans and melons, while fruit trees include grapes, mulberries and pomegranates.

Grazing is extensive, especially in the lowland strip east of the Kuh-i-Ahangaran, and livestock include fat-tailed sheep, camels, and horses.

Makran, Jaz Murian Basin, and Rudian Basin (fig. 57)

In Makran cultivation is limited to small oases watered by wells, qanats, and intermittent streams, which are dammed with mud walls to hold the spate after occasional rains; in the potentially fertile Dashtiari plain the river bed is cut too deep for flow irrigation. Dates predominate, with cereals grown beneath the palms (photos. 248, 249).

In the Rudian basin conditions and crops are similar to those of Makran, though near Qulashgird dry cultivation of cereals is possible in some years. The Minab oasis, extending some 10 miles south and west of Minab, contains the largest palm groves of south-east Persia; henna and indigo are also produced, and it is the northern limit of the plantain; mangoes and bananas grow at Pariab 15 miles north of Birinti.

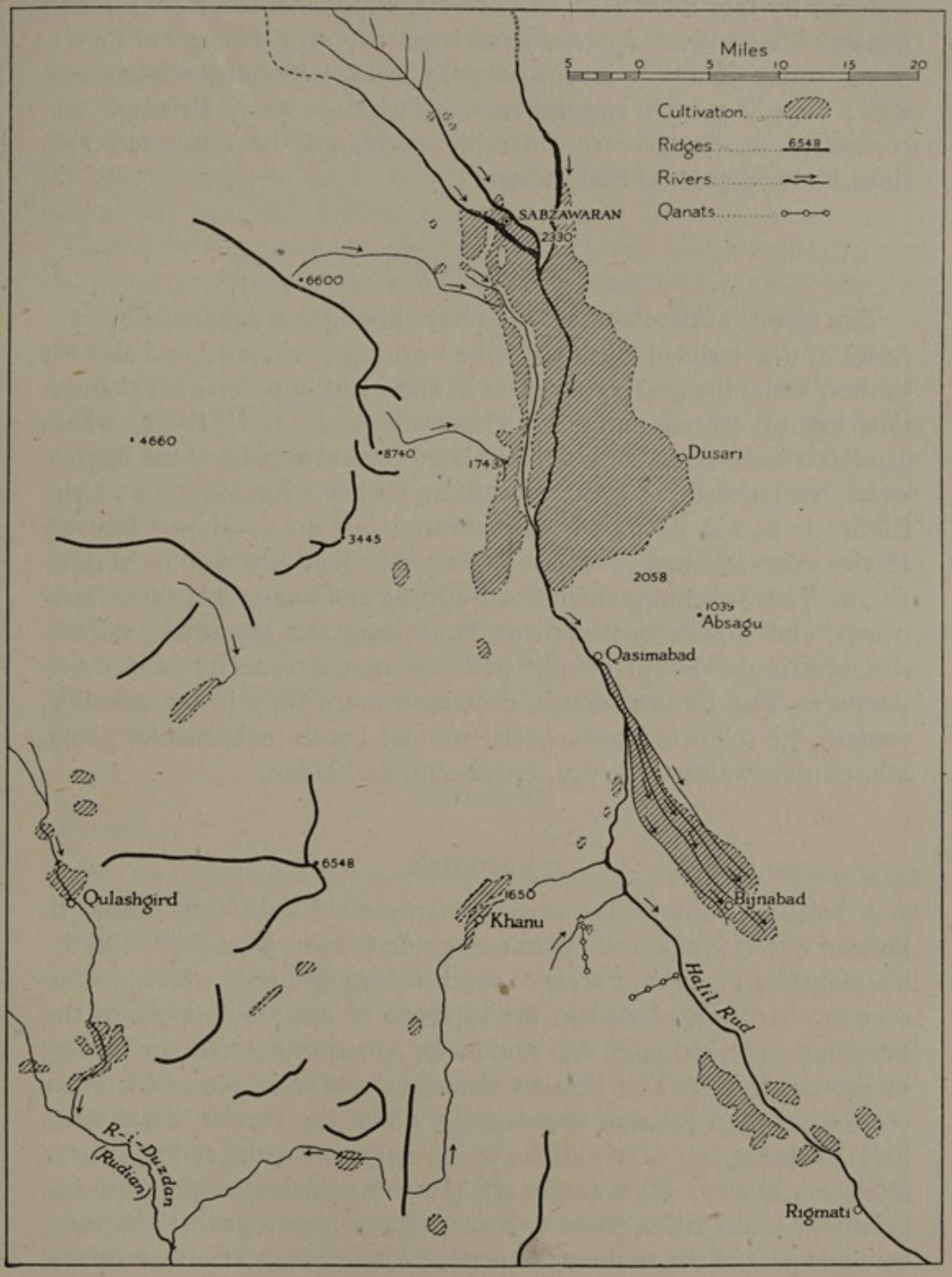


FIG. 57. *Cultivated areas of Jiruft and Rudian districts; qanats are incompletely shown*

The Jiruft, Khanu, and Bampur oases of the Jaz Murian are watered by free flow from their rivers, supplemented by wells and qanats. The cultivated area of Jiruft is extensive for this part of Persia, being some 35 miles long and 7–15 miles wide; the climate and water supply permit two harvests of wheat a year, although uncontrolled floods have considerably decreased the cultivated area since its heydey in Abbasid times.

Forestry

The forests of the Zagros ranges have been greatly reduced by centuries of unrestricted cutting for the burning of charcoal and also for timber, while the grazing of goats in areas with a permanent population has prevented natural reafforestation. In the Elburz, where growth is more rapid, and in the isolated central massifs of the Zagros, Persia still possesses great wealth in timber. Exploitation in the Elburz is nominally under state control, but no developed forestry service exists, though there is a forestry school at Kharkun in Mazanderan. There are many small wood-cutting and box-making establishments, and a state-owned plant for cutting and creosoting railway sleepers in the Babul district with an annual capacity of 600,000 sleepers. The Elburz forests, described more fully in Chapter IV, contain the following commercial woods: beech, oak, maple, plane, ash, poplar, walnut, juniper, hornbeam, and alder.

Fisheries

A brief account of the principal species of fish-fauna found in Persian waters is given on pp. 221–223. In the southern Gulfs and the Caspian Sea Persia has access to rich fishing-grounds which at present are hardly exploited in the interests of the food-supply of the Persian people, although fish could supplement the general deficiency in protein foods. The Persian Caspian fisheries are worked under concession by a Russian company in which the Persian State owns half the shares, but nearly all the products go to Russia, and at Tehran fish are a luxury. The waters are being over-fished at present, and production has fallen from 10,000 to 5,000 tons a year. The most valuable part of the trade is the production of caviare from sturgeon; the method is a trade secret jealously guarded by the company. Production of caviare also has been halved, declining from 80 to 40 tons a year, the bulk of which likewise goes to Russia. The company has

refrigerating plants at Pahlevi and Babulsar. The concession does not prevent local fishing by the coastal inhabitants.

The Gulf fisheries are at present confined to inshore fishing by traps and stake-nets, but recently state interest has been shown by the establishment of a state-controlled canning factory at Bandar Abbas, the policy of which is to can sardines for export at high prices; crustacea have also been canned successfully on a small scale. Production of sardines is about 50 tons a year.

Local fishing also takes place along the coasts of Makran; this was known in antiquity as the land of the fish-eaters or Ichthyophagi, and dried fish is still a staple diet in inland Makran, being exchanged for dates.

The A.I.O.C. and the Persian Government have both shown interest in the possibilities of trawling in the Gulf, and the former is said to be acquiring a trawler with an experienced crew. It has already organized the transport of 800 tons a year of Gulf fish by motor-boat to Abadan.

The expansion of the Gulf fisheries and the establishment of a refrigeration transport service by motor-lorry, similar to that which plies between Iraq and Palestine, would contribute greatly to the improvement of nutrition in Persia, provided that the population can be induced to eat fish. The Moslem code allows the consumption only of fish with scales.

Industries

General

Before 1934 Persia possessed little modern machinery and few large factories. Foodstuffs, clothing, and domestic articles were prepared in a multitude of small workshops usually congregated in the bazaars, while primary agricultural products were treated by small mills and primitive installations throughout the country (photos. 252–255; 258, 259). This system still characterizes the carpet industry and a considerable part of the rest of industrial production. But about 1934 Riza Shah began to create a modern industrial system, largely to make Persia less dependent on imported goods, and by 1941 some 250 plants existed which might be termed industrial establishments, including some thirty large factories directly owned by the State. The latter are all well planned and equipped with efficient modern machinery, mostly of German, Russian, British, and Czech origin. They are the largest establishments in their respective trades and in several have a monopoly of production. Private enterprise has also played a con-

siderable part, though under general state control; the authority of the Department of Mines and Industries is needed for the establishment of new factories, and all plans and specifications must be submitted to the department, which also exercises general control over all industrial establishments (p. 466).

The chief of the new industries is textiles; the second deals with food and other vegetable products and includes a group of modern sugar refineries; there is also a small group of chemical factories, a nascent armaments industry supported by an incomplete metallurgical scheme, and several large establishments connected with the building and constructional trade. As a whole the planning of this rapid industrialization was coherent. The means have been provided for the rapid treatment by modern machinery of Persian agricultural products, whereby agriculture has been stimulated, while the equipment of the Persian armed forces with light weapons produced within Persia cheapened the cost of internal security.

The factories have been well located in relation to the new roads and railways created at the same time. The plants for treating foodstuffs are mostly at the centres of the major agricultural regions. Half the textile industry is located at Isfahan, a convenient centre for gathering the cotton produced sporadically throughout south-western Persia, and the remainder is distributed among the capitals and route centres of the northern cotton districts. There is thus a considerable decentralization of industry. Most provincial capitals have one or two modern factories appropriate to their local products, and several factories have been placed at convenient route-centres which hitherto were unimportant places. Tehran district, with a quarter to a third of all factories, has the largest single share; the new chemical and armament establishments are located either at Tehran or at convenient centres such as Karaj and Sultanabad on the road or rail network within 25 miles of Tehran, and the city has a considerable number of food, clothing, and miscellaneous plants, including several of the largest monopolistic factories. Tabriz, with some thirty miscellaneous factories, is a minor industrial centre; Resht, with twenty-two small factories, is less important. Shahi in Mazanderan is characteristic of the newly created centres, having two large state-owned textile mills and a large state-owned cannery.

Size is relative and best indicated by the number of employees. The majority of the factories employ from 30 to 100 workers; about 10 have from 100–400; some 15 large concerns, including some of the Isfahan textile factories, have 400–1,000 workers. The largest single

factories in Persia seem to be the state arsenal with 2,300 employees, and the state tobacco factory with 3,300, both at Tehran. The textile industry employs some 25,000 persons, of whom half are at Isfahan. No total for industrial population can be given. The number working in bazaar workshops is quite unknown, while those working in modern factories, other than textile, is not less than 19,000 and probably 20 per cent. higher. Altogether modern factory industry seems to account for less than the oil industry alone, which employs some 50,000.

The general weakness of Persian industry is the lack of skilled workers, foremen, and maintenance engineers, who are produced only slowly by the new technical schools (p. 404). The finest of the new factories are lamentably inefficient; many produce only a fraction of their capacity, and few ever attain the maximum. Several large factories were incomplete in 1941 and have never been in production; others suffer at present from a lack of spare parts and raw material.

Power and Fuel

Information about the sources of power in Persia is incomplete. Fuel oil being cheap and abundant, the diesel engine is the most frequent prime mover and is commonly used to generate electricity; units are often small, from 20 to 90 h.p., though there are larger engines of 150–300 h.p. in the heavier industries. Oil-fired boilers and steam-turbines are in use, and native coal is sometimes used as fuel in the Tehran district, where also electricity is supplied from the urban net. Electric power is generated at most provincial capitals and large towns, though it is not always efficiently distributed.

No general statistics exist, and the following account is merely descriptive; figures for daily or weekly production cannot be converted readily into annual totals.

Food Industry

Sugar. Eight modern refineries, owned and operated by the State, and situated in the districts of Tehran (3), Tabriz, Iraq (Sultanabad), Kermanshah, Shiraz, and Meshed, employ 700–800 men each during the refinery season, with a maintenance staff of 70–80 throughout the year. Their total annual capacity is 44,000 tons.

Wheat and Flour. Of 7 state-owned cleaning plants, 5 are in the north-western provinces, 1 at Kermanshah, and 1 at Quchan. Their daily capacity is 180 tons of wheat each, with 20 workers.

Of 11 large modern flour-mills 6 are in the north-western pro-

vinces, 3 at Meshed, 1 at Kermanshah, and 1 at Resht. Most have a daily capacity of 30 tons of white flour and employ 60 men.

Canneries. Of 3 canneries each with a daily output of 3 tons, 2 for meat and fruit are in Mazanderan at Babul and Shahi and 1 for fish at Bandar Abbas. At Meshed and Tehran 5 small canneries for fruit and vegetables have a total annual output of 100 tons.

Distilleries. Spirit (*araq*), wine, and alcohol are produced by some 12 larger and many small plants from grapes and beet molasses. Six distilleries at Tehran produce daily 1,100 gallons of araq, 220 of wine, and 66 of alcohol. The Parchin factory (p. 462) produces 286 gallons of alcohol daily. There are 2 breweries at Tehran with a combined daily capacity of 990 gallons of beer.

Tobacco. The state monopoly has rendered possible the centralization of this industry at Tehran, where a large factory with 3,300 workers handles 13,500 tons of tobacco yearly and produces 12,000,000 cigarettes daily, apart from pipe tobacco.

Soaps and Vegetable Oils. A large state-owned refinery at Veramin with a maximum annual capacity of 3,000–5,000 tons was being completed in 1943. Five other refineries (at Kermanshah, Iraq, Bandar-i-Gaz, Babul, and Meshed) had a total annual output of 1,700 tons, and there are many small presses. A large state factory at Tehran has a maximum annual capacity of 8,000 tons of soap and 400 tons of glycerine, but the difficulty of collecting animal fats and vegetable oils from scattered slaughter-houses and presses reduced production in 1942 to 300 tons of soap and 50 tons of glycerine. Two other soap factories in north Persia have a total annual output of 1,700 tons, and 13 smaller plants vary from 50 to 300 tons each a year.

Textiles and Clothing

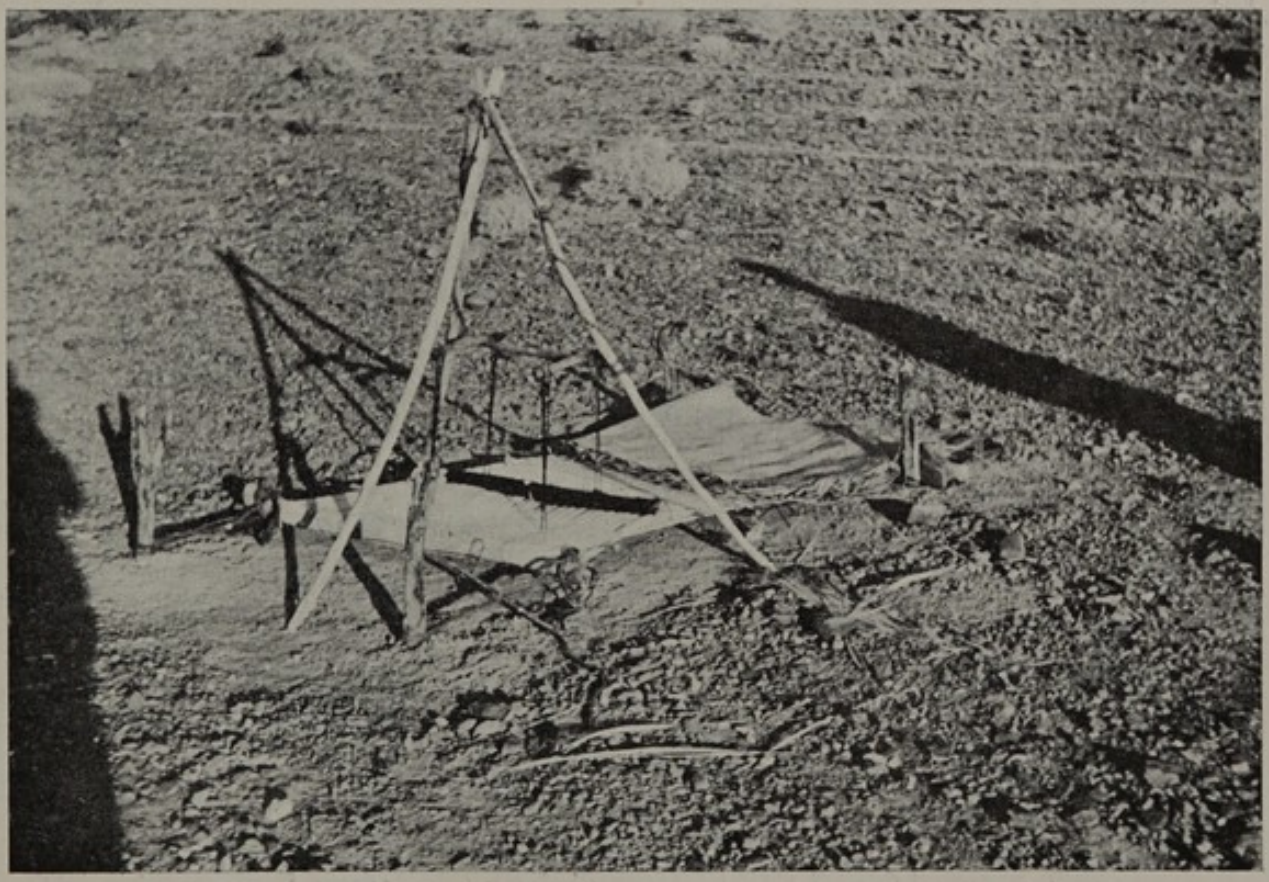
Cotton. Raw cotton is ginned by 104 gins in 97 plants with a total capacity of 258 tons of ginned cotton in 12 hours, using 12 workers each.

There are 26 large spinning-mills, 12 of which are also weaving-mills, and 10 other weaving-mills. The spinning-mills comprise 172,000 spindles, of which 54,000 are in two state mills at Shahi (Mazanderan) and Behshahr (Gurgan). Nine mills at Isfahan have 57,500 spindles and produce 42 per cent. of the total annual output of 10,800–12,450 tons. The average annual rate is 132 lb. a spindle with most plants working a 20-hour day, but the state plants working an 8-hour day produce only 44 lb. a spindle (photo. 257).

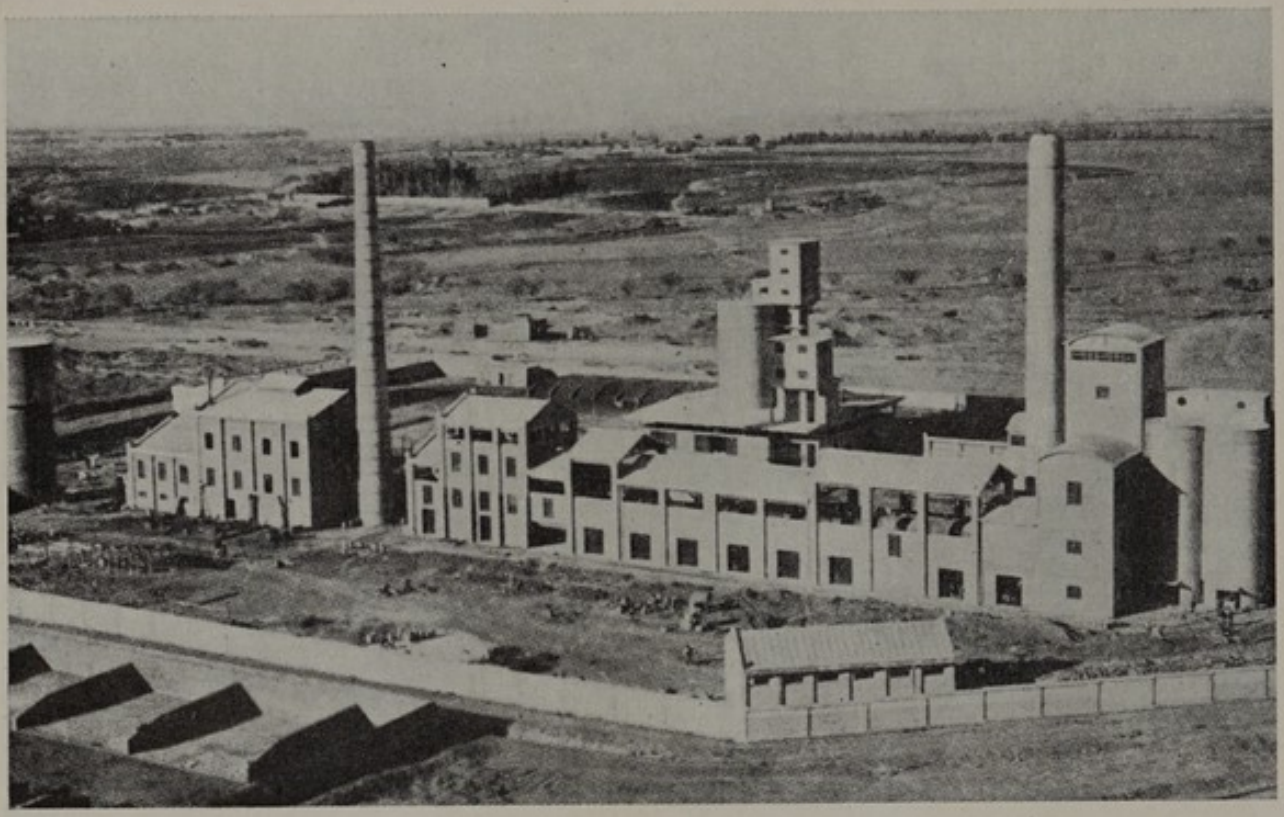
Most weaving is still done on hand looms, which handle 6,500–



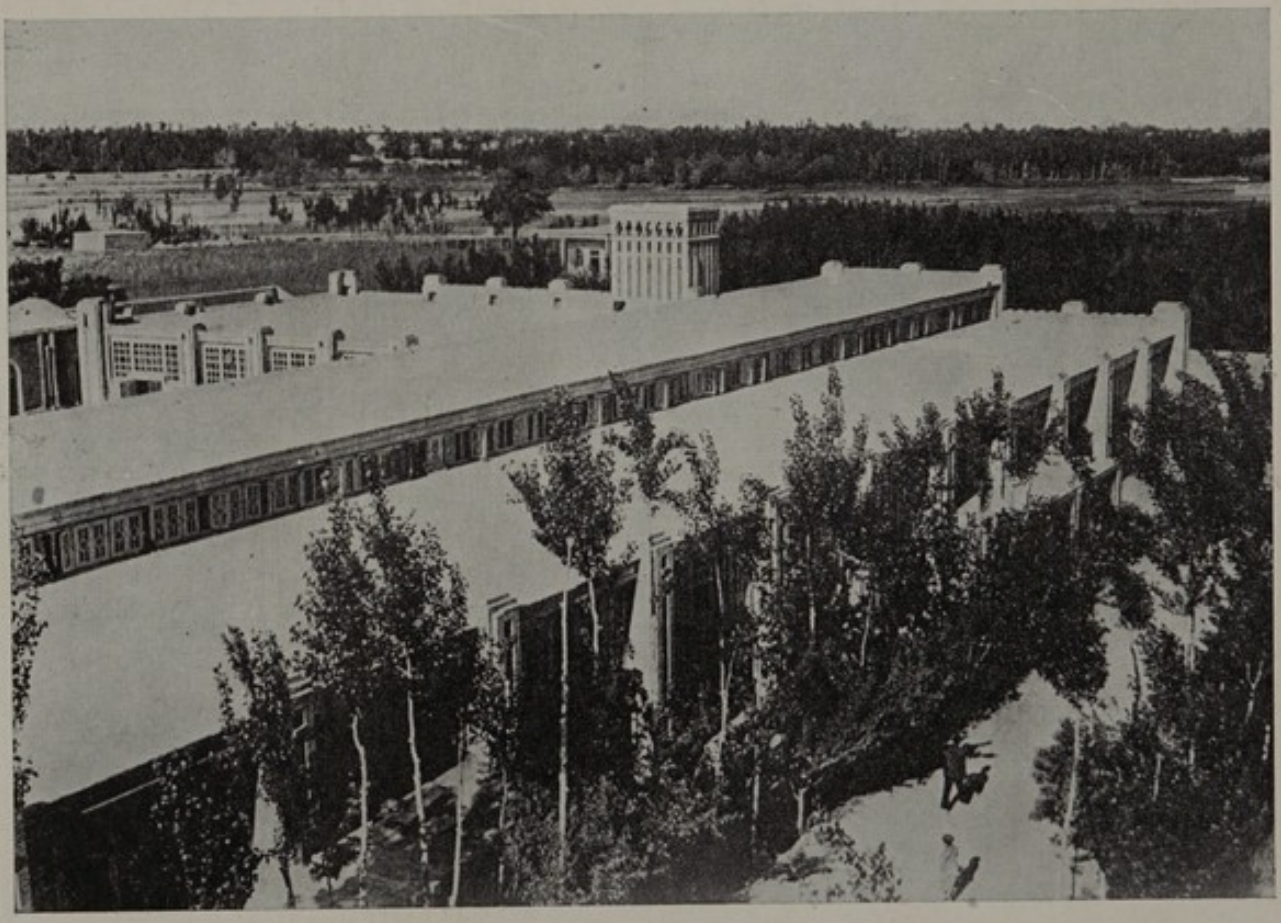
254. *Basket-ware made from dwarf palm*



255. *Hand loom used by tribal women*



256. *Cement works near Tehran*



257. *Modern cotton mill at Isfahan, with bad-gir for ventilation*

8,000 tons of yarn a year. Some 2,190 mechanical looms produce about 32,800,000–38,280,000 yards of cloth a year.

Some 200 tons of sewing-thread a year is made at Isfahan.

Wool. Ten large wool-spinning and weaving plants, of which 5 also spin cotton, comprise 27,780 spindles and 505 looms, producing about 3,641,000 yards of cloth a year from 3,300 tons of raw wool, and also some 546,800 yards of blankets. Of these factories, 4 are at Isfahan, 2 at Tabriz, and 2 at Kazvin.

Knitted Goods, such as stockings and underwear, are made by 26 factories, of which 11 are at Tehran and 3 at Isfahan. Twelve of them, each averaging about 25 workers, produce a combined total of 370,500 dozen pairs of stockings, 48,000 dozen articles of underwear, and 85,000 other pieces a year.

Silk. This is woven either on hand looms in small workshops or at the state mill at Chalus (Mazanderan), which takes the best grades of cocoons. Its annual capacity is 1,093,000 yards of tissues, but it has not produced more than 382,800 yards, using 100 tons of cocoons. It has 220 looms and 1,500 workers.

Jute is made into sacking for agricultural and other purposes by two large and similar factories, a private plant at Resht and a state plant at Shahi. Each has 60 looms and a capacity of 5,468,000 yards of sacking and 100 tons of twine annually, working 20 hours a day. In 1942 with 1,360 workers production was only a half of capacity.

Carpets. This valuable industry is mainly a bazaar craft, though companies organize the workshops (photos. 258, 259). At Hamadan some 400 looms are scattered through the city with ancillary shops for cording and spinning, and 1,500 craftsmen and children make 437 yards monthly. A single company co-ordinates their efforts, and similar organizations exist at the main carpet centres. In normal times there is an export of 4,000–5,000 tons a year. The characteristics of Persian carpets are described on p. 467. The main centres of production are the districts of Tabriz, Hamadan, Bijar, Senna, Sultanabad (Iraq), Kashan, Shiraz, and above all Kirman; but types of carpets are often known after the village concerned rather than the provincial capital.

Leather. Tanning and the making of shoes and boots is mainly a bazaar industry, but 5 factories at Tabriz, Hamadan, and Tehran have a total annual capacity of 2,350 tons; of this 1,300 tons is upper leather, 900 tons soles, and 150 saddlery. Two Tabriz factories with some 1,480 workers make the bulk of this, the other 3 producing 100–150 tons each annually.

Constructional

Bricks. Building bricks and glazed tiles are produced by numerous small plants in proportion to local demands. At Tehran from 3 to 4 million are made weekly, and a tile factory with oil-fired kilns produces 10,000 tiles weekly. Clay for fire-bricks occurs near Burujird, Kermanshah, and near Tehran at Aminabad, where a state works makes 2,000 tons of refractory bricks a year.

Cement is made by the state plant at Rez (Kharizak) near Tehran, where 64,000 tons were produced in 1942. Daily capacity is 300 tons, and the number of workers 950 (photo. 256).

Gypsum or *gach* for plaster is ground in large quantities in most places. Plants are mostly primitive, but a mechanical grinder at Tabriz produces 28 tons daily.

Tanks, *pipes*, *heating installations*, *windows*, and *door-frames* are made by constructional engineers at Tehran in their own workshops.

Domestic Needs

Glass. A large glass-works, at Tehran, employing 800 persons and providing 80 per cent. of Persian needs, has a daily capacity of 10 tons, including 3 tons of window glass and a range of domestic and industrial containers and utensils. Many small plants also exist.

Pottery is made by individual potters and by small workshops typically employing 20 men and 6 oil-fired kilns and producing 100 pieces a week.

Cardboard is made from straw at a Karaj factory with an annual output of 400 tons, and *plywood* by a Tehran factory with a daily capacity of 300 pieces measuring $4{\cdot}9 \times 4{\cdot}9$ feet.

Rubber. A well-equipped state factory near Tehran, designed to produce 30,000 gas-masks yearly, now makes metal and rubber containers and machine parts for local industrial needs.

Matches are provided by 6 large factories; 3 with modern machinery produce an annual total of 138,000,000 boxes, and the other 3 using hand methods, primitive machinery, and a quarter of the 1,640 workers of the industry, make only 6,000,000 boxes. The total is about 75 per cent. of Persian needs.

Paint factories are local and small. *Miscellaneous* establishments include small plants for shoe-polish, shoe-laces, and razors.

Chemicals

There are 4 state and 2 private establishments in the Tehran district. The *sulphuric acid and explosives* works at Parchin, 20 miles



258. *Carpet weaving in a Kurdish workshop*



259. *Carpet weaving*



260. *A.I.O.C. power house at Tembi*



261. *A.I.O.C. topping plant at Masjid-i-Sulaiman*

south-east of Tehran (350 workers), has a daily production, excluding what is used on the premises, of 7 tons of sulphuric acid, 165 gallons of alcohol, 77 gallons of ether, and 2 tons of guncotton, cordite, dynamite, and powder. The *soda* plant at Aminabad was to be completed by 1944, with 80 workers and a daily capacity of 5 tons of sodium carbonate or 4 tons of caustic soda; by-products included sodium sulphate, sodium sulphide, and thiosulphite. The combined *coke and hydrochloric acid* plant at Tehran (72 workers) uses coal from the Shimshak mines. The coke plant produces daily 10 tons of coke and small quantities of tar, phenol, anthracene oil, benzol, and naphthalene; the acid plant produces 80 tons a year of hydrochloric acid and 200 tons of anhydrous sodium sulphate. The *arsenical poison* plant of the Ministry of Agriculture at Karaj (40 workers), using arsenic ore from Zara Shuran (p. 465), has a capacity of 270 tons of arsenic a year. Finished products include sodium arsenate and arsenite, Paris green, and special poisons. *Potassium bichromate*, used by tanneries and matchmakers, is produced by 2 new plants at Tehran with a total daily production of 4,400 lb.

Other chemicals produced include *borax* at Tehran (10 tons monthly), *nitre* by 4 plants at Hamadan (300 tons yearly), *sodium carbonate* by crude manual methods at Qum (1–3 tons daily), and *sodium* and *magnesium salts* at Isfahan (1 ton daily).

Metals

Steel. Large and elaborate blast furnaces at Karaj were left unfinished by German engineers in 1941. The intended capacity is unknown. For the sources of iron and coal see p. 464.

Copper. Concentrates are smelted at the mines (p. 465) and the matte is treated at the state refinery at Ghaniabad near Tehran, completed in 1940. Its annual capacity of electrolytic copper with a purity of 99·96 per cent. is 1,500 tons, but production in 1942 was 300 tons. Workers number 150.

Metal Plating. Casting, machining, spinning, and enamelling with non-ferrous metals is done by a factory at Tehran containing 30 machines and 160 workers.

Armaments

There are 4 large state plants in Tehran district equipped with modern European machinery. The *Sultanabad Arsenal* produces telephone wire (daily capacity 2 tons), tubes, ingots, shell cases, and cartridge cases; shells (300 daily) and ammunition (150,000 daily).

The *City Arsenal*, erected in 1924 and extended in 1938, produces 250 rifles daily, and also makes castings up to 1½ tons, forgings and machine tools for other factories and for the State Railways. The *Machine Gun* factory, built by Skoda engineers, has an annual capacity of 1,200 light and 300 heavy guns with their tripods. A well-equipped *Aircraft* factory, employing 400 men, assembles, repairs, and overhauls aircraft. The *Gas-mask* factory is mentioned above, p. 462.

Mining

The following account describes mining activity which is directed by Persian owners. Mineral oil is described on p. 489. The mineral wealth of Persia still remains largely unexplored, and much information about distribution is inexact. Hence this description refers mainly to materials known to be exploited. Although some eleven minerals are worked in commercial quantities, production is limited to local needs and expansion is hindered by difficulties of transport. Production for export is at present limited to red oxide. The minerals include coal, chromite, iron, lead, sulphur, copper, arsenic, red oxide, antimony, nickel, and manganese. The main mining centres are in the Elburz and its foothills, the Samnan–Damghan district, the Anarak district west of the Great Kavir, and the Kirman basin, but small workings exist sporadically throughout Persia. Minerals are state property and are worked either directly by the State or by lease and concession. Mining methods are generally primitive; there seems to be no modern excavating machinery.

Coal. Deposits exist at Shimshak and Lasherak about 20 miles north of Tehran, at and near Zirab (22 miles from Shahi in Mazanderan), at Gulindi Rud (45 miles west of Shahi), and 30 miles north-west of Karaj. Output has been restricted recently to 450 tons a day, but the three latter deposits are thought to have a potential of 2,000–7,000 tons a month. The Delilam mine near Zirab produces the best coal with a calorific value of 14,500 B.T.; its sulphur content is 1½ per cent. and ash 23 per cent.

Chrome. Chromite with a 45 per cent. content of chrome is mined at Fariumad in the Shahrud–Bustam district, and near Meshed and elsewhere in Khurasan. It is used for the production of potassium bichromate.

Iron. The main deposits are at Samnan (estimated quantity 2,500,000 tons); Kirman (estimated 15,000,000 tons in two grades, one containing 60 per cent. iron and 8 per cent. phosphate and the

other 40 per cent. iron and 8 per cent. manganese); Anarak basin (haematite); and also at Chah-i-Shah, 12 miles north of Isfahan. None of them is extensively worked even in peace-time.

Lead. Mines at Nglak and Charkarbuzar in the Anarak district produce 600–700 tons of refined lead (97 per cent. purity) a year, with a potential by present methods of 1,000 tons; 3 tons of hand-picked ore are used for 4 tons of concentrate for smelting, which is done with charcoal. Equipment is primitive and costs high. The deposits are galena cerussite-bearing veins in limestone rock, and the ores are rather free of zinc. Other deposits of lead and lead-zinc are worked near Meshed, Yezd, and Damghan.

Sulphur. Ores mined near Samnan contain 40 per cent. sulphur and 40 per cent. silica, and being free from arsenical matter can be used for sulphuric acid. Output at present is 100 tons a month. Deposits occur close to the sea, near Bandar Abbas, with a content of 33 per cent. sulphur, 44 per cent. silica, and 0·2 per cent. arsenic; transport by boat is possible but no work is at present being done.

Copper. There are three deposits of importance at Anarak, Zenjan, and Abbasabad (Shahrud–Bustam district), with a daily output of concentrates and matte which produce 2 tons of pure copper (99·96 per cent.). The ores worked include native copper, malachite, chalcocite, and cuprite. There is a modern crushing, jigging, and flatation plant at Zenjan with a daily capacity of 100 metric tons, and the mattes are sent to the Ghaniabad state refinery (p. 463).

Nickel and Antimony. These are mined with lead at the Anarak mines, where nickel speis occurs containing 37 per cent. nickel, 2 per cent. cobalt, and 9 per cent. copper.

The antimony sulphide ores contain 45–70 per cent. stibnite; 3 tons of ore produce 1 ton of antimony (97–98 per cent.) and are sublimated in a small state plant at Tehran, which has a daily capacity of 1 ton. Annual production of ore is 70–100 tons. Other deposits occur at Firdaus and elsewhere.

Arsenic is mined at Zara Shuran near Sain Qaleh in Azerbaijan. The ore contains 45 per cent. arsenic oxide; 3 tons of ore produce 1 ton of oxide. The annual production of 420 tons (1942) goes to the Karaj poison plant (p. 463). Transport to the railway over a distance of 125 miles is by camel.

Red Oxide. This noted Persian product is found on Hormuz island, whence 20,000 tons are exported annually. Other deposits exist in this part of Persia and are associated with salt plugs (p. 72).

Manganese dioxide is mined at Robat Kerim, 22 miles from Tehran. The characteristic content of the ore is not yet established, and the proximity of the railway may make these deposits important.

Other actively worked minerals include *fullers' earth*, on Hormuz island; *alum*, of which small-scale production from deposits of pyrites and alumina is widespread; *calcium borate*, which is worked at Sirjan and used for borax; *rock-salt*, deposits of which occur in many places often in huge quantities, is mined on Qishm and Hormuz islands. To these may be added gypsum (p. 462), limestone, ferruginous clay, quartz, and siliceous rocks; they are widespread and are worked in small quantities for local needs. *Desert salts* may one day be a source of some wealth. Large deposits of very pure sodium sulphate and magnesium sulphate are known, but the conditions of production and transport present difficulties. There are also possibilities of potassium and sodium nitrates.

Turquoises are mined by primitive methods in the long-established Madan pits near Nishapur. They are obtained either by digging and blasting in shafts and galleries or by search among the debris of old workings. The beds are mostly situated in the hills between the altitudes of 4,800 and 5,800 feet in an area of about 40 square miles. Formerly the sole source of good stones in the world, the Madan mines are now surpassed by those of the U.S.A.

Conditions of Labour

Working conditions in bazaar workshops are generally rendered as bad as possible by lack of light, ventilation, overcrowding, and very long working-hours, though exceptions exist in some carpet-making centres. Child labour is extensively employed, and there is no feeling against the employment for long hours even of very young children.

All factories and workshops employing motor power, and all other workshops employing over 10 persons, are nominally subject to a set of regulations relating to industry, first published in 1936. These render compulsory the provision of specific hygienic conditions in respect of overcrowding, ventilation, lighting, and heating, and amenities such as spittoons, lavatories, drinking-water, and control of noise and fumes. The regulations define the size of rooms and windows in all new buildings. There are also clauses concerning the obligations of employers and employees in matters of sickness, negligence, death, or dismissal, and the establishment of provident funds financed by workers' contributions for accident compensation, with a scale of benefit rates. The regulations make general provision for the

inspection of factories by the Department of Industries and Mines, which has power to close down factories which break the regulations. But whether an inspectorate exists and functions is another question. It is likely that the ubiquitous corruption of the Persian administration would render any such inspection quite ineffective. It is noteworthy that certain state plants work an 8-hour day, but many private factories work a 20-hour day, presumably in 2 shifts.

Persian Carpets

Persian rugs and carpets have been continuously imported into Europe since at least the sixteenth century, and have continued to be made in Persia by the same methods and partly according to the same patterns during the whole of that period. They are still made entirely by hand; the bulk of the yarn is hand spun, and all the weaving and knotting still done by simple and traditional hand-looms (photos. 258, 259). In some centres of production especially large carpets, such as those of Mushkabad (Sultanabad–Iraq district) or the fine modern work of Tabriz, are made in fairly large workshops, but nowhere by machine. The deftness of the work, indeed, in the modern products of Tabriz, Kashan, or Saruq (Sultanabad–Iraq district) can rival that of any previous century. It is often said that the oriental workman does not make a good 'machine-minder' but takes naturally to fine handicrafts, and it seems likely that hand-made textiles will continue to be produced in Persia (though possibly at rising prices) so long as the European and American demand for them persists.

Apart from the loose and careless weaving in thick wool which is naturally to be found in the cheapest productions, degeneration is observable chiefly in the dyes. The vegetable dyes, which contribute so much to the distinctive charm of the older rugs, are expensive both to make and to use. Reds, for example, made of madder or cochineal (*kermes*), may require as much as two days' 'cooking' to produce the richest tints, and the expense of firing as well as the original cost of the dye may give a great advantage to aniline products. The modern aniline dyes are very superior to those first introduced, which would not only fade quickly but run and smear all over the rug; some native dyes, moreover, particularly black (made of vegetable acids and iron), and any dye into which black enters, and also green (which requires a very acid mordant) have always been unsatisfactory, since they are injurious to the wool; it is a common feature of oriental rugs that the black parts of the pattern, unless made from the wool of

black sheep, become threadbare before the rest of the rug shows any signs of wear. None the less, the peculiar attractiveness of the older work has always been associated with vegetable colours, and both the Persians themselves and the European or American marketing firms have tried to maintain their use in spite of their costliness. In 1900 the Shah issued an edict entirely prohibiting the import or use of aniline dyes under penalty not only of confiscation but of fines and imprisonment, while an earlier edict threatened the cutting off of the right hand. These edicts have not suppressed the practice, but probably there is more chance to-day of obtaining vegetable-dyed rugs than forty or fifty years ago.

There are still to be found, though mainly in museums and fine private collections, examples of the magnificent work of the sixteenth and seventeenth centuries. Carpets of that age are usually classified according to pattern rather than by their place of manufacture, which is seldom known, though dealers often call them 'Isfahan'. 'Garden' carpets show a sort of diagrammatic map of ponds, flower-beds, trees, and so forth; floral patterns are common, sometimes alone, sometimes with figures of wild animals attacking their prey ('hunting rugs'), sometimes arranged symmetrically in vases ('vase rugs'); another favourite pattern is arranged round a central medallion, a device on which many modern types are still based. In the earlier work the flowers are usually attached to long, wavy stems and tendrils, while in later periods the stems become less prominent or are omitted altogether and the flowers become larger and more formal in arrangement. The silk carpets of the early period often have areas worked in gold or silver thread and tend to be patterned in scrolls rather than with flowers or animals. All the earlier rugs which survive are fine and sumptuous, clearly not meant for daily use in the home. Presumably other rugs were produced for utility, and possibly some of the modern types were also then made for use, but have long ago worn out.

The diverse types that are still made, excepting those which are deliberate reproductions, cannot be dated for certain before the middle of the eighteenth century, and some of the present day do not go back before the latter half of the nineteenth, when the production for export was being largely increased and attractive novelties were constantly in demand. But so far as they can be traced backwards some of the present types—e.g. Farahan and Saraband (both Sultanabad district), Kirman, Senna, Shiraz, Khurasan, and Kurdish—show great persistence and individuality; in other cases—e.g. Herez and Gorevan

(both Sultanabad district) and Balkshis (Tabriz district)—there have been periodical innovations to adapt them to the demands of a changing market, though perhaps in some of these cases the changes have been rather in the names attached by dealers than in the products themselves.

Modern products may be divided into two classes, according to their fineness. The very finely woven rugs, often short-piled and rather thin in texture with a closely worked pattern, such as Sennas, Tabrizis, the better type of Farahans, Kashans, Saruqs, and Kirmans, are all made on a cotton (or silk) warp. The rather heavier rugs, associated particularly with north-west Persia, Kurdistan, and the Shiraz basin, have a longer pile on a woollen foundation; very durable and attractive rugs of this character are the Qaradaghs (near the Aras frontier), Bijars, Hamadans, and Shirazis (including Niriz and Afshar types). Persian rugs can usually be distinguished easily enough from Caucasian or Turkish, both of which tend towards angular or geometrical patterns with floral decoration only in a very conventionalized rather than a naturalistic form; their colouring also, particularly in Turkey, is usually simpler and closer to the primary tints, although some types of Caucasian rugs are not unlike Persians in the delicacy of their colour. On Persian rugs the patterns tend to be more intricate, to be curved and flowing rather than rectilinear, and to be worked on a smaller scale, though the scale varies with the fineness of the knotting.

Rugs are made on a cotton foundation for fineness, not for cheapness. Fine knotting can also be done on a woollen warp, as in the Tekke rugs of Bokhara, the finest of which can rival the best Persian work and go as high as 400 knots to the square inch. Though silk rugs can be even finer, anything between 300 and 400 knots to the inch is very fine indeed, even by the standards of the sixteenth century; the famous 'Ardebil' carpet in the South Kensington Museum, for example, has about 380; a normal 'superfine' rug, as the dealers would call it, may have between 200 and 250. The fineness of the knotting depends on a thin warp, closely packed, and for that purpose cotton is more suitable than most wools. Carpets thus made are expensive; such fineness is necessary only for the more intricate and delicate patterns, and does not make the rug more durable than work at from 60 to 100 knots to the inch in stouter yarn, which can still be closely packed with the knots made firm; such rugs, e.g. those from Kurdistan, Hamadan, or Shiraz, are very hard-wearing and fine enough in texture to render their comparatively simple patterns satisfactorily.

Many people find the very finely woven rugs more attractive, and it is in such work that the Persian products are pre-eminent. Among the fine types some, e.g. from Kashan, Saruq, Tabriz, or Tehran, though very well made and hard wearing, very expensive and much sought after, are disliked by collectors on account of their sophistication. Most of them are not collector's or 'museum' pieces, merely because their designs and colouring are modern, or modern adaptations of old patterns to suit the European market. But they make very decorative floor-coverings and fit in admirably with modern tastes in furnishing. Of the finely woven rugs, Sennas and Kirmans, with some Farahans, probably keep to their old native types better than most and are less contaminated by the influences of the art schools; of medium weaves, perhaps the most uncontaminated are the Joshaqans, Khurasans, and Mesheds, and the very handsome carpets from Herat, beyond the Afghan border.

There is perhaps a closer adherence to the old colouring and pattern among the heavier weaves, particularly in the Kurdish and nomad productions and in some rugs from Mosul, often included in the Persian group. Such rugs have a longer and softer pile, often in a very lustrous wool, with soft and rich colouring. The colours are sometimes very bright, as in the exuberant reds and yellows of a Bijar, which contrast with the pale and delicate tones of a Tabriz. But in the heavier rugs, too, there are many specimens cheaply and roughly woven for the European market, and every experienced purchaser knows that it is more important to obtain a good specimen of its type than to buy a rug because it belongs to a good type.

CHAPTER XII

CURRENCY, FINANCE, COMMERCE, AND OIL

CURRENCY

THE complexities of Persian currency are due to both external and internal causes. The basis of modern currency was intended to be the gold standard, which was instituted by an Act passed in March 1930 to come into effect two years later, but never put into force. A sum of 4 million pounds sterling had been accumulated in London as a backing for the new currency, but the economic crisis of 1931 and the departure of Britain from the gold standard reduced the gold value of this reserve by almost a third, and in consequence the projected reform of the currency was postponed. A new Currency law was adopted in March 1932 by which a decimal currency of dinars, rials, and pahlevis was adopted, to be based on gold at some future date. Under this legislation the *rial*, which is subdivided into 100 *dinars*, should contain 0·07322382 of a gramme of gold. One hundred gold rials were to make a *pahlevi*, the equivalent of £1 gold. Meanwhile the new unit of currency is the rial, which is the nominal equivalent of the older *kran*, and the only coins in circulation up to the end of 1943 were 5-, 10-, and 50-dinar copper-aluminium pieces. Under recent legislation silver coinage was authorized and put into circulation on 28 February 1944. The alloy is 60 per cent. silver and 40 per cent. copper, 1-, 2-, 5-, and 10-rial pieces being issued; the quantity of pure silver in a 1-rial coin is 96 centigrams. The gold pahlevi was issued later in the year. There are also notes for 5, 10, 20, 50, 100, 500, and 1,000 rials, issued by the Banque Mellié Iran, which replaced the kran and toman notes previously issued under a concession to the Imperial Bank of Persia (p. 479). The coin and notes of the older kran currency were gradually withdrawn from circulation, though tomans are still found.

For a time the rial was tied to silver (4·14 grammes), of which there were large stocks in the country. Wide fluctuations in the exchange were the result, to counteract which persistent efforts were made, but in the end the attempt to control the exchange was abandoned (p. 472), until it was fixed after the Allied occupation. Early in 1935 the rial and the silver standard parted company and the Persian currency was left to find its own level. At the end of

1939 the currency was based on gold, but no gold coins were put into circulation until 1944.

Previous to the law of March 1932 the currency comprised shahis (chahis), krans, and tomans; 20 shahis equalled 1 kran, and 10 krans equalled 1 toman. Thus the nominal equivalents of the two currencies were as follows:

Old 2,000 shahis = 100 krans = 10 tomans
New 10,000 dinars = 100 rials = 1 pahlevi[1]
(1 shahi = 5 dinars; 1 kran = 1 rial; 10 tomans = 1 pahlevi)

The wide fluctuations in the sterling value of the kran and rial are shown in the following short table:

	Krans to the £		*Krans or Rials to the £*
1902	18	1930	90–130
1913	55	1932	86
1914	68	1939	120–160
1920	19	1941	80–140
1922	70	1942	128–130

Various methods of dealing with the difficulties caused by these fluctuations were adopted. At times imports were severely restricted, in some cases prohibited (p. 486). Attempts were made to prevent the export of silver, which when the silver content of the kran exceeded its exchange value was very profitable. Government monopolies covering a wide field of commerce were instituted. In February 1930 the Government instituted a monopoly of dealings in foreign exchange. A year later it took control of foreign commerce in natural and industrial products, with the intention of reducing to a minimum the importation of luxury goods and of those that competed with Persian products. It was not until the Anglo-Persian Financial Agreement of 26 May 1942 (p. 476) came into force that the rate of exchange 128 rials to the £ sterling for buyers, 130 for sellers, was fixed.

The amount of currency in circulation and, with it, the cost of living, have risen steeply during the present war, especially since 1941. In the year ending February 1944, notes in circulation increased from under 3,700 to nearly 5,700 million rials (to *c.* £44 millions), and by October 1944 the figure reached 6,320 millions (£48·6 millions). The balance sheet of the Issue Department of the

[1] At the end of 1944, 220 rials (paper) equalled one gold pahlevi.

National Bank (Banque Mellié Iran) on 20 February 1944 was as follows:

Liabilities	*Rials*	*Assets*	*Rials*
Notes in circulation.	5,696,655,590	Gold backing . .	3,369,959,456
Notes in banking department. .	864,095,010	Silver backing .	461,859,121
		Foreign exchange .	984,730,442
		Crown Jewels .	344,201,581
		Fiduciary Issue .	1,400,000,000
	6,560,750,600		6,560,750,600

The cost-of-living index meanwhile has shown a substantial rise. Taking 100 as the figure from April to August 1939, it had increased over sevenfold by December 1943. The greatest rise (169 points) was during the quarter ending in March 1943, since when the rate of increase has fallen.

Gold, chiefly in the form of coin, is freely bought and sold at fluctuating prices, mostly through the medium of the National Bank, and though the new Persian gold pahlevi has the same gold content as the British sovereign, the latter fetches a rather higher price. The sterling value of the sovereign in Tehran fell in 1943 from 105*s.* 4*d.* on 1 January to 81*s.* 3*d.* on 30 September, and rose again to 100*s.* 7*d.* by 31 December, the reason being the change in Allied fortunes caused by the victories in North Africa.

FINANCE

Public Finance

'There can be no power without an army, no army without money, no money without agriculture, no agriculture without justice.' This maxim of the Sassanid king Ardashir explains why prosperity has declined, no less than how it was achieved in the days of Persia's greatness.

Until 1906 it might almost be said that there was no system of public finance in Persia. In theory the Shah was entitled to whatever he wanted and was accountable to no one for the manner in which he spent whatever he received. Even to-day no statement of actual revenue and expenditure, in the Western sense, is published or, so far as is known, compiled. The farthest the Government goes is to publish yearly estimates under these headings, but no one, it seems, can tell to what extent these estimates are realized. 'The usual

statistics and works of reference available in European countries are conspicuous by their absence, and statistics have therefore only been used to illustrate specific points, it being impossible to produce absolutely accurate tables or to convert them exactly into sterling or English weights and measures' (*Report on the Trade and Industry of Persia*, Dept. of Overseas Trade, April 1925). Seven years later, according to Sir Arnold Wilson, there had been no improvement. Budget estimates and financial statistics in scattered form were published by the daily newspapers in Tehran throughout the year, but no translations into European languages were made and no official finance reports were issued. For the same reasons no tabular statements are given here, for though some tables are available, they are incomplete and misleading. At the same time a brief historical review is perhaps of interest.

History

Prior to the introduction of a Constitution in 1906 the revenue of Persia fell for the most part into two divisions—normal and irregular. Normal revenue included authorized taxation, revenue from state domains, and customs duties. Irregular revenue consisted of more or less unauthorized requisitions, gifts—voluntary or forced—fines, and confiscations. Authorized taxation comprised taxes on land, animals, trades, and artisans. The basis of land taxation was a tithe or 10 per cent. of the value of the produce. It was collected in cash or in kind, and, as in other countries in which similar conditions prevailed, the incidence of the tax varied widely from district to district and from time to time. The taxes on animals fell for the most part on the tribes. Those on shopkeepers and craftsmen took the form of a guild tax, the members of a trade in every district being grouped together and assessed, every trade or calling at different rates.

Revenue from state domains was derived from rent paid on agricultural land, the rate depending on conditions of cultivation. Under the heading 'Rents and Leases' was included the revenue from monopolies and concessions such as the Post Office, telegraph service, mint, mines, &c. Until 1899 customs duties were farmed out by districts and were collected not only at the frontier but also as octroi at internal centres. There was consequently some competition among the customs farmers to attract, by the reduction of rates, more business to their districts, and the rates paid therefore varied from district to district. In 1899 this system was swept away and a new one set up, more or less on European lines.

Irregular revenue is best described as irregular in all senses of the word. Requisitions were made whenever the State was involved in war, and to pay for visits by distinguished foreign guests, to provide for the construction of roads and royal palaces, and to defray the expenses of royal journeys. The Shah expected to receive handsome presents on the occasion of every festival, and also from the fortunate recipients of high office.

With the Constitution came great improvements. First, a Ministry of Finance was set up. Shortly afterwards a group of American experts was invited to reorganize the finances, and on their advice many reforms were introduced, including the establishment of a General Treasury in which all revenue and expenditure were centralized. A Belgian Mission carried the reforms farther and, above all, began to train local officials, and to reorganize and direct the Customs Service.

For less than a year (1911–1912) a United States citizen, W. Morgan Schuster, with a staff of American assistants, was Treasurer-General; but the difficulties he encountered made it impossible for him to retain the office. He was succeeded by a Belgian Treasurer-General, who remained in office until the end of the war in 1918, when he was replaced for a short time by a Persian. In 1920 a British mission came in anticipation of the ratification of the Anglo-Persian agreement of 1919, but political considerations soon led to its departure. In 1922 another American mission under Dr. A. C. Millspaugh was called in.

This mission remained in Persia for five years, after which Dr. Millspaugh's place was taken by a German as Treasurer-General. Dr. Millspaugh found that there had been a deficit at least since 1888, if not earlier, and he resolutely tried to provide a remedy. He drastically reduced the great army of pensioners for most of whom there was no justification, instituted a much-needed cadastral survey, revised land-tax assessments which were long out-of-date, abolished many irritating but non-remunerative levies and tolls, replaced them by import and export duties, and made serious efforts to collect arrears of taxation. Among the new taxes introduced on his advice were an income tax, stamp duties, registration fees, and a tobacco excise. The opium taxes were increased and their collection tightened. The Administrations of Indirect Taxes and Public Domains, the Alimentation Service, and the Financial Agency of Tehran were transferred from the Ministry of War to the Treasury. The Bank-i-Iran (p. 479) passed under Treasury supervision; the collection of revenue from Public Works and Pious Foundations (*waqf*) and also

the administration of customs became duties of the Treasury. The greater efficiency which resulted from this centralization increased the revenue derived from almost all the existing taxes. Dr. Millspaugh was given by the Majlis complete control of the financial administration, including the appointment, promotion, and dismissal of all officials; payments and financial undertakings required his written approval, and no decision on a matter of finance or the grant of any concession could be taken without consulting him. It fell to him also to prepare an annual budget.

The Second World War. After the departure of the Millspaugh mission in 1927 the control of the financial administration reverted to Persian hands, since when it is more difficult to follow the course of events. The war of 1939, however, added fresh economic difficulties to a situation already becoming acute. By 1941, when the Allies had to intervene, it was chaotic. An Anglo-Persian Financial Agreement was therefore concluded on 26 May 1942. The sterling rate of exchange was fixed at 128/130 rials to the £ for the duration of the war, subject to modification in the event of change in the sterling-dollar rate. Persia agreed to supply Persian currency necessary for transactions with the sterling area; to purchase at the fixed rate of exchange all sterling-area currencies offered to finance British Government expenditure in Persia; to place no unreasonable restrictions on transactions in sterling-area currencies; and to allow authorized transactions at the controlled rate. The British undertook to ensure as far as possible essential supplies to Persia for her own use; to convert into gold sufficient of Persia's sterling balances to enable her to buy essential supplies in North America in dollars; to convert in addition 40 per cent. (afterwards increased to 60 per cent.) of unspent sterling balances; and to guarantee the sterling balances against any depreciation in terms of gold. The sterling to which the agreement applied could not be used by Persia to finance transactions outside the sterling area, Canada, and the U.S.A.

A similar agreement was afterwards made between Persia and the U.S.S.R., and another between Persia and the U.S.A. was under negotiation in 1944.

The Second Millspaugh Mission. To grapple with the chaotic state of the country's finances and economics Dr. Millspaugh was again invited to Persia as Director-General of Finance in November 1942. In the May following his arrival in the country he was given wide powers, which included control of the purchase of raw materials and manufactured goods, including import, export, transport, storage,

and distribution; powers against hoarders; control of rents and wages paid on public works and services; and authority to stabilize prices and to secure equitable distribution. Such powers were essential to prevent a complete breakdown in the internal economy of the country, which would have resulted in a famine similar to that which overtook Persia in 1918. Unfortunately Dr. Millspaugh met on his return the same hostility which he had encountered on his earlier mission now considerably reinforced, not only by the development of national feeling, but also by Persian suspicion of the occupying Powers, of which he and his colleagues were generally considered the agents. His employment of United States citizens in the more responsible and influential positions to the exclusion of Persians, many of whom considered themselves equally qualified, was also resented. Opposition gathered sufficient strength in June 1944 to induce the Majlis to limit the powers of Dr. Millspaugh and the other American advisers strictly to the financial sphere, a limitation which they would not accept, and they thereupon tendered their resignations.

The Budgets

In view of the absence of figures of actual revenue and expenditure the financial position of Persia is necessarily obscure, since any study of it must be based on the estimates and there is no indication that these estimates are realized. It is, however, known that there is a large accumulated budgetary deficit. There are now two budgets, ordinary and extraordinary, the former including what might be called 'estimates of normal revenue and expenditure', the latter comprising royalties and abnormal taxes, monopolies allocated to special purposes, and road taxes, on the revenue side; and expenditure, nominally non-recurring, on railways, roads, military equipment, and factory construction, on the expenditure side. The extraordinary budget is a comparatively recent innovation.

From the financial year 1923/4 to 1938/9, estimates of revenue and expenditure were almost exactly balanced. Since then, except in 1942/3, the ordinary budget has shown a deficit. For the year 1943/4 the ordinary budget estimated a revenue of 1,890 million rials and an expenditure of 3,297 millions, and the extraordinary budget a revenue of 579 millions and an expenditure of 589 millions. Thus the *expected deficit* on both accounts was more than 1,400 million rials (£10·9 millions at 130, the average rate of exchange) above the total revenue of 2,469 million rials (£19 millions). Of the revenue for that year 812 millions were expected from indirect taxation and

310 from direct. Concessions were estimated at 443 millions, including 439 from oil; other items of revenue were customs (234 millions), octroi (150 m.), excise on petrol and oil (130 m.) and on alcohol (62.5 m.), sugar and tea monopoly (119 m.), and road tax (53 m.). Of the ordinary expenditure of 3,297 millions, the army (1,000 m.), gendarmerie (298 m.), and police (187 m.), together accounted for about 45 per cent.

The income tax serves a double purpose, since the receipt for payment is accepted as a voucher or licence to trade for the following year; it was increased in 1944 so as to rise on the larger incomes as high as 70 per cent. The sugar and tea monopolies, which were in effect taxes additional to the import duties on these commodities, were introduced in May 1925 to provide funds for the projected construction of the Trans-Iranian railway. They were subsequently the foundation of the extraordinary budget. The oil royalties were originally intended to form a reserve on which the proposed currency reform could be based, but these have also been absorbed into the extraordinary budget.

Before the management of Persian railways was taken over by the Allies in 1941 they were being run at a considerable loss, the personnel was inefficient and under-paid, and most of the locomotives were breaking down through lack of skilled engineers and mechanics (p. 552). The present position is therefore considerably obscured by the vast sums of money spent by the Allies on the improvements of roads, railways, and rolling-stock for the purpose of taking supplies to Russia. Though Persia should greatly benefit by the extension of communications, her budget cannot be expected to repay the capital expenditure on these works, nor even to maintain all the modern improvements out of normal revenue.

External Loans and Public Debt

The first Persian state loan was raised in London in 1892. The amount borrowed was £500,000. This loan was repaid eight years later out of one of 22½ million roubles obtained in Russia. In 1902 a further 10 million roubles were borrowed in Russia. The security for both these loans was the customs receipts of northern Persia. Later the Indian and British Governments lent money to Persia on the security of the customs revenue of the southern ports. By 1920 the foreign debt amounted to about 7 million pounds, of which 4½ millions were due to the Russian Government. The Government of the Soviet Union cancelled this debt under the Russo-Persian Treaty

of 26 February 1921. This left an outstanding foreign debt of £2,444,657, far the greater part of which was due to Britain and India. In the meanwhile accumulated surpluses, built up out of the oil royalties and shortly reinforced by the reforms introduced by the American financial mission, exceeded this total. By the end of 1942 the external debt fell below a million pounds, the residue of a sterling loan of $1\frac{1}{4}$ millions borrowed in 1911. There was also an internal public debt owing to the Banque Mellié of over 3,000 million rials. On 20 July 1943 the Public Debt was:

External . .	219,887,482 rials	(£1·7 millions)
Internal . .	3,742,093,840 ,,	(£28·8 millions)
Total . .	3,961,981,322 ,,	(£30·5 millions)

Banking

The first European bank—the New Oriental Banking Corporation Limited of India—was established in Persia in 1888, and modern banking ideas were thereby introduced into the country. It opened branches or agencies in all the principal towns. In 1889 a concession for the establishment of a State Bank was granted to an English group under Baron Julius de Reuter of News Agency fame, and the Imperial Bank of Persia was formed and took over the Persian branches of the New Oriental Banking Corporation. It enjoyed the right of issuing bank-notes in the kran currency to a total value of £800,000. Also in 1889 a Russian bank, the Banque de Prêts (later renamed Banque d'Escompte de Perse), a subsidiary of the Russian State Bank, with the monopoly of holding public auctions, was established. It was later absorbed by the Russian State Bank, which then undertook all classes of banking business, particularly mortgage. The Persian branch of this bank with all its assets and liabilities was transferred by the Soviet Government to the Persian State in 1921, became known as the Bank-i-Iran, and came under Treasury supervision. In the previous year the Ottoman Bank had opened branches in Persia, concerning itself mainly with the transit trade with Iraq, and a new Soviet Bank, the Banque Russo-Persane, or Ruspers, was founded in 1925 with branches in all the important towns of northern Persia, to assist commerce between Russia and Persia.

In 1930 the Government transferred the right of issuing notes from the Imperial Bank of Persia to the Banque Mellié Iran, the National Bank of Persia, which had been founded in 1927 to encourage and help trade, farming, agriculture, and industry with capital derived

from the sale of Crown jewels and domains, and other government sources, including the older Bank-i-Iran. The new bank has now branches in all parts of the country; its agricultural section was constituted an independent organization in 1933 and took the name of the Agricultural and Industrial Bank of Iran; it has branches in all the principal agricultural centres and supports agricultural and industrial development in the country. The Banque Pahlevi (Auto Bank) was established in 1925 as a convenience for Persian military officers, with part of the Army Pension Fund as capital. Under the direction of the Ministry of Finance it deals principally with inland bills and advances money on landed property, functions which foreign banks are not allowed to undertake; it also conducts a transport business with branches at Resht and Meshed. In 1939 a National Savings Bank was inaugurated. In the same year the Majlis authorized the establishment of a mortgage bank.

Apart from the foregoing there are many small local bankers, some of them combining banking with commerce. The rate of interest for loans varies from 12 per cent. per annum by the foreign banks in the larger towns to as much as 30 per cent. for small shopkeepers. The mortgage rate of interest varies similarly—from 9 per cent. on the largest amounts to 30 per cent. on small properties when foreclosure is probable. Mortgage business is mostly in the hands of local bankers. There are no agricultural banks apart from those mentioned in the preceding paragraph, but landlords are accustomed to advance money to their tenants.

The position as regards deposits and advances of the National Bank is shown by the following tables:

Bank Deposits (million rials) on 9 Dec. each year

	Govt.	*Other*	*Total*
1939 . .	540·6	1,418·0	1,958·6
1940 . .	757·4	1,184·6	1,942·0
1941 . .	852·6	1,340·8	2,193·4
1942 . .	1,641·9	1,820·3	3,462·2
1943 . .	1,799·2	5,440·3	7,239·5

Bank Advances and Bills (million rials) on 9 Dec. each year

	Govt.	*Other*	*Total*
1939 . .	1,088·3	614·9	1,703·2
1940 . .	1,714·5	953·5	2,668·0
1941 . .	2,266·9	599·7	2,866·6
1942 . .	3,184·0	705·5	3,889·5
1943 . .	2,475·2	572·2	3,047·4

COMMERCE

COMMERCIALLY Persia was for very many years almost in the power of Russia. The first trade agreement in her more recent history was made in 1822 between the Governments of Russia and Persia. This and a long series of later agreements tended to make Persia more and more economically subservient to Russia. The separation by geographical features of northern Persia, the region closest to Russia, from the south, the better transport facilities with Russia, and the position of Tehran, the seat of government, helped towards this end. Moreover, the bulk of the population and of agricultural production is in the north. Previous to 1914 most of the imports came through the Caspian ports, Trebizond (Trabzon) on the Black Sea, and Erzurum, from Russia, and to a less extent from Turkey. Trade with Russia represented 63 per cent. of Persia's total trade and that with Britain only 20 per cent. Russia took 69 per cent. of Persia's exports and sent 58 per cent. of the imports. Of the remaining exports 13 per cent. went to Britain and of the imports 24 per cent. came from that country.

Persian trade was therefore seriously affected by the Russian revolution and its aftermath. In the year 1920/1 when the value of Persian exports, apart from petroleum, had shrunk to a third of the pre-war figure, only one-sixteenth of the total went to Russia, while for a time the value of imports from Russia was only one-tenth of the total, and Iraq had replaced Russia in the transit trade.

The loss of Russia as a customer, the rise in the prices of the commodities that Persia had to import, and the fall in the world prices of her own products brought her almost to bankruptcy. With export trade reduced to a fraction, Persia faced the economic crisis of 1921; the export of gold and silver in all forms, including that of currency, commenced, forced by the necessity of buying abroad and with little to sell. This export had to be stopped by legislation, since it led to the further impoverishment of the country and a catastrophic fall in the rate of exchange. An obvious step under such circumstances is to discourage, and perhaps prohibit, the import of luxury commodities and those which compete with internal production. But Persia had no luxuries and no indigenous industries to be protected or fostered. Consequently the only result of high import duties was to raise the price of necessities and thus to impose a still heavier burden on the population.

After the Bolshevik revolution the political attitude of Russia towards Persia changed. One consequence was the rise of Britain to the first place among Persia's customers and suppliers, her share of Persia's reduced total trade reaching 60 per cent. Nevertheless Russian trade gradually recovered, and by February 1926 so dependent was Persia again on Russia because of geographical reasons, that at this period when Russia prohibited all imports from Persia, except cotton, Persia had no means of redress. It was not until May 1928, under an agreement made six months earlier, that Persia secured freedom to fix her own tariffs and was able to give 'most-favoured nation treatment' to all countries equally in treaty relations with her. Even this agreement gave Russia some favours; for instance, Russian goods had to be taken in exchange for Persian products and these were not always marketable in Persia. In June 1932 a new agreement was made. Under this, Russia's share of the total imports into Persia was fixed at about 50 per cent. as compared with an average of about 33 per cent. during the previous three years. Included in the 50 per cent. was the monopoly import of sugar and matches, though this monopoly to Russia did not last long.

Meanwhile three events were changing the traditional foundations of Persian trade. The first was the commercial development of mineral oil in south-west Persia, particularly in the first decade after the war. The second was the construction and improvement of communications. The third was the autocratic centralized rule of Riza Shah, which brought order in the countryside and considerable security for international trade. Persia, which had for ages been dependent on foreign sources for almost every necessity except cereals and some textiles and had only had such products as raw cotton and wool, skins, and gums to sell abroad, found herself in possession of one of the most valuable of world commodities, though this had only been discovered after several years of patient exploration (p. 489). Henceforward the economics of Persia have been greatly influenced by oil, for not only is oil her greatest export, but also its exploitation has changed the emphasis on commodities for import.

Principal Exports and Imports

During the decade 1930/1 to 1940/1 the principal exports were petroleum products, raw cotton, raw wool, fruits, skins, gum, and carpets, the last being the only manufactured export; to these may be added rice (which has grown in importance in recent years but is a very variable commodity), raw silk, opium, and tobacco. Petroleum

products dwarf all others into comparative insignificance. In 1930/1 their export value amounted to 1,005 million krans (*c.* £10 millions) compared with 459 millions (*c.* £4·6 millions) for all other exports. In 1938/9 petroleum exports amounted to 1,752 million rials (*c.* £13·5 millions), fruits and berries coming second in value and carpets third with only 176 and 100 million rials respectively (*c.* £1·3 and £0·8 millions). But it is difficult to assess the actual revenue value of oil production, since this includes, besides royalties and dividends, a large item of 'invisible exports' such as money spent by the Company within the country on wages and purchases, medical, educational, and other services, &c. (p. 485).

During the same period the principal imports were cotton and woollen goods, sugar, tea, vehicles of all sorts and their accessories, machinery, and tools. It is impossible to state their order of priority and importance over a ten-year period, since they varied considerably. Railway construction and other development put the emphasis at times on machinery. Moreover some bodies, as for example the Anglo-Iranian Oil Company, have the right to import certain goods free of duty, so that presumably such goods are not always shown in the figures.

In May 1936 a new customs tariff was drawn up. Specific duties were introduced, for the most part in place of *ad valorem* rates previously levied. The duties were made payable in the currency of origin, and the fluctuating surcharge, at times as high as 160 per cent., was therefore abolished. The new tariff imposed duties on practically all imports, though necessities were only lightly taxed.

The table on p. 484 gives the value of the principal imports and exports during the years 1938/9 to 1941/2. It should be mentioned that over this period imports by the Anglo-Iranian Oil Company averaged about 32 per cent. of the whole, and exports by them amounted to 64 per cent., an indication of how much Persia owes to the Company in her balance of trade.

Countries of Destination and Origin

During the decade under consideration almost the whole of the petroleum products went to the British Empire. Carpets were mostly taken by the United States, the export of these to the United Kingdom being rarely more than half that to the United States. Of the raw cotton and wool almost 90 per cent. went to Russia in the early thirties, but by 1938/9 Russia had dropped out of this trade and 90 per cent. was taken in almost equal shares by Germany and Japan.

Imports

(Thousands of rials)

Commodity	*1938/39*	*1939/40*	*1940/41*	*1941/42*
Cotton goods	54,451	103,124	127,099	18,278
Woollen goods	23,086	12,861	11,188	10,094
Sugar	90,187	90,491	87,298	106,632
Tea	81,105	80,975	69,098	33,137
Machinery	40,583	20,912	33,345	46,301
Mineral oil	15,122	2,770	4,227	2,651
Others	390,000	301,031	532,670	396,761
Total Imports	694,534	612,164	864,925	613,854

Exports

(Thousands of rials)

Commodity	*1938/39*	*1939/40*	*1940/41*	*1941/42*
Petrol products	1,752,467	1,680,064	1,313,591	1,011,337
Carpets	100,145	106,828	120,118	131,627
Fruits and berries	175,885	154,349	193,319	138,305
Raw cotton	55,952	118,189	113,977	32,422
Wool, hair, &c.	38,519	116,979	162,590	141,824
Skins	41,172	64,620	66,811	36,161
Gum	42,917	52,320	37,761	81,648
Others	186,681	208,818	245,309	263,585
Total Exports	2,393,738	2,502,167	2,253,476	1,836,909
Exports excluding Petrol products	641,271	822,103	939,885	825,572

Of the imports Russia was at first the largest supplier of cotton goods, with Japan a good second, Britain next with less than a third of the Russian goods, and India fourth. Three-quarters of the vehicles were imported from the U.S.A., and one-sixth from Britain. Russia then had the monopoly supply of sugar, and Germany supplied most of the machinery and tools, with Britain and Czechoslovakia bracketed second. By 1939 Japan had captured almost the entire trade in cotton goods, and Germany had greatly improved her position all round. India and the Netherlands East Indies almost shared the tea imports, and the latter supplied most of the sugar, the balance coming from Belgium, Egypt, and Russia.

The pre-war development of German trade with Persia is interesting, particularly since, because of distance, Persia has never regarded German trade with her as connected with politics. A commercial treaty in 1929 gave most-favoured nation treatment to both countries, and German trade thereupon increased until in 1935 a currency clearing agreement gave Germany additional advantages. In the following year another agreement was negotiated fixing total trade between the two countries at £3 millions a year; machinery, motors, cement, haberdashery, and domestic goods were to be imported into Persia in exchange for cotton, silver, gold, rice, caviare, and skins; of these cotton was the most important, since some 20 per cent. of German imports of this commodity came from the Middle East. By 1938/9 Persian trade with Germany had risen to first place with about half the total exports and imports. This trade continued to expand after the outbreak of war in 1939, and all of it then passed through Russia, additional commodities reaching Germany from this source being wool, silk, dried fruits, and probably oil. Trade was on a barter basis after 1940, but came to an abrupt end with the attack by Germany on Russia in 1941.

Balance of Trade and Monopolies

External trade is fundamentally the monopoly of the State, which supervises all imports and exports and can limit them or confine them to certain countries. Consequently the State should be able to maintain a general balance of trade, though this may lead to shortages of certain goods and fluctuations in internal prices. There is of course one large item which ought to be considered as an 'invisible export', but is not. This is the large sum spent by the Anglo-Iranian Oil Company in wages and purchases in Persia; it amounted to £2½ millions in 1937/8, but is excluded on the grounds that all operations

of the Oil Company represent a withdrawal of national capital. With this exception other 'invisible exports' are negligible, and the balance probably slightly adverse, since they comprise the difference between the expenditure of Persian currency by diplomatic agents and other visitors, less the amount of foreign currency spent by Persians abroad.

The State therefore endeavours to balance imports and exports, leaving the operations of the A.I.O.C. out of account. This is effected largely by the Foreign Trade Monopoly Law of February 1931, whereby the whole of the foreign trade of Persia was declared a state monopoly. The sugar and tea monopolies, imposed in 1925 to provide capital for railway construction, and the opium monopoly of 1928, designed to control the collection and distribution of the drug, were already in being, but the powers given by the new law were specifically for revenue purposes and for the control and balance of trade.

All imports and exports now fall into three groups:

(i) Those prohibited except with special state authorization: e.g. arms, ammunition, currency, bank-notes, and certain necessities.

(ii) Those monopolized by the State or ceded by the State to societies and companies: e.g. petrol products (A.I.O.C.), Caspian fish products (Soc. Mahié Iran), Khuzistan dates (Soc. Khochguebar de Khouzistan), sugar, alcohol, &c.

(iii) Those subject to licence or special conditions: e.g. drugs and poisons, cinema and radio apparatus, tea, playing cards, &c.

A list of the more important articles in the various categories is given below.

This system has not always worked smoothly, though where they have been run by special companies (in which the State often owns most of the shares) they have been profitable. At first the control was unsuccessful, and an attempt by the State to force exporters to sell 90 per cent. of their foreign exchange to the Government also failed. In February 1932 the attempt to control the exchange was abandoned. The introduction of licences also had the curious effect of initiating a speculative trade in these licences which for a time was more profitable than the ordinary purchase and sale of commodities. But, on the whole and in spite of some years when the balance of trade, excluding oil considerations, has been adverse, the state monopoly of trade has served its purpose.

Import Control

A. *Merchandise, the importation of which is monopolized by the State.*

(1) Automobiles and trucks.
(2) Accessories and spare parts of motor vehicles.
(3) Tyres and tubes for automobiles.
(4) Cotton cloth.
(5) Silk cocoons.
(6) Sugar.
(7) Cigarette paper, cigarettes, and *mochtouke*.
(8) Machines for cutting tobacco and manufacturing cigarettes.
(9) Matches.
(10) Alcoholic drinks (not medicinal).
(11) Playing cards.
(12) Railway materials, e.g. locomotives, wagons, &c.

In general these items reach the market through commercial houses after payment of the monopoly taxes.

B. *Merchandise, the importation of which is prohibited.*

(1) Arms.
(2) Ammunition.
(3) Photographic and cinematographic apparatus adaptable to aeroplanes.
(4) Books, literature, &c., conducive to public disorder, or contrary to religion or morals.
(5) Merchandise carrying marks, &c., which mislead as to manufacture, qualities, or characteristics.
(6) Merchandise marked with the 'Lion and Sun' or the Persian Flag.
(7) Medals and buttons marked with the 'Lion and Sun' and resembling the local currency.
(8) Persian bank-notes—each traveller is limited to 200 rials.
(9) Money of all sorts of brass, nickel, copper.
(10) Foreign bank-notes not at the time in circulation.
(11) Forged stamps, &c.
(12) Lottery tickets.

C. *Merchandise, the importation of which is subject to licence by the Ministry of Commerce.*

(1) Morphia, cocaine, &c.
(2) Poisons.
(3) Certain special pharmaceutical products.
(4) Synthetic dyestuffs not included in the authorized list for carpet manufacture.
(5) Vegetable products.
(6) Animals and animal products.

(7) Apparatus for taking cinematograph pictures.
(8) Radio apparatus.
(9) Tea.
(10) Playing cards, and bottles containing alcoholic drinks, which must bear the octroi tax stamp.

The above items are controlled by the appropriate departments such as Ministry of Public Health, &c.

Export Control

D. *Exports reserved to the State or ceded by the State to certain Societies.*

(1) Opium and its derivatives (monopoly of the Ministry of Finance).
(2) Cotton.
(3) Tombac, tobacco, and derivatives (monopoly of the Ministry of Finance).
(4) Iron oxide (monopoly of the Ministry of Finance).
(5) Gum tragacanth.
(6) Asafoetida (monopoly of Soc. Anghouzeh Iran).
(7) Khuzistan dates (monopoly of Soc. Khochguebar de Khouzistan).
(8) Caspian fish products (monopoly of Soc. Mahié Iran).
(9) Petrol products (monopoly of A.I.O.C.).

E. *Exports prohibited except with special Government authorization in each case.*

(1) Arms.
(2) Ammunition.
(3) Gold and silver in bars or money, articles made of gold or silver except personal jewellery.
(4) Persian bank-notes (limit 200 rials).
(5) Cereals, grains, potatoes, flour, pastes, starches.
(6) Live animals and meat (except pork).
(7) Fresh and salted butter, olive-oil, cheese, eggs, honey.
(8) All manufactured cotton and woollen goods, clothing and hats.
(9) Leather and leather manufactures.
(10) Bags, packing twine, cord, jute and jute bags.
(11) Local pasteboard.
(12) Matches.
(13) Sugar confectionery, jam.
(14) Metals and manufactures.
(15) Foreign goods to the country of origin.

F. *Exports subject to special conditions.*

(1) Dried fruits (sufficient capital to prepare, pack, and sell efficiently).
(2) Sheep and goat skins, and natural wool (ditto).

(3) Palms, tree fruits, grains, tobacco, tombac, jute, and industrial wood (authorization of Ministry of Agriculture).
(4) Asafoetida, quince, saffron (certificate of purity).
(5) Animals and animal products (veterinary certificate).
(6) Films, photographs of the country, its works, ports, monuments, &c. (authorization of Prefecture of Police).
(7) Antiquities (authorization of the Ministry of Public Instruction).
(8) Almonds (marking requirements).

OIL

Operations to the War of 1914–1918

The presence of mineral oil in Persia has been known at least since Achaemenid times, when the ancient Persians used the escaping gas in their Zoroastrian fire-temples. Oil from seepages has also long been used in Persia for lighting, and as a medicament for skin diseases and camel sores. It was not, however, until the latter part of the nineteenth century that mineral oil became an asset of world economic importance. Its exploitation in Persia was then included with that of other minerals, the concession for which was held by the Persian Bank Mining Rights Syndicate. This body made two attempts, both unsuccessful, to find oil in commercial quantities, first at Daliki, about 42 miles north-east of Bushire, and then on Qishm island. Soon afterwards the numerous seepages from Kurdistan to Fars attracted the attention of W. K. D'Arcy, a Devonshire man who had made a fortune from gold-mining in Australia. In 1901 D'Arcy secured the exclusive right for a period of sixty years to search for, develop, and sell all natural gas, petroleum, asphalt, and ozokerite throughout Persia, except in the northern provinces of Azerbaijan, Gilan, Mazanderan, Asterabad, and Khurasan, and the exclusive right to construct oil pipe-lines from anywhere in Persia to the south coast. The total area of the concession was about 400,000 square miles.

Geological work began at Chia Surkh near Qasr-i-Shirin, and drilling started in November 1902, the necessary equipment being brought from Europe through Basra and Baghdad. Oil was struck the following spring, but further drilling up to February 1904 resulted in production amounting to only about 60 barrels a day, a quantity far too small to justify the construction of a pipe-line through turbulent Pusht-i-Kuh to the Gulf. Work was therefore suspended in June, and activities were transferred nearer the coast in order to

lessen such transport difficulties. Seepages between Shushtar and Ram Hormuz were already known, but in spite of promising surface conditions the results from drilling at 'White Oil Springs' and Mamatain were disappointing. At Maidan-i-Naftun, however, near a ruin known as Masjid-i-Sulaiman and said to be the remains of an ancient fire-temple, oil was at last struck in May 1908 in considerable quantity, and in most of the wells which were then drilled in the immediate neighbourhood the oil was found to be under gas-pressure.

For more than seven years most of the operations had been undertaken and expenses borne by D'Arcy. The Anglo-Persian Oil Company was formed on 14 April 1909 to take over his interests and to provide capital for the major engineering works required for development. These included not only the machinery and buildings at the oilfield but also a refinery on Abadan island and a pipe-line from Masjid-i-Sulaiman to the refinery. This pipe, completed in 1911, carried about one-quarter of a million tons of crude oil in 1913. Its capacity was about 400,000 tons a year.

On 20 May 1914 the British Government purchased £2 millions of the A.P.O.C.'s stock in order to ensure oil-fuel for the British Navy. Consequently, when Turkey joined Germany in war at the end of the year, the pipe-line and refinery became objects of strategic importance. In February 1915 the pipe-line was cut by Persian tribesmen instigated by German and Turkish agents, an act which Persia was under obligation to prevent, under the terms of the D'Arcy concession, and which caused British military intervention in south-west Persia during the war (p. 302).

Later Development

Despite the cutting of the pipe-line in 1915, the company made steady progress with its operations during the war of 1914–1918. The Masjid-i-Sulaiman field was further developed, and the capacity of the pipe-line was trebled; a corresponding increase in the capacity of the Abadan refinery was made. In the period between the two wars there was very considerable progress. In 1929 a second major field at Haft Kel reached the production stage. A third (and still larger) field at Gach Saran has since been discovered and brought into production, while two others have been discovered in the region but have not been fully developed. In 1939 the capacity of the pipelines and refinery was over 11,000,000 tons a year. Since that date further increases have been made in the output of the various fields, the throughput of the pipe-lines, and the capacity of Abadan refinery.

After the Japanese overran the oilfields in Borneo, the Netherlands East Indies, and Burma in 1942, the oil produced was of the greatest value to the Allied forces in the Middle East and India. A very large quantity of 100-octane aviation spirit was produced, in addition to vast amounts of fuel oil, motor spirit, &c.

Nature of the Oil Structures

In south-west Persia oil occurs in large oval limestone domes, each of those so far discovered being between 15 and 20 miles long and from 2 to 3 miles wide. The domes are buried below a group of covering rocks consisting of red and grey shales, anhydrite, gypsum, and salt, in complicated beds both underground and at ground-level, and the surface relationships of the rocks afford little help in discovering the underground limestone domes, a fact which makes exploration laborious, slow, and costly (fig. 7). The oil, which contains gas under pressure, soaks into the minute pores of the limestone reservoirs and effervesces when it escapes. It is the gas-pressure which causes seepages and the flow of oil within the rock, and without ample pressure the oil cannot of itself escape when the covering rocks and dome are drilled. It is therefore of the utmost importance to conserve the pressure. Little was known of this technique in the early days of the century and it was at first estimated that between 400 and 500 wells would be required in the $3\frac{1}{2}$ square miles then believed to be oil-bearing in the Masjid-i-Sulaiman field. Though this field is now known to be ten times the area estimated at first, experience has shown that less than 400 wells are required for the whole area, the reason being that fewer wells more widely spaced and carefully sited around the edge of the reservoir yield all the oil that can be economically handled and scientifically operated to conserve the pressure and thus increase the total yield. A recent development is to pump back from Abadan through another pipe the less valuable heavier oil after refining, and to inject it back into the reservoir rock in order to control the underground water-level and to assist the gas-pressure. The experience gained at Masjid-i-Sulaiman was subsequently applied with conspicuous success at Haft Kel and Gach Saran, though this essential policy of conserving the gas-pressure has sometimes led to the charge of restricting output.

Termination of the D'Arcy Concession

In November 1932 the Persian Government cancelled unilaterally the D'Arcy concession, which had still nearly thirty years to run.

The political causes for this action have already been mentioned (p. 311). But the main reasons for Riza Shah's action were the instability of Persia's finances, the high cost of internal reforms and projects, and the need for a larger and more stable income from oil, which formed a large part of the national revenue. Thus the annual revenue from oil royalties in nine years from 1919/20 to 1927/8 averaged £708,667 sterling, but it varied from £411,000 in 1923/4 to £1,400,000 in 1926/7, and dropped again to £502,000 in 1927/8. Negotiations between the Company and the Persian Government were undertaken three times between 1928 and 1931 without success. The final break came when the provisional figure for Persia's share for 1931 was made known. This amounted to only £306,872 compared with £1,288,312 for 1930 and £1,437,000 for 1929.[1] The Persian Government refused to accept the reduced royalty and on 27 November cancelled the concession. The legality of this act was at once challenged by the Company and by the British Government. After the matter had been laid before the Council of the League of Nations, the Company and the Persian Government agreed to negotiate a new convention, pending which the Company was to continue operations as before. Sir John Cadman, Director of the Company, arrived in Tehran on 3 April 1933, and the new convention, signed on the 29th, received the ratification of the Majlis on 28 May and came into force on receiving the Shah's assent the following day.

The New Convention

The main points of the new convention were: (1) the reduction of the concession a total of to 100,000 square miles, the districts to be selected in the southern part of the original concession by 31 December 1938, and (2) the abolition of the exclusive right to construct pipelines to the south coast. These two clauses enable Persia to negotiate further concessions. The financial terms provided that from 1 January 1933 the Persian Government should receive 4*s*. per ton of petroleum sold in or exported from Persia by the Company in addition to a fixed sum of £671,250 (equivalent to 5% on the ordinary stock capital) plus a sum equal to one-fifth of the annual profits actually distributed to the ordinary stockholders, with a minimum aggregate under these two heads of £750,000 per annum. Other clauses dealt with sterling exchange rates, the supply of information acquired in

[1] The low figure for 1931 was caused by the world depression and causes beyond the Company's control. The negotiations already undertaken broke down largely through the intransigeance of the Persian Government.

the concession, the recruitment and training of Persian labour and technical staff, education and medical attention, and the settlement of outstanding financial claims. These last were liquidated by a lump-sum payment of £1,000,000 by the Company and by readjusting the regular payments for 1931 and 1932 on the basis of the new convention.

The Company was reassured of exemption from customs duties and other taxation on petroleum exports and on imports of all material required exclusively for its oil operations and for medical and sanitary purposes. Other exemptions included freedom from surrendering foreign exchange (p. 472), and from national and local taxation for thirty years. The period of the concession was extended to 31 December 1993, that is, for more than thirty years longer than the D'Arcy concession, as partial compensation for the reduction in area, and it could be ended by the Company earlier, at two years' notice, though not by the Persian Government, except by default on the part of the Company. Matters of dispute were to be submitted to arbitration, and if necessary referred to the Permanent Court of International Justice.

The selection of boundaries of the new concession raised several problems. The region was little known and in part unexplored, the existing maps were inaccurate and compiled from different sources of varying accuracy, and much of the country was either uninhabited or held by tribesmen amongst whom order had only recently been established by the central government at Tehran. Communications, excepting those already provided by the Company, were still primitive. A large amount of exploration and survey, both topographical and geological, had therefore to be carried out during the next five years, particularly in the southern Zagros and Makran. By the end of 1938, however, the areas had been selected and the boundaries submitted to and ratified by the Persian Government. To eliminate the possibility of future disputes the boundaries are defined by straight lines joining a number of points, specified by their geographical co-ordinates of latitude and longitude, on the inland sides of the concession, and by the Iraqi border and territorial waters on the west and south. The areas within these boundaries are calculated theoretically on an agreed figure of the earth and are therefore independent of existing maps.

The Naft Khaneh Oilfield

Efforts have also been made to develop oil production in areas examined in earlier years, though without much success except in

the Naft Khaneh field about 36 miles south of Qasr-i-Shirin. This field was discovered by the Anglo-Iranian Oil Company (then the A.P.O.C.) before the demarcation of the Turko-Persian boundary in 1914. The field lies astride the boundary, but the Ottoman Government recognized the Company's rights on their side of the boundary, and the Iraqi Government in 1925/6 accorded the same rights in an agreement which provided for the formation of the Khanaqin Oil Company, a subsidiary of the A.I.O.C. That portion of the Naft Khaneh field within Persian territory, now known as the Naft-i-Shah field, is developed separately by the A.I.O.C., the oil being piped to Kermanshah, where it is refined before distribution, mostly to northern Persia.

Other Occurrences and Concessions in Persia

Although south-west Persia is undoubtedly by far the most important oil-bearing region in the country, both intrinsically and because of proximity to ocean and air routes, some seepages have long been known in the north. Those at Sari in the Caspian coastlands have been used in the past to supply a small local demand. Concessions were obtained by the Amiranian Oil Company[1] in a large area in north-eastern Persia, but this company relinquished its privileges in 1938, after carrying out preliminary surveys with moderate success in the Gurgan province, because they did not justify the construction of a long pipe to the southern coast. Drilling has also been carried out on the edge of the Great Kavir basin near Samnan and also near Qum where small seepages occur, but the results did not justify further outlay. North of the Elburz prospects are better, but transport by pipe would only be possible to the Caspian or Black Sea. These prospects and those of Azerbaijan, about which little is known, are less likely to be of interest to world markets, though if exploited by Russia they might be of economic and political significance to Persia.

Among the individuals and companies which have at one time or another obtained rights of exploration in the north are: (1) Khostharia, a Russian Georgian, whose rights in North-west Persia were subsequently acquired by the Anglo-Persian Oil Company. The A.P.O.C. formed a subsidiary known as North Persian Oils, Ltd., in which the Standard Oil Co. of New Jersey became an equal partner; (2) the

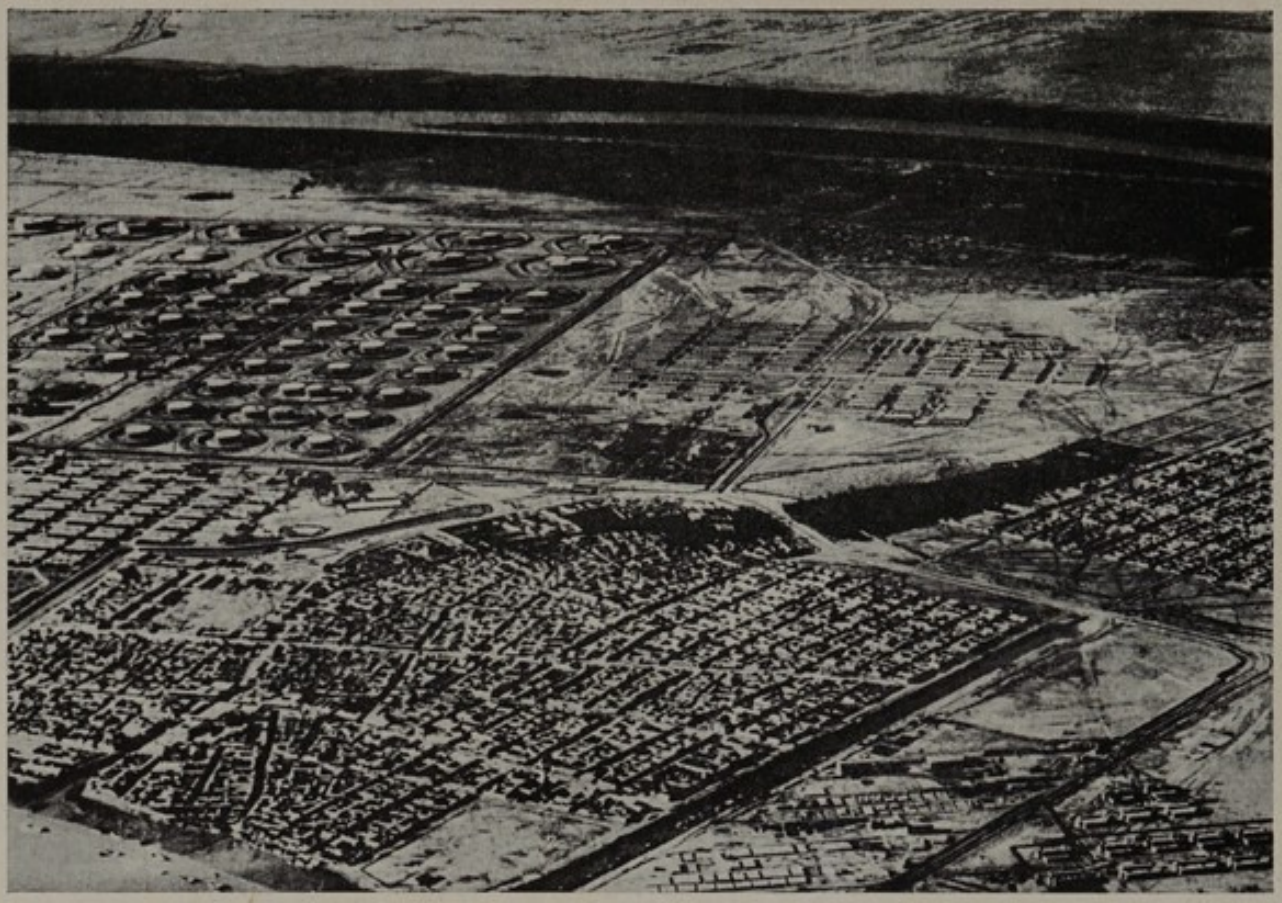
[1] A subsidiary of the Seaboard Oil Company of Delaware, U.S.A., with half the shares taken up by the Texas Corporation. The Soviet Government protested against the grant of this concession.



262. *Abadan refinery and water front, with jetty 4 before its enlargement*



263. *Houses of the European staff at Abadan*



264. *Abadan village with tank farm behind*



265. *Riverside houses and foreshore at Abadan village*

Sinclair Oil Corporation, which competed in the same area but failed to raise the necessary capital; (3) a Franco-Belgian group which carried out some prospecting in Mazanderan, but abandoned operations because of political difficulties; (4) the Kavir Khurian Company, which was financed by the Russian Bank and was responsible for the drilling near Samnan, but whose title to the concession is held by the Persian Government to be invalid; and (5) a Dutch Company, connected with the Royal Dutch-Shell group, which obtained a short-term exploratory concession in 1939. In 1944 the Persian Government decided to shelve all outstanding negotiations for oil concessions until after the war.

Oil in Iraq and the Persian Gulf

Outside Persia the Anglo-Iranian Oil Company owns 23¾ per cent. of the capital of the Iraq Petroleum Company, which works the profitable Kirkuk fields and pumps the oil to the Mediterranean coast. The Kuwait Oil Company, formed by the A.I.O.C. and the Gulf Corporation in 1934, struck oil at Burgan in Kuwait territory in 1938, and there are good prospects for the future. Farther down the Gulf on the Arabian coast the A.I.O.C. has, through the I.P.C., some interests, but the California Arabian Standard Oil Company of America, now known as the Arabian American Oil Company, has concessionary rights covering most of Saudi Arabia.

CHAPTER XIII

PORTS AND INLAND TOWNS

PORTS

The Southern Ports

The estuary ports of southern Persia consist of Abadan and Khurramshahr on the Shatt al Arab and Bandar Shahpur on the Khor Musa. These are all sheltered ports with modern equipment for large vessels. The first two are limited by the general conditions of the Shatt al Arab channel and its bars, described in the Geographical Handbook of *Iraq and the Persian Gulf*, p. 559, to vessels of about 20–23 feet draught, though by use of the tidal rise ships up to nearly 31 feet draught have reached Abadan. The ports of the Gulf coast, Bushire, Bandar Abbas, Lingeh, and other minor places, are open or naturally protected roadsteads from which cargoes are landed on beaches or at small piers and wharves with rudimentary equipment. The coast of Makran is short even of these indifferent facilities, and only Jask and Chahbar offer roadsteads of any value.

Abadan (30° 20′ N., 48° 16′ E.). Hospitals. Clubs. Bank.

Abadan lies on Abadan island on the left bank of the Shatt al Arab, about 27 miles above Fao. It has one of the largest refineries and oil ports in the world, with limited but efficient accommodation for the discharge of general cargoes. The site is fringed by date-groves on all sides. (Photos. 262–265.)

Description. The A.I.O.C. establishments have all been built since the original D'Arcy concession of 1901 on the site of former palm-groves and mud-flats (p. 121). A great part of the residential quarters, refineries, and port has all been carefully planned and laid out by the firm of Costain. The residential quarters flank the refineries to east and west. On the west the houses of the European staff stand with fine gardens on broad avenues (photo. 263); there are shops, cinemas, clubs, and a swimming-pool. On the east the Persian settlement of Abadan village stretches back from the waterfront between two creeks and is separated by the Abadan railway from the newest Persian quarter, called Ahmadabad. The older part of Abadan village, nearest the waterfront, is somewhat irregular and crowded, but in the

newer part and Ahmadabad the road plan is rectilinear; the houses are built round traditional courtyards (photos. 264, 265). The hospitals, dispensaries, church, post office, and bank are north-east of the refineries, adjoining the Abadan tank farm. The extensive refineries occupy a rectangle about 3,000 by 4,000 feet behind the waterfront and are backed by the huge Abadan tank farm for crude oil, fed by the pipe-lines which enter the island from the north across the Bahmishir channel. Finished products are stored for shipment in the Bawarda tank farm, 4,000 feet east of Abadan village, and distributed by pipe to the oil jetties. Refineries, residential quarters, tank farms, and port are served by the Abadan light railway (3-ft. gauge). The population, recorded in 1937 as 60,000 Persian subjects and 950 Europeans, has increased since then to a figure between 120,000 and 140,000. The Persians are mainly Arabs and Lurs.

The Port (fig. 58)

Ships awaiting berths moor at buoys or at their own anchors opposite Bawarda. The berths for large ships are all at quays and jetties built out into the river, while the lighter-wharves are bankside quays in creeks. There are also pontoons and piers for small craft. Of the 13 jetties for large ships, 12 handle petroleum products only. Six of these 12, all short in length (60–100 ft.) with depths alongside of 30–40 feet, extend downstream from Abadan village to the lower end of Bawarda tank farm. The other 6 oil jetties are distributed along the waterfront opposite the refineries and include 2 long jetties (187 and 350 ft.); only 3 have deep water (28–35 ft.). The cargo jetty, recently enlarged, is in the centre of the refinery waterfront and has 23 feet of water. All these 13 jetties except 1 are of steel and concrete; the berths tend to silt up and usually one or two are out of action. The lighter wharves are in Braim creek, which flanks the European quarter on the west, and in the creek which marks the eastern side of Abadan village.

At the quays marked 2–8 and 11–15 on the plan the height of the jetty's deck above low water averages 12–15 feet.

Cranage is confined to Jetty No. 4 (4) which has seven 3-ton electric gantries, and to the Braim lighter wharf (1), which has 3 cranes varying from 3 to 15 tons and an 80-ton hoist. There is also a floating-crane of 200 tons. The maximum capacity of these two quays is about 40,000 tons monthly.

Warehouses are extensive, located behind No. 4 jetty (4) and served by the light railway. *Harbour craft* are numerous and well assorted;

they included, in 1940, 4 ocean-going tugs, 5 harbour-tugs, 52 cargo-lighters, and some crane-barges and diving-barges.

Details of Quays

No. on plan	*Name*	*Construction*	*Length (ft.)*	*Depth (ft.)*	*Location*	*Remarks*
1	Braim lighter wharf	Screw pile; concrete deck	1,500	29	Braim creek	General cargo; 3 berths, cranes, rly.
2	Jetty No. 1	Steel and concrete	187	18	Refinery front	Petroleum products only.
3	Jetty No. 3	Steel, concrete, timber, and stone	40	4½	,, ,,	,,
4	Jetty No. 4	Steel and concrete	600	23	,, ,,	General cargo; rly. and cranes.
5	Jetty No. 5	,, ,,	80	34½	,, ,,	Petroleum products only.
6	Jetty No. 6	,, ,,	60	1	,, ,,	,,
7	Jetties Nos. 7 and 8	Steel, concrete, earth, and stone	350	28	,, ,,	,,
8	Jetty No. 9	Steel and concrete	75	29	,, ,,	,,
9	Lighter wharf	Solid fill	3,000	..	Creek east of Abadan village	General cargo; rly.
10	Jetty No. 15	Steel and concrete	70	38½	Bawarda front	Petroleum products only.
11	Jetty No. 10	,, ,,	100	42½	,, ,,	,,
12	Jetty No. 11	,, ,,	75	35	,, ,,	Petroleum products only; 200 ft. with dolphins.
13	Jetty No. 12	Steel and concrete	90	29½	Bawarda front	Petroleum products only; 220 ft. with dolphins.
14	Jetty No. 13	,, ,,	60	30½	,, ,,	Petroleum products only; 150 ft. with dolphins.
15	Jetty No. 14	,, ,,	100	30½	,, ,,	Petroleum products only.

Repair Facilities. Major repairs are done by the A.I.O.C. workshops, which provide for boiler-making, plate welding, rolling, punching, and lathing. A floating dry-dock, 72 feet long, for vessels up to 12·5 feet draught and with a lifting capacity of 750 tons, is moored between Jetty No. 6 (6) and Jetties 7 and 8 (7). There is a concrete slipway for barges of 125 feet.

Water is available at all 15 jetties and quays from the large water-tanks of the refinery, in which it is stored after settling, filtering, and chlorination.

Fuel. Oil is delivered by pipe at jetties, at the rate of up to 1,000 gallons an hour; coal must be obtained at Basra. Electricity is produced by the A.I.O.C. plant.

Communications. There is no rail communication outside the island. The A.I.O.C. area is served by a 3-ft.-gauge light railway and by

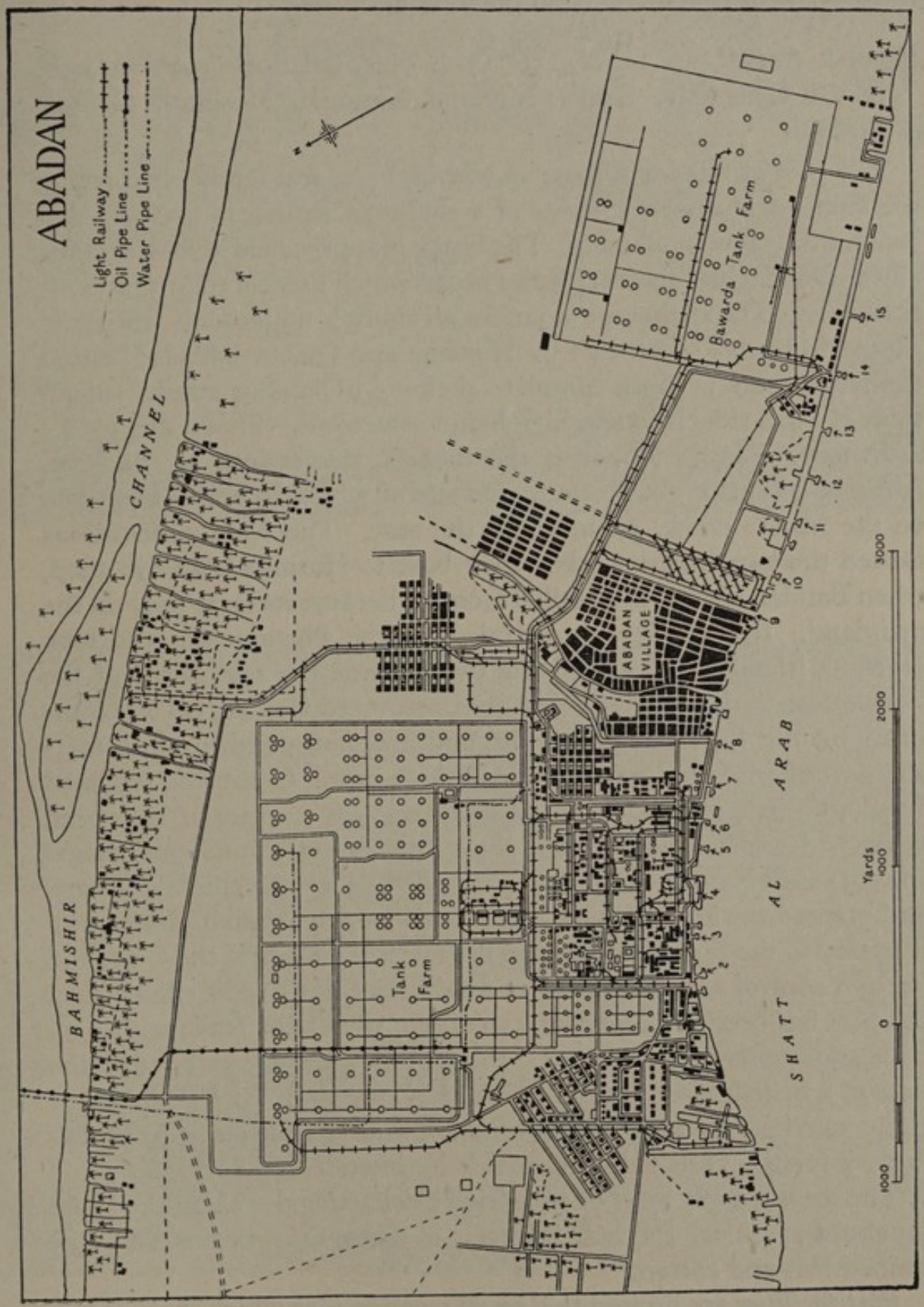


FIG. 58. *Abadan*

metalled roads. The only road connexion outside follows the pipelines north to join the Persian network at Ahwaz.

BANDAR ABBAS (27° 11′ N., 56° 17′ E.). Population (1937) 15,000. British Consulate. Banks: Imperial, National. Hospital. Garage. Airfield.

The port of Bandar Abbas, on a level, bare, and sandy plain facing the strait of Hormuz, consists of a sheltered roadstead and an open beach with a few small piers. The beach is approached across a gradually shallowing flat about 1½ miles broad which has less than 3 fathoms at deepest. The anchorage is 3 miles off shore in 4½ fathoms, sheltered except from the south-east by Hormuz and Qishm islands; behind the latter there is more complete shelter in Clarence strait. Inland there is a low ridge 100 feet high behind the town. (Photo. 267.)

History. Bandar Abbas is the modern descendant of the great Abbasid emporium of Hormuz, the site of which has been identified on the Minab creek, 50 miles to the east. The Mongol invasions caused the local rulers to shift their base to Hormuz island in 1300, when Bandar Abbas, then called Comru, became its ferry port on the mainland. In 1512 it was occupied by the Portuguese, who took Hormuz island in 1514, and the two became the main base of the Portuguese traders until Shah Abbas recovered Comru, called Gombrun by the Portuguese, in 1612, and in alliance with English merchants the island of Hormuz in 1622 (photo. 266). Gombrun, renamed Bandar Abbas, entirely replaced Hormuz as the centre of European trade and was the seat of the rival English and Dutch merchants (p. 283) until Nadir Shah (1736–47) made Bushire the chief Gulf port, and granted the lease of Bandar Abbas to an Arab shaikh. From him it passed to the Sultan of Muscat, the maritime ruler of the Gulf, and Persian control was not finally re-established until 1868. Since then the port has been the centre of a small but increasing trade with Kirman and south-eastern Persia. In 1916 Bandar Abbas became the base of a British force in south-west Persia (p. 305). Riza Shah added to its activities by establishing a cotton mill and also a fish-canning factory for the Gulf fisheries, which he intended to develop.

The *town*, mostly built of sun-dried brick, straggles along the shore for about 1½ miles. Its trade is largely in dates, nuts, raisins, and now canned fish and cotton.

Port facilities are limited to a small wooden pier which dries at low water, and a pier of masonry inshore and steel piles at its seaward end, in front of the custom-house, with steps, a railed track, and 3 feet of



266. *Bandar Abbas and the Gulf in the seventeenth century*



267. *Bandar Abbas*



268. *Bandar Shahpur, the old jetty before 1942*



269. *Bandar Shahpur, the new jetty, starting from the foot of the old jetty*

water at low tide; the beach is firm but liable to surf. Cargo is loaded to ships and unloaded by sailing dhows. Warehouse accommodation is very slight. *Water* is from reservoirs (*birkeh*) west of the town which collect rain, and from wells in the river-bed at Naiband. No fuel is available.

Communications. Motorable roads north to Saidabad and Kirman, east to Minab, north-west to Lar and Shiraz. *Landing-ground* 1 mile north-east of town, and approved seaplane anchorage.

BANDAR SHAHPUR (30° 23′ N., 49° 07′ E.) (with BANDAR MASHUR). Population, 1,000.

This small port is built on the reclaimed area of a mud-flat on the north side of the Khor Musa about 45 miles from the open sea. There is not less than 24 feet of water over the Khor bar at low tide and 29·5 feet at high. The channel is easy and unencumbered, and the Khor can accommodate many large ships at anchor. From the land the port is approached solely by a railway embankment across mud-flats and creeks. Bandar Mashur anchorage is 7 miles to the east-north-east in the Khor Mashur, the eastward continuation of the Khor Musa. (Photos. 268–269.)

History. Bandar Shahpur was built by Riza Shah in order to secure a free exit for the Trans-Iranian railway, because the Shatt al Arab is in Iraqi territory. An area about 1 mile long by 400 yards broad was raised to a height of 5–8 feet above its natural level, a railway embankment was built to the mainland, brick warehouses, port buildings, bungalows, and a labour camp were erected. A curving jetty of wood and steel 1,000 feet long was built out into the fairway, and the channel was buoyed and lit. Oil-loading berths were also established at Bandar Mashur. The port was declared open in 1932, but in 1941 the Allies, who occupied it, found the buildings incomplete, the water-pipes laid to the jetty unconnected to any source of water, and the buoyage and lights well planned but ill maintained. In 1942 work was begun on a second jetty similar to but larger than the first, which was completed by 1944 after many delays. A lighter wharf was repaired, and the buoyage system was rendered efficient.

There is no settlement except for the offices and houses in the port area. At the head of the Khor Mashur is the small village of Bandar Mashur.

The Port. There are two jetties, the Old and the New, which leave the shore close together and curve west and east respectively. The west or *Old Jetty* (No. 1), 1,000 feet long and 41 feet wide, is built on

open-pile railroad trestles, and has 800 feet of berth space, reckoned as 2 berths, with 24 feet of water at low tide; there is a double railway-track alongside the berths and 6 cranes varying from 3 to 15 tons capacity. The east or *New Jetty* (No. 2), built of steel pile with a timber deck, 1,800 feet long, has 1,200 feet of berthing space, reckoned as 3 berths, with 30 feet depth at low water; it has a triple railway-track alongside the berths and is intended to have a complement of 9 cranes varying from 3 to 15 tons capacity.

There are 2 oil-berths at Bandar Mashur, each consisting of 4 buoys moored in a rectangle, for vessels up to 550 feet, with 45 feet depth at low water. Oil is supplied by submarine hoses, which are buoyed for use. The rate of supply is 500 tons an hour.

Warehouses include 6 sheds with a total capacity of 4,000 square yards.

Capacity before the doubling of the quays was 800–1,000 tons daily, and maximum capacity may reach 2,400 tons daily (1943).

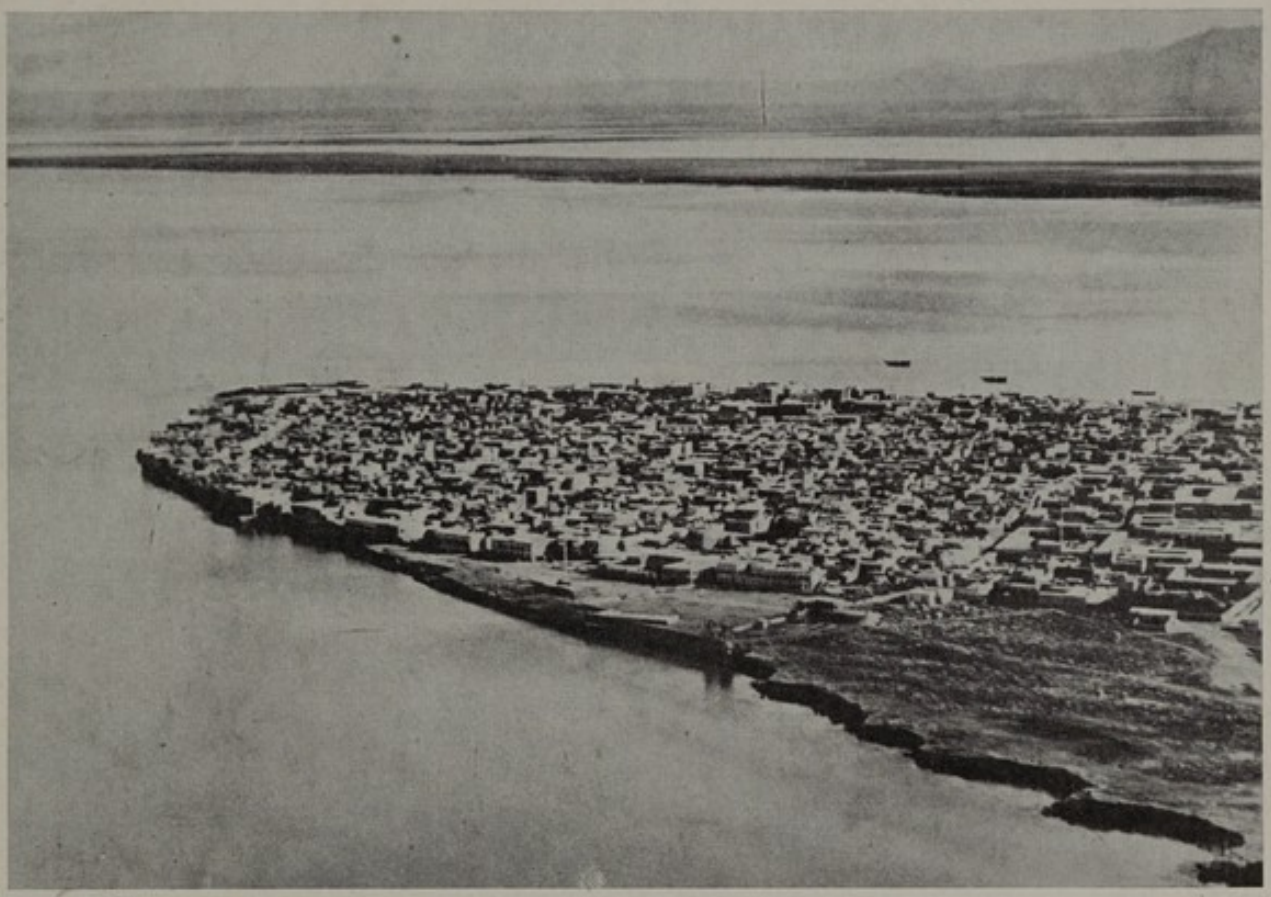
Water. A pipe-line from Gargar, where the railway crosses the Jarrahi river, supplies a very large tank in the harbour area. Locomotive water is brought by barge from Ahwaz or Bandar Mashur.

Communications. The railway yards in the port area have been enlarged. The sole exit is by rail to Ahwaz.

BUSHIRE (28° 59′ N., 50° 50′ E.). Population (1927), 30,000–40,000.
Hospital. Consulates: British, Russian. Banks: Imperial, National.
Hotels (2). Rest-house. Garage. Airfield. Cable station.

Bushire, some 140 miles south-east of the mouth of the Shatt al Arab, is situated on a shallow bay at the northern end of a coral-rock peninsula 12 miles long and up to 3½ miles wide, which is parallel to the mainland and connected to it by a neck of marshy ground (photo. 270). The port consists of an open roadstead and lighter quays along the shore. There are two anchorages, the inner 3 miles from the quay with minimum depths of 18 feet, and the outer 7 miles off shore with minimum depths of 36 feet. The Khor Sultani creek, with 20 feet of water, runs parallel to the east or inner shore of the peninsula, but is separated from the anchorages by a broad bank which has only 6 feet of water.

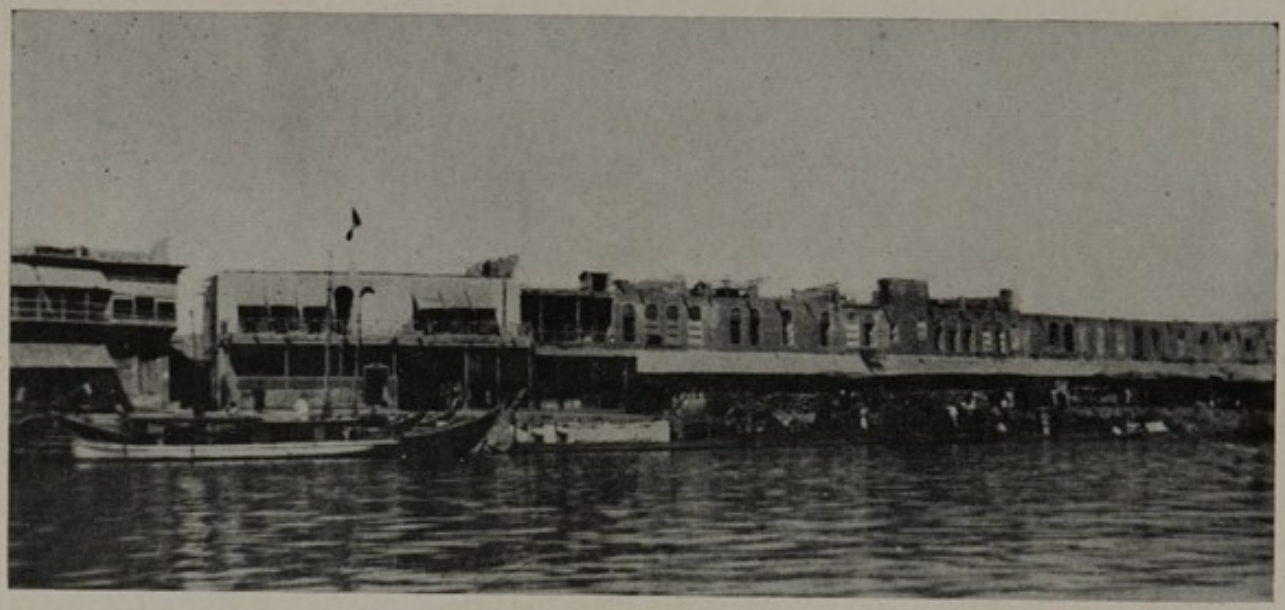
History. The Portuguese had a trading-station and fort at Reshire (Rishahr), 6 miles to the south, until 1622, but Bushire or Abu Shahr, from being a fishing-village, became a port of consequence only when Nadir Shah (1736–1747) made it the base of his short-lived Persian navy and the centre of Persian commerce, instead of Bandar Abbas.



270. *Bushire from seaward*



271. *Bushire, centre of the town*



272. *Khurramshahr, quays on the Karun water-front*



273. *Khurramshahr, new quays on the Shatt al Arab*

The East India Company moved their station thither from Bandar Abbas in 1763. By 1800 the population had grown to about 8,000 and by 1890 to 15,000. The town was ruled by Arab shaikhs from Oman until about 1850, when Persian authority was re-established, and since the eighteenth century it has been the seat of the British Resident in the Gulf, now with the rank of consul-general. The establishment of a cable-station of the Indo-European Telegraph Company in 1864 at Reshire added to the importance of Bushire. Before 1939 the airfield was used by Dutch and French lines to India and the Far East. The Arab element which formerly preponderated has been largely Persianized.

The town, which stands on a rocky ridge 40 feet high, is compact and crowded (photos. 119, 271); a broad lane leads from the east to the west shore, and there is an esplanade of sorts on the seaward side. The buildings, unlike those of central Persia, are built of stone with two stories and many outward-facing windows. Numerous *bad-girs* or wind-traps rise above the roofs like chimneys. The population contains Persians, Arabs, Jews, Armenians, and a few Europeans.

The port consists of the quay, which faces the Khor Sultani and mostly dries at low water, and 4 small jetties: the New Customs Jetty, at the south end of the quay, about 240 feet long with 5–7 feet at low water; the Old Customs jetty, 300 feet long with 1 foot at low water, now disused; the Residency jetty, 150 yards south of the New Customs jetty, 30 feet long with 2 feet of water, and the new A.I.O.C. jetty at Pudar, 1½ miles south of the New Customs jetty. On the western, outer shore, at Dastak near Reshire cable-station, there is a derelict stone wharf of 4,000 sq. feet, which could be used in fair weather only.

Cranage consists of two 10-ton tractor-cranes on the quay (1942) and a 7-ton hand-crane on the New Customs jetty (1938). Usually about 40 lighters of 14 tons capacity, and dhows of 15–20 tons, are available for unloading ships. The maximum monthly *capacity* with the present equipment is estimated at 6,000 tons of heavy cargo or 10,000 tons of light, allowing for bad weather but with night work. *Storage* consists of 8 modern warehouses measuring 90×35×15 feet at the New Customs jetty.

Water from wells is brackish and usually dirty; a condenser supplies European residents with 300 gallons daily. Electricity for lighting is supplied by 3 small plants.

Communications. Motor-roads on the mainland east to Firuzabad and thence to Shiraz; south-east to Lingeh; local road to Reshire.

W/T station north-north-east of Reshire point. Submarine cables to Fao, Bahrein, and Muscat. *Airfield* 2½ miles south-south-west of town.

KHURRAMSHAHR (30° 26′ N., 48° 10′ E.) Population, 30,000. British Consulate. Hospital. Quarantine station. Hotel. Banks: Imperial, National. Airfield.

Khurramshahr, formerly called Mohammerah, now the largest general port of Persia, lies at the junction of the Karun and the Shatt al Arab, about 38 miles above Fao. The town and the quays for small craft are on the north (right) bank of the Karun, the modern port is on the Shatt al Arab, and the small Persian naval base is on the south (left) bank of the Karun on Abadan island, where also is the suburb or village of Kut ash Shaikh. A belt of palm-trees, one-quarter of a mile wide, separates both town and port from the bare level desert which stretches inland. (Photos. 272–274.)

History. In Graeco-Parthian times the port of Charax Spasinu was probably near one of the mouths of the Karun, but it was not until the cutting of the Haffar channel through the deltaic flats in Abbasid times that the Karun entered the Shatt al Arab, and that a settlement on this site called Bayan became an entrepôt of the trade from the Karun river to the river ports of the Tigris and Euphrates. After Abbasid times Bayan faded away with the declining prosperity and nomadization of Khuzistan. In 1812 the village of Mohammerah was built by the shaikh of the Muhaisin tribe as his residence and opened as a free port. This brought Turkish intervention and caused the Muhaisin to seek Persian assistance, but the shaikhs of Mohammerah remained the virtual rulers of southern Khuzistan. In 1857 the town was shelled by British men-of-war during the brief Anglo-Persian war, and temporarily occupied. The shaikhs formed a friendly connexion with the British and co-operated with the firm of Lynch Brothers in the development of the Karun trade, and in the twentieth century with the Anglo-Persian Oil Company in the protection of its establishments. Their power was finally broken by Riza Shah in 1925 and direct Persian administration was established. Hitherto ships had discharged into lighters which unloaded at bankside quays on the Karun front, but about 1938 deep-water accommodation was planned on the Shatt al Arab front, and by 1941 one concrete T-shaped jetty with a head length of 400 feet had been finished. A Customs pier and warehouses were built on the Karun front, and a small naval station with jetties for light craft was built on Abadan

island. After the Allied intervention in 1941 the deep-water jetty was enlarged by an American firm into a continuous deep-water quay with 6 berths for ocean-going vessels, a task completed by 1944. Extensive lighter quayage was also built by the British authorities at Failiya creek, above the deep-water berths. The port, including the Failiya Creek, was also connected by railway to the existing Trans-Iranian system at Ahwaz. Thus the war has left Persia provided with a port on the Shatt al Arab of much the same size as Basra, which increased similarly in the War of 1914–18. With the decline of the Iraqi–Persian hostility which led Riza Shah to prefer Bandar Shahpur as a Gulf port, Khurramshahr should take its natural place as the principal port of Persia.

Description of Town. The town of old Mohammerah clusters around a creek about 1½ miles upstream from the Karun mouth, and newer quarters extend inland north-westwards. The old town is a huddle of mud-brick houses and narrow alleys with finer buildings on the waterfront, while the newer quarters are penetrated by avenues roughly parallel to the waterfront. A broad road about 300 yards from the river leads directly west to the Customs area. The Anglo-Iranian Oil Company has built offices and a bungalow settlement. The inhabitants mostly speak Arabic.

The Port

A bar in the Shatt al Arab about 2 miles below the Karun mouth which generally carries a minimum of 20 feet limits access. In the Haffar channel there is 2½ to 3 fathoms but little room for large vessels to swing, hence these usually moor in the Shatt al Arab.

On the Shatt al Arab a continuous quay about 3,200 feet long and 60–100 feet wide provides 6 berths, 5 of 500 feet and 1 of 408 feet. The quay is detached from the river bank and access is gained by 4 road piers (240×40 ft.) set at right angles and by 3 curving rail piers carrying a single line each. Construction is of timber except for the original No. 1 or Sentab berth, which is of concrete (photo. 273).

The Failiya lighter wharves on Failiya creek, 1¼ miles above No. 6 berth, were built by revetting the creek banks with palm trunks, and have a total length of 1,000 feet. They handle the heaviest goods, including locomotives and tanks.

The Customs jetty and the A.I.O.C. jetty on the north bank of the Karun are available for lighters only; other riverside quays include a coal wharf, and are revetted with palm trunks (photo. 272).

At the Naval Station on the south bank of the Karun there are 6

wooden and 1 steel T-shaped jetties with 7–16 feet of water (photo. 274).

Warehouses. Before 1941 the Customs sheds with a capacity of 5,000 tons were the only enclosed stores, and goods were stored in the open. The 1942 plan envisaged the construction of 10 warehouses of 200 × 50 feet behind the new quay, but it is not certain what has been erected. A large motor assembly plant has been built at the marshalling yards.

Cranes. The port lacked mechanical lifts in 1941, and the equipment of the new quays with cranes was slow. Information is not complete, but the first 4 berths were intended to be equipped with 9 cranes varying from 3 to 15 tons and 3 travelling gantries of similar capacity. At Failiya 2 travelling gantries of 3 tons and 2 cranes of 3 tons were to be installed; a 100-ton derrick was set up. Motor power was by diesel engine.

Capacity. In 1943, when the new berths were incomplete, up to 2,000 tons were handled daily. Rail and river clearance is a limiting factor in the use of the port; up to 800 tons daily might be dispatched by the Karun.

Water and Fuel. The Shatt al Arab is fit for drinking on the ebb tide, but the water is purer at the Karun mouth and in summer it is up to 16° cooler. Oil is obtained at Abadan and coal by lighter at Khurramshahr. Electricity from the town system.

Communications. The Failiya quays and the deep-water berths are connected by rail to a marshalling yard five-eighths of a mile inland, whence a single track leads to the Trans-Iranian railway at Ahwaz junction.

Motor roads have replaced dry-weather tracks to Ahwaz and Tanuma (Basra).

For the navigation of the Karun, *see* p. 581.

Minor Ports

Of the fishing-villages and small anchorages Bandar Dilam, Bandar Rig, and Ganaweh have been briefly described on pp. 123–125.

LINGEH (26° 34′ N., 54° 53′ E.), a port of Laristan, on the Gulf coast 17 miles east of Ras Bustaneh, is the largest Gulf town after Bushire, and remarkable for its small boat harbour enclosed by a pier. The water deepens rapidly to 3–4 fathoms 400 yards off shore and to 5 fathoms at 1,200 yards (photo. 276). Numerous dhows engaged in coastal trade and in the pearl fisheries of the Arabian waters belong to



274. *Khurramshahr naval base*



275. *Jask, the west bay*



276. *Lingeh*



277. *Caspian port of Bandar Shah*

the town, where there are boat-building yards. The town, which stretches along the shore for 1¼ miles and is about a quarter of a mile broad, contains a bazaar and a mosque. *Rain-water* is collected by channels from the hills behind the town to 36 domed reservoirs (*birkeh*) north-west of the town. The inhabitants are mixed Persians, Arabs, and descendants of African slaves. There is general trade with the Arabian coast and Bahrein. *Communications* are by motor-road north to Lar and north-west to Bushire.

HENJAM island (26° 41′ N., 55° 53′ E.), 5½ miles long and 3 broad, off the south coast of Qishm island in the strait of Hormuz, has a fine deep-water anchorage off its northern point (Ras al Masheh) in the sound between the two islands 1 mile wide with 6–12 fathoms. Landing is at a small decayed wooden pier, west of Ras al Masheh, with 3 feet of water at low tide alongside its steps. Boats can also land on the north-west side of Ras al Masheh, where the beach is fairly steep-to. There are two villages, Ghail on the west coast and Henjam at the southern end of the island, with a total of some 600 inhabitants who live by their goats, date-palms, about 40 pearling dhows, and the exploitation of salt mines; there are several Persian officials (Customs, Quarantine, Deputy Governor). This station, formerly used by H.M. ships stationed in the Gulf (p. 133), is well situated for the control of its entrance, the Arabian coast being generally visible. There is abundant *water* at Ghail village on the west coast. No *communications*, signal or otherwise, now appear to exist, but the anchorage is an approved seaplane landing area.

JASK (25° 37′ N., 57° 46′ E.), 140 miles south-east of Bandar Abbas on the Makran coast, is notable as the original Gulf station of the English East India Company (p. 282). The promontory along which Jask village straggles is separated on the north side by a marshy creek, the Khor-i-Jask, from the low-lying coastal plain which rises in 4 miles to hills of 300 feet, and the only exit is eastward. There is anchorage on either side of Jask promontory sheltered from all but southerly winds, half a mile off shore in the west bay, closer in the east bay (photo. 275). The village, on the west bay, is visited by trading dhows which unload on the open beach near the customs-house, or in south-west winds on the foreshore north-east of the promontory; these beaches are of shelving sands, elsewhere there is coral rock. The only export is of dried fish as manure to India. There are 1,200 inhabitants, all of whose food, except fish, is imported. From 1865 until 1937 there was a cable-station, the buildings of which are now used by the Persian

telephone-telegraph service and house a skeleton meteorological station. *Communications* are by bad motor-tracks to Bandar Abbas and Chahbar. Slow mail steamers called weekly in peace-time. *Landing-ground* 1½ miles east-north-east of town. W/T station.

CHAHBAR bay (25° 17′ N., 60° 30′ E.), an inlet (p. 141) on the Makran coast sheltered from all winds except the southerly monsoon, has 3–5 fathoms 2 miles off shore on either side of the bay. Native craft anchor in 2 fathoms about half a mile off Chahbar village, which is 1½ miles north-east of Chahbar point and contains a population of fishermen, three large single-storied barracks of the Persian army, and a telegraph station. Water is scarce, and communication is by motor-road north to Bampur and Iranshahr and by bad motor track west to Jask and Bandar Abbas.

THE CASPIAN PORTS

Persistent silting and the decrease in the level of the Caspian have gone far to reduce the value of the new ports of Bandar Shah, built to be the terminus of the Trans-Iranian railway, and Nau Shahr, and it is likely that the older port of Pahlevi will hold its own as the chief Caspian port of Persia. Of the five minor ports listed below four are nothing more than open anchorages with poor landing facilities, mainly used for the export of rice and all hampered by silting, which has also limited the usefulness of the fifth, Bandar-i-Gaz, on the bay of Asterabad.

BANDAR PAHLEVI (37° 27′ N., 49° 28′ E.) Population, 37,000. Russian Consulate. Banks: Imperial, National, Russian. Hospital. Hotels (2). Cinema. Garages. Landing-ground.

Bandar Pahlevi, for long the principal Caspian port of Persia, situated at the entrance to the Pahlevi lagoon or Murdab, consists of the town of Pahlevi on the west side of the entrance channel and the port area of Ghazian (Qazian) on the east side, each on a narrow sandy spit about 1 mile wide. The channel through the spits is soon congested by islands, of which the largest is Miyanpushteh, past which it enters the shallow Murdab. Though protected by moles, the port cannot be entered when strong winds blow from the north; ships then lie in the roadstead, which has depths of 22–30 feet 3 to 4 cables off shore.

History and Description of Town. Pahlevi, formerly called Enzeli,



278. *Quay for small craft at Bandar Pahlevi*



279. *Bandar Pahlevi, the harbour mole*



280. *Ahwaz, the town quay*



281. *Ahwaz, transhipment area and quay*

has suffered much the same vicissitudes as Resht (p. 532), the capital of Gilan, of which it is the outport. Quays and port buildings, first built by the Russian Government before 1914, were handed over to Persia by the Russo-Persian agreement of 1921 in 1928. Improvements have been effected since then, especially in the Naval Yard, where a slipway was built for the construction of a large dredger. A large 5-span bridge was built to connect Pahlevi, Miyanpushteh island, where the late Shah had a palace, and Ghazian, and an airfield was established at Ghazian. But it was the intention to supplant Pahlevi as the principal port of the Russian trade by the new ports of Nau Shahr and particularly Bandar Shah, the terminus of the Trans-Iranian railway. The silting up of these two, however, left Pahlevi still pre-eminent in 1941.

In Pahlevi town there are fine administrative buildings and a public garden facing the lagoon. Behind lies the old town of closely packed stone houses standing in narrow alleys, and to the west there are many thatched huts in the style of Gilani villages. At Ghazian, apart from shops and garages, most buildings are connected with the port; there is a notable fish factory where caviare is made. Population is mixed, with Russians, Caucasians, Armenians, and Turkomans as well as Gilaki-speaking Persians.

The Port

Two moles, the eastern and western, with total length of 850 and 525 yards respectively, protect the harbour. The quays are along the Ghazian shore and approached by a channel with a minimum depth of 11 ft. 5 in., the depth in the entrance being 14 feet. Constant dredging is necessary to prevent silting, and, though tides are negligible, other factors may cause the water-level to vary by as much as 3 feet. (Photos. 278–279.)

The Ghazian quays can accommodate 4 vessels of 10 feet draught and 500 tons' burden. Three berths are alongside the Customs Quay, 690 × 81 feet, and the fourth berth is alongside the Slipway Quay in the Naval Yard, which is about 190 feet long, with an adjacent area 200 feet wide. Other small wooden jetties are useful only for small craft because of the lack of depth.

New construction by the Russians may have increased the quayage to berths for 5–6 ships of 500–800 tons.

Cranage consisted of 1 steam floating-crane of 30 tons, two 10-ton caterpillar-cranes, and a gantry of 10 tons in the Naval Yard. These were apparently transferred (1942) to Bandar Shah. Unloading is

normally by ships' derricks or by hand; the caterpillar-cranes were used for stacking in the open.

Warehouses include closed sheds with an area of 59,200 square feet and open sheds of 23,700 square feet. Other closed sheds of 9,500 square feet were being built in 1942.

Capacity is estimated between 1,000 and 1,500 tons daily; in 1935–36, 114,000 tons of goods were imported and 36,000 tons exported.

Facilities. The slipway in the Naval Yard, 199 feet long and 14 feet wide, can cope with vessels up to 500 tons. A small floating-dock 150–200 feet long and 20–30 feet wide also existed. The Naval Yard has workshops with electrically driven machines; there is also an electrical welding-plant and a pile-driver. *Harbour craft* included (1941) 2 tugs, a large suction-dredger of 1,878 tons since transferred to Bandar Shah, and 2 large mud-barges.

Fuel and Water. No coal is stocked. Oil is stored in tanks totalling about 43,000 tons. Ample *water* is available from wells; a water-tower is being built. *Electricity* is supplied by the town and by small commercial plants.

Communications. Exit from the port area is by a gravel-surfaced road to the main road to Resht (23 miles). Thence roads connect with the Trans-Iranian railway either at Tehran by Kazvin and Karaj, or at Shahi by Chalus.

The *landing-ground* is immediately east-south-east of Ghazian. The harbour is usable as a seaplane anchorage.

BANDAR SHAH (36° 54′ N., 54° 05′ E.).

This port, the Caspian terminus of the Trans-Iranian railway, is situated 5 miles south of the Gurgan river mouth, in the Turanian plain on the east coast of the Caspian, and consists of a single jetty which crosses a foreshore of mud and shifting soil to shallow waters where silting is rapid. There is no settlement except for the port buildings and a few houses for officials (photo. 277). The nearest inhabited centre is Bandar-i-Gaz, about 20 miles by railway to the south-west (p. 513). Though built about 1930 to replace Bandar Pahlevi as the chief Caspian port, by 1941 silting was so bad that the harbour was little used and the Persian authorities had abandoned hope of dredging the channel clear. Its capacity was then not more than 200 tons daily by use of lighters, and the actual tonnage in 1940 was only 970. Since 1941 the Russians have dredged the approach channel to a depth of 14 feet, strengthened and repaired the jetty, added to the cranage, and improved the rail facilities.

The Port consists of a jetty 575 feet long and 60 feet wide standing unprotected in shallow water, and approached by a channel 7½ miles long and at present with a dredged depth of 14 feet. There are berths for 4–5 vessels of 800–1,000 tons, and cargo is unloaded by ships' derricks or by three cranes into railway wagons (35-ton floating-crane from Bandar Pahlevi, 15-ton barge-crane, and 8-ton railway-crane). There are 3 railway tracks, and motor transport can use the jetty, since the surface has been decked. Harbour craft include a tug and many barges of 40–80 tons, and a large dredger transferred from Bandar Pahlevi.

Warehouses include 7 sheds each of 360 square yards, 2 sheds each of 900 square yards, and 8 Customs stores; the total covered area is estimated at 25,300 square yards.

Capacity is estimated at between 1,200 and 1,500 tons daily. In 1935–1936 48,000 tons of goods were imported and 2,000 tons exported.

Repair facilities are confined to the workshops of the railway.

Fuel and Water. Oil is stored for the railway in 3 tanks totalling about 150,000 gallons and connected to the jetty by a pipe with a capacity of 200 gallons an hour. A smaller store in drums exists south of the port area. No coal is available. Electricity is supplied by the railway plant. Ample *water* is available from a channel of the Qara Su in winter, but it is scarce in summer. The regular supply is brought daily by rail, though a pipe 25 miles long has been planned to the hills. The railway station has storage and softening facilities.

Communications. Exit is usually by the railway to Shahi and Tehran. Motor-roads west to Babul and Tehran; east to Gurgan town and thence south across the Elburz to Shahrud or north-east to Bujnurd and Meshed; *airfield* under construction in 1942.

NAU SHAHR (36° 39′ N., 51° 32′ E.). Hospital.

Nau Shahr, formerly Deh Nau and Habibabad, is an artificial harbour about 1½ miles east of the mouth of the Chalus river in the coastal plain of Mazanderan, which is here about 3 miles wide and backed by a steep ridge parallel to the line of the coast.

The port, built between 1933 and 1940 by a Dutch firm, is on a badly chosen site, which is liable to rapid silting both from the Chalus river and a small stream which flows directly into the harbour. The town, which extends about 1 mile along the coastal road, is entirely new, being one of Riza Shah's model towns and intended as a resort.

The harbour basin is enclosed by an eastern quay (400 × 27 yards)

and a western quay (378×22 yards), which are extended by breakwaters through which there is a channel dredged to 13 feet. The southern quay, along the shore between the east and west quays, is 572 yards long and 22 yards wide. The dredged channel extended in 1942 only along the first 240 yards of the eastern quay; it was intended to dredge the rest of the harbour, which was then unusable, to a depth of 15 feet, shallowing to 10 feet along a 66-foot strip of the southern quay.

There are berths at the eastern quay for 2 ships of about 500 tons. Ships are unloaded either at quayside into lorries and into trucks of a light railway (90 cm.) which serves both quays, or else by lighter.

Cranes were numerous (1941) including 3 railway-cranes varying from 7 to 15 tons, one 6–10-ton floating-crane, a 12-ton bridge-crane, and 3 caterpillar-cranes of 3–11 tons.

Warehouses consisted of 2 closed sheds each of 710 square yards and 2 open godowns each of about 2,000 square yards.

Capacity was estimated at 600–1,000 tons daily.

Repair facilities consist of machine repair shops.

Fuel and Water. Oil is available at an A.I.O.C. depot at Chalus, water is supplied from the town system, and electricity from a local power-station.

Communications. Roads south by Chalus across the Elburz to Karaj and Tehran, or east to the Trans-Iranian railway at Shahi (96 miles). Light railway (90 cm.) from the south quay to stone quarries in the hills (4·3 miles).

Minor Ports

ASTARA (38° 26′ N., 48° 51′ E.; hotels (2); Customs; population (1930) 6,000) is a fishing-village on the right bank of the Astara Chai which forms the boundary between Russia and Persia. Forested hills rise steadily from the narrow coastal plain, reaching over 6,000 feet 14 miles to the south-west. The port consists of an open roadstead, ships lying 2½ miles off shore, and a wooden jetty now left high and dry by the recession of the Caspian. There is a small power-station.

Communications are by the motorable coastal road south-east to Resht and by a mountain route following the Astara Chai valley west to Ardebil. The Russian village of Astara opposite is connected by rail to Baku and Tiflis.

BABULSAR (36° 43′ N., 52° 40′ E.; population, 3,500; hotel), formerly called Meshed-i-Sar, is 11 miles north-north-west of Babul

(Barferush) in the Mazanderan plain, which is here 17–18 miles wide. It is reckoned the port of Babul, and consists of an open roadstead, a wooden jetty now left high and dry by the recession of the Caspian, and a good stone customs wharf approached by a channel with sufficient water for the local barges of 40–80 tons, of which some 20 frequent the port. There are 2 light cranes of 10 cwt. and a store shed near the jetty. There is also a small *oil jetty* and 3-inch pipe-line at which oil-barges, loaded off shore from ships, can discharge into a tank of 150,000 gallons; there are smaller tanks for petrol and kerosene. *Capacity* is reckoned at 150–200 tons daily (1942); imports and exports in 1935–1936 totalled 25,000 tons. *Water* is from the local river, and *electricity* from a single generator.

A new model town was built by Riza Shah as a sea side resort with hotel, casino (uncompleted), and modern houses. The old village with thatched Mazanderani houses is clustered to the east of the port. There is a station of the Russo-Persian Caspian fisheries, and an unspecified factory.

Communications are by motor-road south-south-east through Babul to the Trans-Iranian railway at Shahi (26 miles), or west by the coastal road to Resht.

BANDAR-I-GAZ (36° 47′ N., 53° 58′ E.; population (1930), 4,000; Russian consulate; banks: National, Russian; hotel) is on the south shore of Asterabad bay opposite Ashuradeh island, 19·4 miles by rail from Bandar Shah. Formerly the main port of the region, it has been replaced by Bandar Shah; silting now limits the use of the bay to very small vessels, which discharge by lighters. These unload at a jetty 1,000 yards long which has about 10 feet of water alongside. *Capacity* has been estimated (1942) at 100 tons daily. *Communications* are by narrow-gauge line from the port to Bandar-i-Gaz station on the Trans-Iranian railway, and by motorable road west to Sari and Babul and east to Gurgan (Asterabad).

MAHMUDABAD (36° 39′ N., 52° 15′ E.) is in the coastal plain of Mazanderan, here from 10 to 21 miles wide, 24 miles west of Babulsar and 16 miles north of Amul. There is a small modern town or large village astride a tarmac road, the inhabitants of which are mainly employed by a rice factory. The port consists of an open roadstead and a wooden jetty 900 feet long, connected by 60-cm. (23·6 in.) decauville railway to the warehouse of the rice factory. Depth at the seaward end of the jetty was only 10 feet in 1941. Trade is in the export of rice.

Communications are by road west to Resht, east to Babulsar and to Shahi on the Trans-Iranian railway, and south to Amul.

SHAHSAWAR (36° 48′ N., 50° 52′ E.), about 77 miles east of Resht, in the fertile Tunakabun plain of Mazanderan, here from 4 to 6 miles wide, is a settlement rebuilt by Riza Shah. The port consists of an open anchorage where vessels of 600–800 tons, lying about 1,500 yards offshore, unload into barges which discharge onshore or at a wooden jetty 200 yards long. The town has a broad main street and central square flanked by modern buildings. *Water* is from the perennial Mazar Rud, which is crossed by a bridge at the eastern end of the town.

Communications are limited to the coastal road west to Resht and east to Babul and to Shahi on the Trans-Iranian railway.

INLAND TOWNS

THE following account describes briefly the larger and more interesting towns of each province, but does not include all places of administrative or economic importance. Population figures refer to estimates dated 1940–1942 where the date is not specified.

In the absence of accurate surveys, and because of recent changes in alinement, mileages where given are only very approximate. No material is available for town plans.

Mosques. The great shrines of Persia were opened by Riza Shah to the visits of non-Moslems, subject to various conditions and the presence of guides and police. It is uncertain whether this policy has been maintained, but with discretion admission can often be obtained to places formally closed to visitors.

AHWAZ (31° 21′ N., 48° 40′ E.). Altitude, *c.* 82 feet. Population, *c.* 30,000 (1939). Consulates: British and Russian. Banks: Imperial and National. Hospital. Hotels (2). Cinemas. Airfield.

Ahwaz is a bridge-town and river-port in the plain of Khuzistan, mostly on the left bank of the Karun where the river cuts through a low sandstone ridge. This causes a series of rapids in the river channel which prevent continuous navigation of the Karun between Khurramshahr and Shushtar, and make transhipment necessary (p. 581).

History. There was a village called Aginis and a bridge of boats near the site of Ahwaz when Alexander the Great's Admiral Nearchus

ascended the then existing deltaic waters to its neighbourhood. In Sassanid times the town of Hormuz Shahr or Hormuz Ardashir existed, which became the capital and market centre of the Moslem province of Khuzistan. The Arabs called it Suq al Ahwaz, the market of the Khuzis or Huzis (*plural* Ahwaz), who were the pre-Arab inhabitants. A great dam, built in Sassanid times on the rocks of the rapids, supplied three irrigation canals which watered the neighbourhood. Above the dam was a bridge taking the route from Fars and Ram Hormuz to the great Mesopotamian city of Wasit in Abbasid times, and navigation between Basra and Ahwaz was made possible by the cutting of the Haffar channel on the lower Karun. Ahwaz was damaged by the Zanj slave rising in the ninth century A.D. but restored by the Buwayhid prince Adud ad Daula (p. 256) in the tenth century. The dam was destroyed either during or after the Mongol invasion, trade ceased to pass along the routes of Khuzistan, the agricultural Khuzis were replaced by nomadic Arabs, and the town of Ahwaz slowly faded away until only a small village occupied the site. In the Anglo-Persian war of 1857 Ahwaz was occupied after 7,500 Persian soldiers had decamped at the sight of 300 British. River transport on the Karun was reopened in 1888 (p. 297), forty-six years after Lieutenant Selby had forced the rapids in the paddle-steamer *Assyria*, and slowly Ahwaz came to life again as a river-port, increasing in population from 700 in 1890 to 7,000 in about 1930; the main settlement, at first called Bandar Nasiri after the then Shah, is on a new site below the rapids. With the construction of the railway increase was rapid and the population had quadrupled by 1939.

Description of Town

Ahwaz is a mean, untidy, ramshackle town, though laid out on a modern plan with broad, roughly parallel streets, which cut the town into irregular blocks. It is the residence of the governor of Khuzistan, the seat of a considerable garrison with barracks west of the Karun, and a military air-station. The Abadan pipe-lines pass close to the east of the town.

The *river-port* consists of bankside quays above and below the rapids on the left bank; these are connected by a decauville railway and have a large storage area at the upper quays (photos. 280–281). On the right bank there are quays below the rapids, served by a branch of the main railway. The A.I.O.C. quay is 700 feet long and built of wooden piles. There are two 15-ton cranes, and depths

alongside quays at low water average 6–6½ feet. The Customs offices are at the lower quays.

Water-supply from the Karun is unlimited.

Communications. The Tehran–Bandar Shahpur line crosses the Karun by bridge above Ahwaz. The station on the right bank is connected to the town by a road bridge.

Numerous roads, mostly motorable only in dry weather, except those to Abadan and the oil-fields, radiate from Ahwaz: north to Shushtar (72 miles), east to Ram Hormuz (69 miles), south-east to Khalafabad (43 miles), south to Shadegan (52 miles), south-south-west to Khurramshahr (83 miles), south-west to Basra in Iraq (77 miles), north-west to Amara in Iraq (105 miles).

Airfields are on the right bank of the river, west of the railway, and on the left bank north of the Jabal Musharreh ridge.

Except during the great floods, when the banks become invisible and stranding is probable, paddle-steamers and sailing-craft ply from Khurramshahr to Ahwaz and from Ahwaz to Dar-i-Khazineh (some 11 miles below Shushtar), whence a light A.I.O.C. railway runs to Chashmeh-i-Ali.

ARDEBIL (38° 15′ N., 48° 17′ E.). Altitude, *c.* 4,100 feet. Population, *c.* 64,400. Hotel. Airfield.

Ardebil, in eastern Azerbaijan, lies in a fertile plain almost surrounded by mountains. This plain is well watered by the Balik Su (Bolagh Chai, 'Fish River') and its tributaries, mostly draining the southern slopes of Savalan (15,814 ft.), an extinct volcano the summit of which is about 25 miles west of the town. There are few trees as the northerly winds in winter are very cold.

History. Ardebil, traditionally founded by the Sassanid King Firuz (457–489), became the capital of Azerbaijan under the Omayyad Caliphs, but in the Abbasid period Tabriz took its place. In 1209 Ardebil was attacked by Georgians and 12,000 citizens were killed; twelve years later it was sacked by the Mongols, but had recovered by 1300 and was once more flourishing.

In 1252 it was the birthplace of the Moslem saint, Safi-ud-Din, founder of a Dervish order, and ancestor of the Safawid dynasty of which this order was the mainstay (p. 263). His tomb and shrine, built during his lifetime, became a pilgrim centre under the Safawids, and Ismail I was buried there. Under Tahmasp I (1524–1576) the famous Kashan carpet was made for the shrine (p. 469). Abbas I added to the benefactions of Ardebil and endowed a fund to provide

free food for pilgrims, of whom a thousand were fed daily in 1637. With the fall of the Safawids Ardebil declined. It was taken by the Turks in 1725 and recovered by Nadir in 1729, who, however, being hostile to Shia Islam discontinued the feeding of pilgrims. In the Russian war of 1825–1828 Ardebil was occupied by the Russians, who plundered the library of the shrine and sent many illuminated Korans and other manuscripts to St. Petersburg. The town was restored to Persia in 1828 and was subsequently a place of captivity for state prisoners. Nasir-ud-Din partly repaired the damage done by Russians and by earthquakes. From 1910 to 1917 the town was once more in Russian hands. Riza Shah completed the repairs to the shrine, but the surviving manuscripts and porcelain are now in the National Museum at Tehran.

Description of Town. The modern town is large and straggling with many ruins; houses are mostly small and dirty. A fort built by French engineers about 1820, now in bad repair, is south-east of the town. The shrine of Safi and the tombs of his descendants, Haydar and Ismail (p. 264), are impressive, but there is little else of interest.

Industry and Commerce. A good trade in carpets, dried fruit, cotton cloth, and hardware is carried on with the rest of Azerbaijan and also by Astara with Russia.

Water-supply is adequate from the Balik Su and other streams.

Communications. One road goes north-east to Astara (40 miles) and the other south-west to Sarab (48 miles) and Tabriz (128 miles). The *airfield* is north-west of the town.

HAMADAN (34° 48′ N., 48° 32′ E.). Altitude, *c.* 6,000 feet. Population, *c.* 104,000. Russian Consulate. British Vice-Consulate. Hospital. Protestant Mission. Banks: Imperial, National, Ottoman, Pahlevi, Russian. Hotels (2). Garage. Airfield.

Hamadan has grown up at the foot of the north-eastern slopes of Alwand, the Mt. Orontes of the Greeks, which rises nearly 6,000 feet above it (photo. 289). It is older than any other existing city in Persia, and lies at the junction of important roads on the edge of a fertile plain.

History. Hagmatana, spelled as Agbatana and Ecbatana by the Greeks, was the capital of the Median Empire in the seventh century B.C. Two small foundation-tablets, discovered in 1923, bear the name of Darius I (521–488 B.C.), and record the building of palaces, one of which is possibly 'the house of the rolls' mentioned in the Book of Ezra, where the name Ecbatana appears as Achmetha (*Ezra* vi. 2).

Traditionally Esther, the Jewish wife of Xerxes I (Ahasuerus), was buried in the town with her cousin Mordecai, and their alleged tombs have been shown for many years. But the Jewish colony in Hamadan was founded only in the fourth century A.D., and the so-called 'Esther's tomb' is probably that of Shushandukht, wife of the Sassanid king Yezdigird I. In the Greek, Parthian, and Sassanid periods Hamadan was a royal city and contained the summer palaces of the kings. The only Parthian relic is a stone lion, connected in Moslem legend with 'Balinas, the master of talismans', otherwise known as Apollonius of Tyana.

The town was taken by the Arabs in 644, and sank to a provincial capital until Seljuk times. In 1036 the philosopher and medical scientist Avicenna (Ali al Husain ibn Sina) died and was buried in Hamadan, and in the twelfth century the Seljuk Sultans made it their capital for over fifty years, but it was sacked by the Mongols in 1220 and by Tamerlane in 1386. Thereafter it again sank into provincial obscurity, later sharing in the prosperity of the Safawid period (1500–1722), when Roman Catholic missionaries settled there and the Latin Bishops of Babylon frequently made it their residence. On the fall of the Safawids it was involved in the Turkish wars, being twice taken by the Turks and recovered by Nadir (1724–1732). Though in ruins, its recovery was rapid, and by 1810 it was said to have 40,000 inhabitants, who had declined by 1890 to 15,000. Between 1910 and 1912 there were serious civil disorders, and the Russians sent troops to restore order. During the War of 1914–1918 it was occupied first by the Russians and later by the British. It suffered severely from famine in 1918, but since then has increased in size and consequence, one factor being the increase of motor transport.

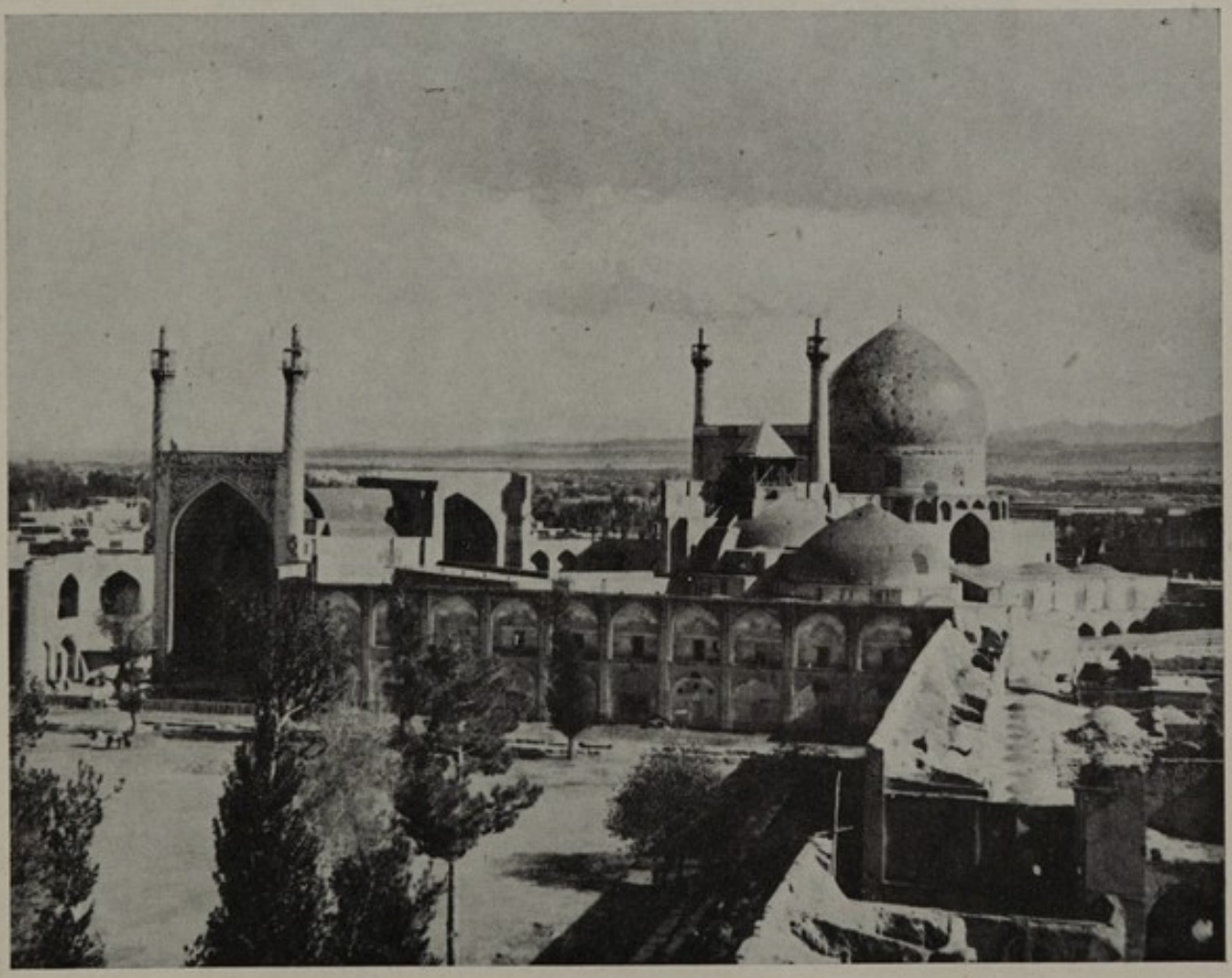
Description of Town. The streets of Hamadan are said to be exceptionally mean and dirty, and there are few buildings of architectural merit. The ruins of the mausoleum known as the Gunbad-i-Alavian date from the second half of the twelfth century, but the tomb of Avicenna was heavily restored in 1877. The so-called tombs of Esther and Mordecai in the centre of the town are annually visited by many Moslems as well as Jews. About one-quarter of the population is Turkish, the remainder being Persians, Armenians, and Jews.

The ancient mounds have attracted the attention of excavators, but little has so far been found, and much archaeological work remains to be done.

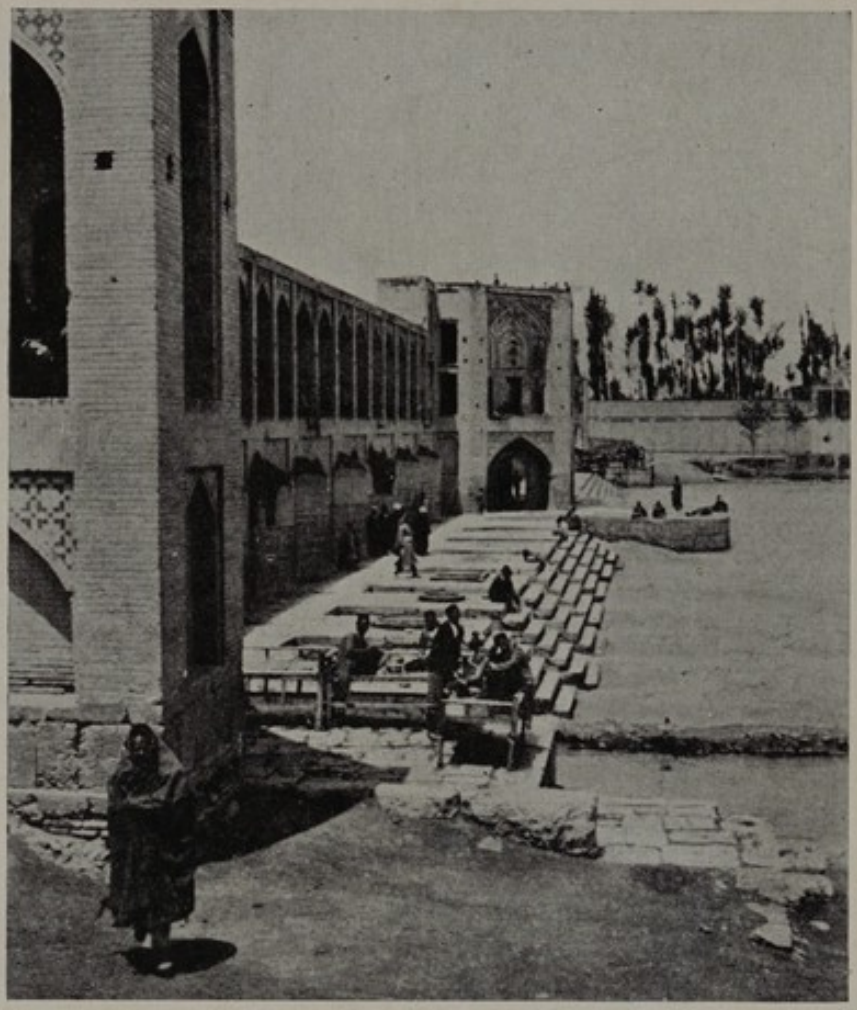
Industry and Commerce. Hamadan stands at the edge of a fertile plain, and is a market centre for agricultural products. Wine,



282. *Isfahan, a general view*



283. *Isfahan, the Maidan and the Masjid-i-Shah*



284. *Isfahan, the Allah Verdi Khan bridge*



285. *Isfahan, the Chehil Situn*

carpets, tanning, and leather work are the principal industries, mostly on a small scale. Modern plants include two flour-mills and a leather factory. Some craftsmen work in metals, including silver, copper, and gold, which is obtained locally by washing the soil; nitre is also produced. The bazaars are large and busy.

Water-supply. The numerous streams from Alwand provide the town with excellent water.

Communications. The Kuh-i-Alwand blocks exits to the south or south-west. One main road goes almost due north before curving north-east to Razan (52 miles), Takistan (121 miles), and Kazvin (143 miles), and ultimately to Tehran (236 miles). Another road runs somewhat north of west at first, but turns south over the Asadabad (Shah) pass to Kangavar (55 miles), Kermanshah (116 miles), and Baghdad (352 miles). A third road runs eastwards for 11 miles and then turns south to Jokar (41 miles) and Malayer (58 miles), with connexions to Shushtar (378 miles) and Khurramshahr (533 miles). The fourth main road leaves the first 8 miles from the town and continues north-west to Qurveh (53 miles) and Senna (105 miles).

ISFAHAN (32° 39′ N., 51° 38′ E.). Altitude, 5,100 feet. Population, *c.* 204,600. British, French, Russian, and Turkish Consulates. Hospital. Armenian and Protestant Missions. Banks: Imperial, National, Pahlevi, Russian. Hotels (2). Airfield.

Surrounded by walled orchards, Isfahan lies in the plain watered by the Zaindeh Rud and is a natural route-centre. For centuries it has been a large city, and is the gem of Persian architecture (photo. 282).

History. Jews were possibly settled on the site of Isfahan by Nebuchadnezzar about 690 B.C., and its name may be linked with the classical Aspadana. Under the Achaemenid kings a town called Gabal (Gabae) seems to have existed, which became the Jai or Jey of Sassanid times. By the tenth century A.D. it was already known as Isfahan (i.e. a gathering-place for troops) and consisted of two quarters, the Madina or city proper and the Yahudiya or Jewish quarter, which by 1052 were united behind a single wall some 12 miles long, the Jews then numbering 15,000. Jenghiz Khan pillaged the town but did not destroy it. Tamerlane followed his example in 1387, slaughtering 70,000 Isfahanis, and piling their skulls into pyramids. Thereafter Isfahan was a centre of local rule until Shah Abbas (1587–1629) made it the national capital and embellished it with many buildings, notably the great mosque called the Masjid-i-Shah, and the smaller Masjid-i-Shaikh Lutfullah, famous for its exquisite

mosaics. In order to make a fitting approach to his new capital, Abbas rented four vineyards and converted them into the avenue known as Chehar Bagh ('Four Gardens'). In his reign also was constructed the bridge called the Pul-i-Allah Verdi Khan, after one of his generals. In 1604 Shah Abbas transported several thousand Armenian families from Julfa in Azerbaijan to a new settlement, opposite Isfahan, named after the old. The colony flourished, and soon included a dozen churches and 30,000 persons.

The seventeenth-century Isfahan is described by the Huguenot traveller Sir John Chardin. The town was then protected by a wall 24 miles long and contained 162 mosques, 18,000 houses, and about 600,000 people. The pride of its inhabitants was shown by the proverb, *Isfahan nisf-i-Jahan* ('Isfahan is half the world'). But in 1722, after a prolonged siege, it was taken by the Afghan invaders who massacred many thousands and destroyed or defaced many buildings. From this treatment Isfahan and the Armenian colony at Julfa never fully recovered, and it was never again capital of Persia. Agha Mohammed Khan destroyed its fortifications, and the town fell into decay until the opening of the Lynch road in 1897, through Bakhtiari country to Ahwaz, made it the entrepôt for trade with the Shatt al Arab and the Persian Gulf. More recently the long-established textile industry has been modernized, so that Isfahan has become one of Persia's industrial cities. But many of the older buildings have been carefully restored by Riza Shah, who intended to preserve the core of Isfahan as a treasury of Persian architecture.

Description of Town. The centre of Isfahan is the imposing Maidan-i-Shah of Abbas the Great, 560 yards long and 174 yards wide; on its east is the Masjid-i-Shaikh Lutfullah and on its north the main bazaar (photos. 283, 286). On its west there is the former royal palace, a mass of buildings, the most notable being the Chehil Situn ('Hall of Forty Pillars') and the Ali Kepi portal or 'Holy Gate'. The former (photo. 285) was the principal *talar* or throne-room, named after the reflection in the lake of its twenty pillars. The latter is a gateway surmounted by a smaller *talar*, where the Safawid monarchs received foreign embassies or watched assemblies in the square below. The Masjid-i-Shah occupies the south side of the Maidan. In front of it are two marble columns, formerly used as polo goalposts. Somewhat farther east, away from the Maidan, is the Arg (citadel) with its moat and ruined walls. The Chehar Bagh, a triple avenue 1,350 yards long lined with trees, shops, and cafés, leads from the south-west of the palace to the many-arched Pul-i-

Allah Verdi Khan over the Zaindeh Rud (photo. 284); the smaller Pul-i-Khaju, rebuilt in the late seventeenth century, is farther downstream Other noteworthy buildings include the yellow-tiled Masjid-i-Jami mosque with two dome chambers (11th century), the Sariban Minaret (12th century), and the Masjid-i-Ali mosque completed in 1523. The finest college is the Madrasa-i-Shah, with lofty porticoes and cells for 160 students, but at present preserved as a monument. The bazaars are large and impressive (photo. 205).

On the south or right bank of the Zaindeh Rud is the Armenian suburb of Julfa, connected to the main city by five bridges. The Cathedral of St. Joseph was founded in 1605 and completed in 1665; there are twelve churches, often with almshouses attached. Most Europeans who now work in Isfahan live in Julfa, which is far cleaner than Isfahan. It is also the site of the Stuart Memorial College. This institution of the Church Missionary Society comprises a hospital and an industrial home, apart from the schools now transferred to the State. Isfahan has a reputation for intolerance, and the dress reforms of Riza Shah were strongly resisted by the powerful Mullas. Apart from Armenians and Persians, there is also a Jewish colony.

Industry and Commerce. Isfahan is the principal textile centre of Persia with 11 spinning and weaving mills for cotton and wool and 3 knit-wear factories. There is also a distillery, paper factory, and match-works. Handicrafts comprise metalwork, brocaded cloth, lacquer-work, felt goods, carpets, saddles, and pottery. Large quantities of sweetmeats are also made. The town serves as a market-centre not only for its vicinity but also for the Bakhtiari country.

Water-supply is mainly by open channels from the Zaindeh Rud, but there are numerous wells, especially in Julfa, water being found at 10–12 feet.

Communications. Isfahan is on an ancient highway, now an all-weather motor-road, leading north to Tehran (265 miles), south-east to Shiraz (291 miles), and thence to Bushire (473 miles). Another road leads eastward to Nain (103 miles), Yezd (204 miles), and Kirman (426 miles). The only obstacle to road construction is the presence of occasional patches of swampy ground, the largest being some 10 miles south of the town. The *airfield* is north of the town.

KASHAN (33° 59′ N., 51° 28′ E.). Altitude, *c.* 3,260 feet. Population, *c.* 45,000. Garage.

Kashan is an ancient centre of Persian bazaar industries situated some 28 miles south of the Masileh Kavir in a stony plain, from

which the Kuhrud hills rise abruptly 10 miles south-west of the town, limiting the westward communications and reaching 9,200 feet in the Kuh-i-Chal 20 miles away; an outlying ridge approaches within 2 miles of the town. The climate is very arid.

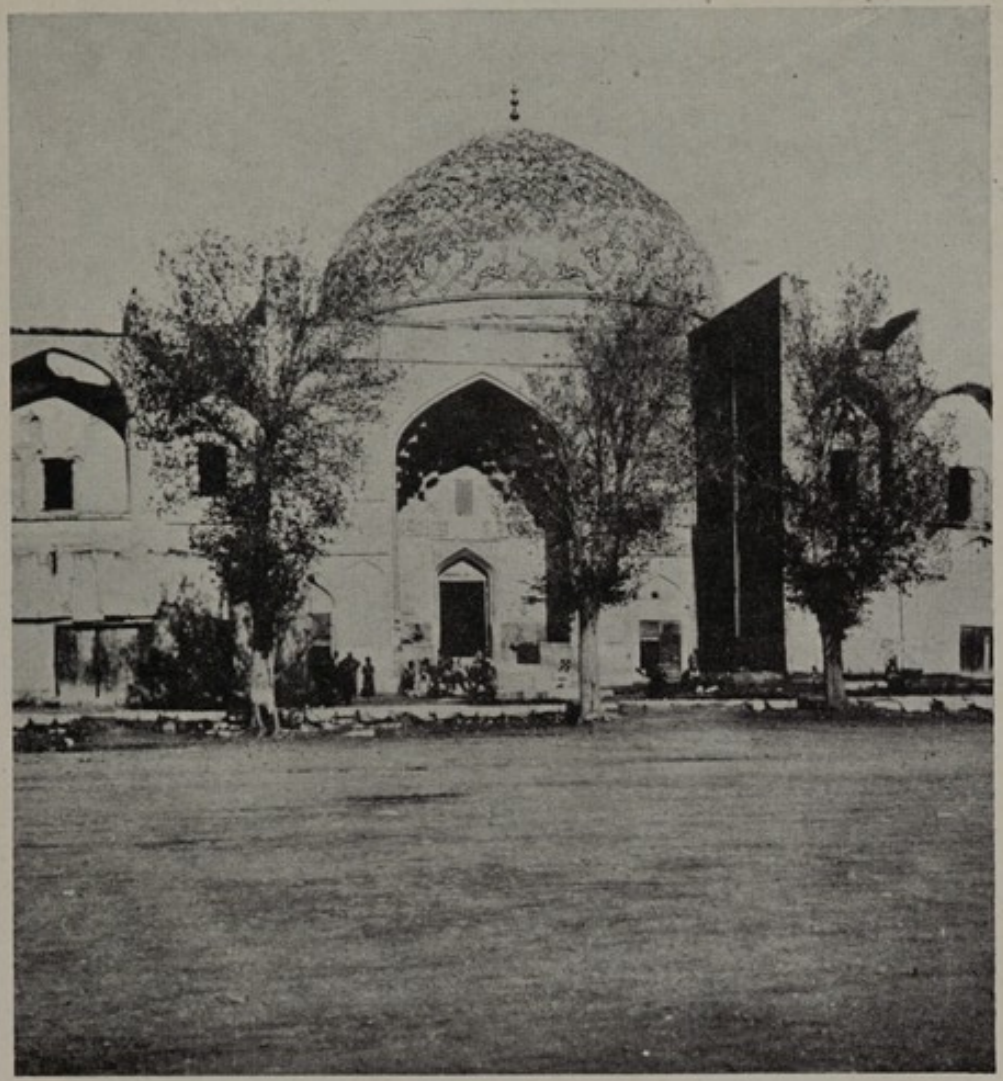
History. The town is an ancient foundation and was regarded in early Moslem traditions as the home of the three Wise Men of the Gospel. In Abbasid times it was famous for the lustrous Kashi-ware of its potteries, the Shia faith of its inhabitants, and its ferocious black scorpions, whence arose the execration 'May a scorpion of Kashan sting thee'. The city suffered in the Mongolian devastation, but soon recovered. By the fifteenth century silk was a thriving industry, and throughout the Safawid period Kashan was a great centre of the silk trade and much noted for its industrious and orderly population, who produced 'velvets, satins, damasks, very good Ormuzenes, and Persian carpets of wondrous fineness'. The fine enamelled tiles of the period were also largely made there. The court often resided at Kashan; Shah Abbas I was buried there (1624) and Shah Safi died there (1642). But in the eighteenth century it was captured by the Afghans, who slew many citizens, and later it suffered from the exactions of Nadir Shah, and from a severe earthquake. Though rebuilt by Karim Khan, by 1810 the town was decrepit. In the peaceful nineteenth century its population increased, and recently the restoration of its native industries was encouraged by Riza Shah.

Description of Town. The town (photo. 291) has been opened to traffic by the cutting of new streets. Many houses have cellar rooms for summer. Bazaars and notable buildings are mostly in the southern quarter. They include two early mosques, the Masjid-i-Jami (11th–12th century) and the Masjid-i-Maidan, two fine *madrasas*, and a leaning minaret 100 feet high, so shaken by an earthquake that its top is 7 feet from the perpendicular. Four miles to the south-west is the pleasaunce and palace of Fin.

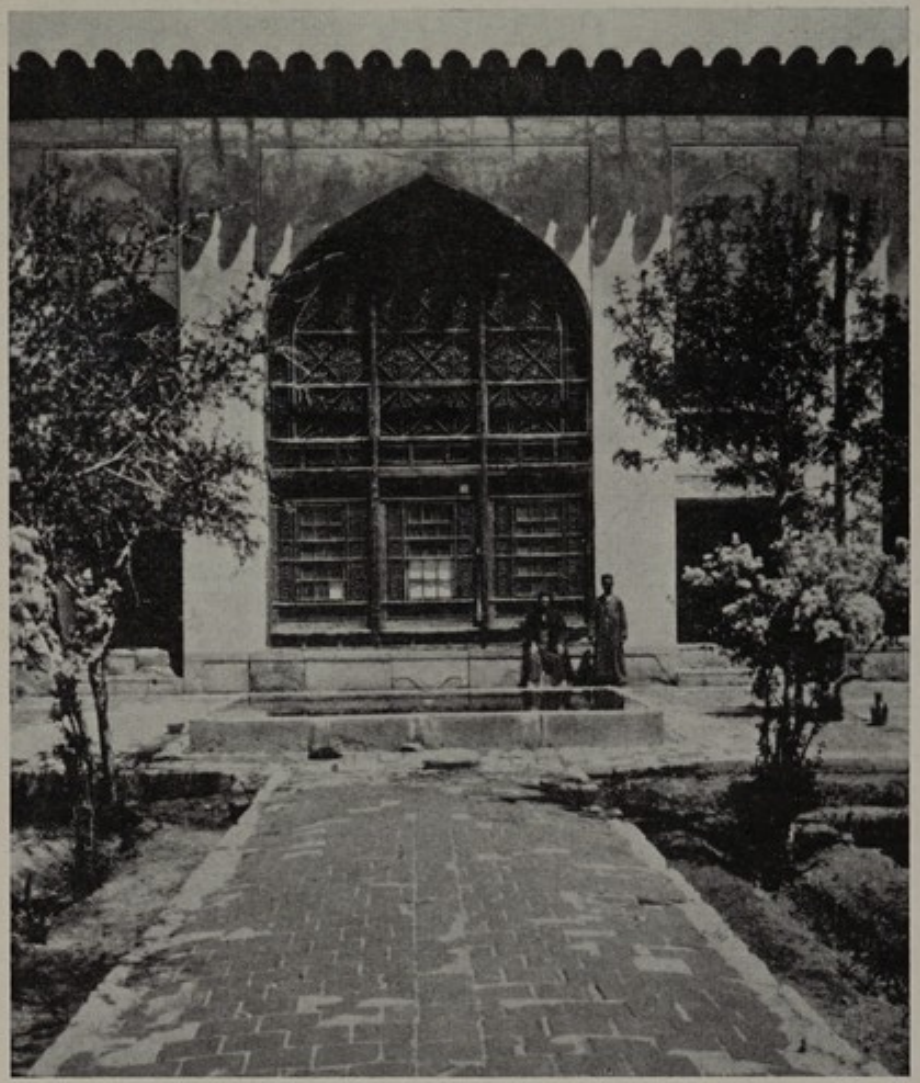
Water-supply is from qanats and from cisterns, some of which are 200 feet below ground and filled by streams from the Kuhrud hills.

Industry and Trade. The textile trade is being restored and there is a modern mill. Bazaar products include domestic copper ware, pierced copper and brass ornamental work, rugs, and rose-water.

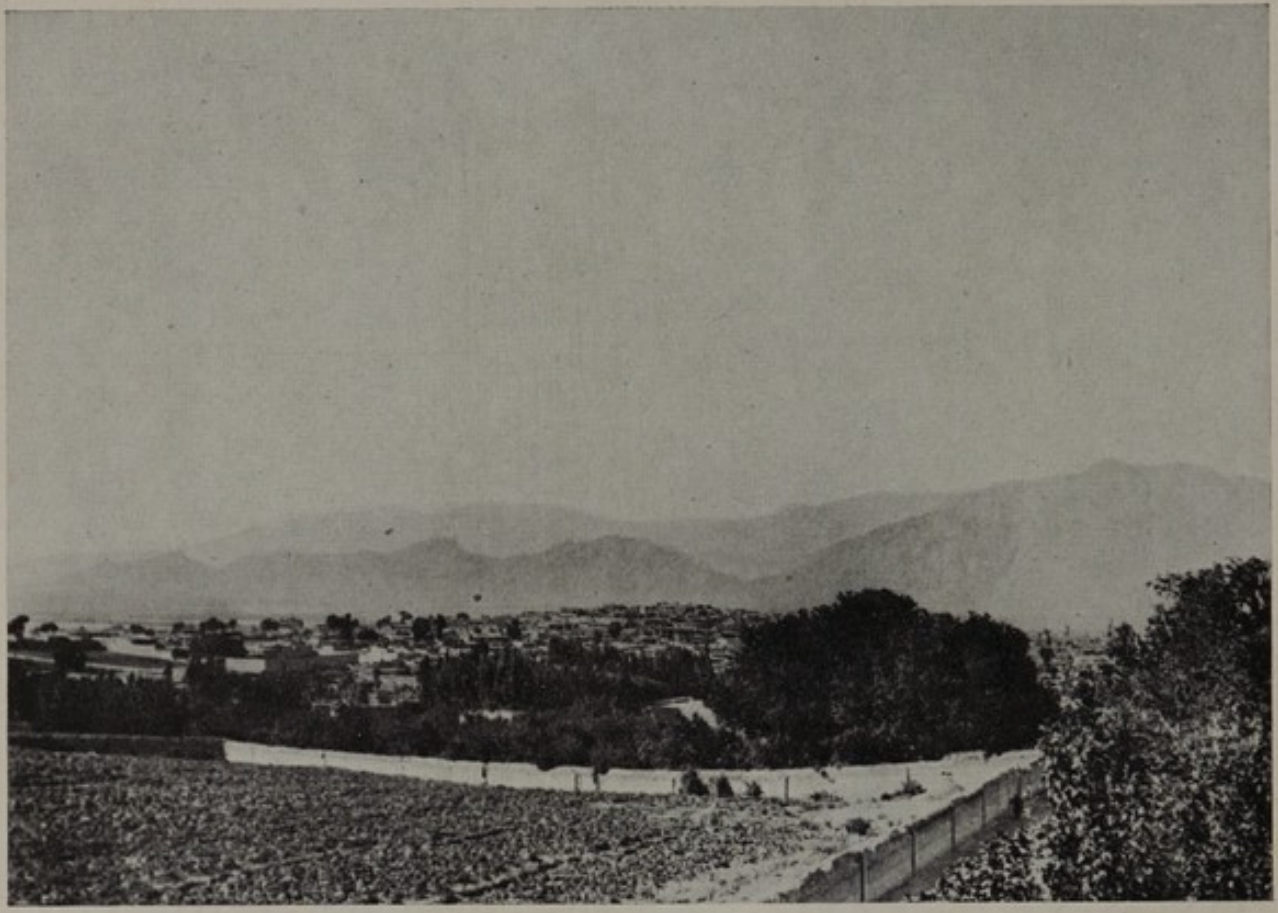
Communications. Kashan station is on the Qum–Yezd branch of the Tehran–Bandar Shahpur line, under construction in 1943. *Roads:* south-east to Yezd (227 miles) and Kirman (449 miles), south-south-east to Natanz and Isfahan, more directly south to Isfahan.



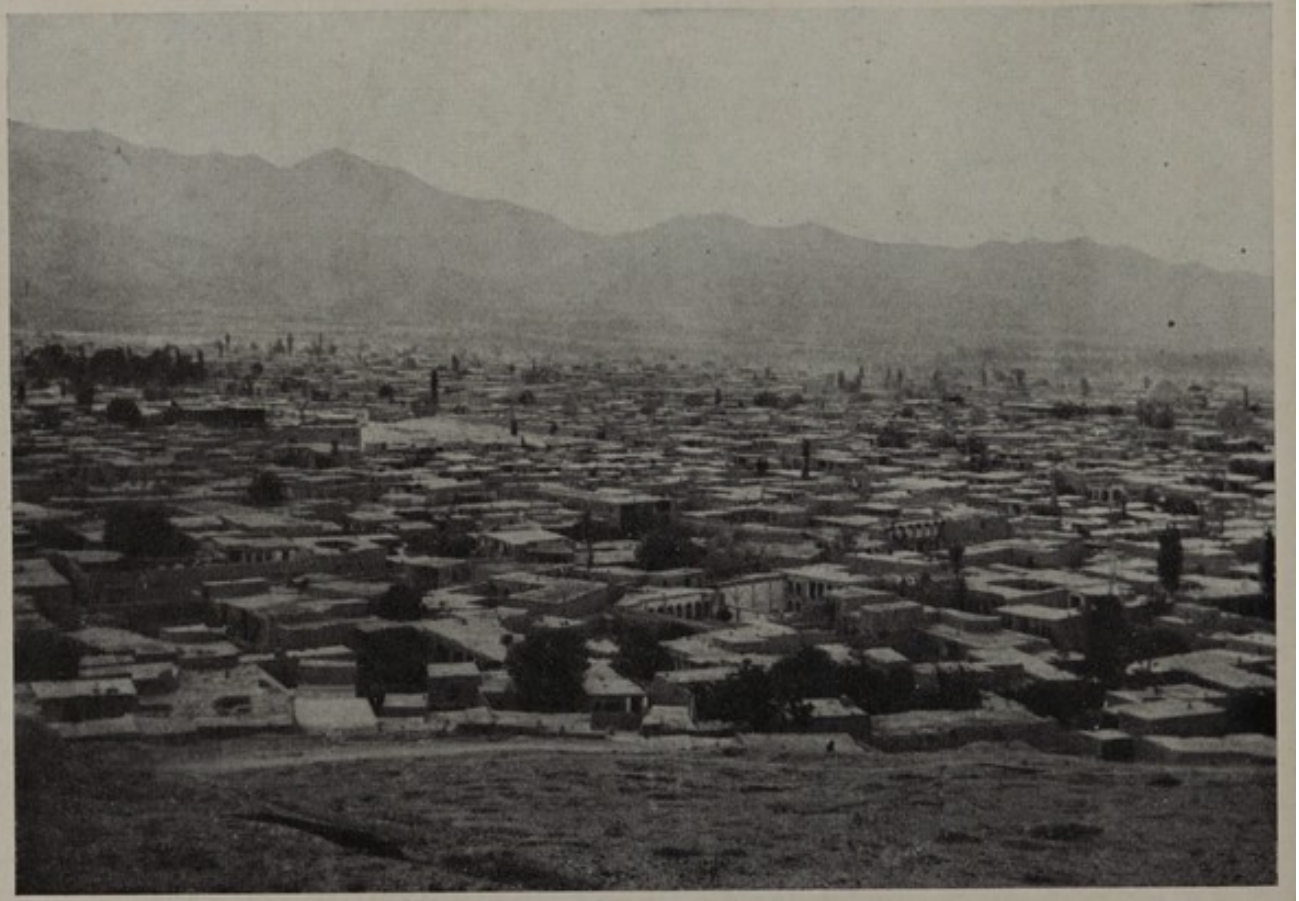
286. *Isfahan, the Lutfullah mosque*



287. *A courtyard in Isfahan*



288. *Kermanshah*



289. *Hamadan*

KAZVIN (36° 16′ N., 50° 00′ E.). Altitude, *c.* 4,200 feet. Population, *c.* 55,000. Hotels (2). Banks: Imperial, National, Pahlevi, Russian. Garage. Landing-ground.

Kazvin, surrounded by gardens on the northern fringe of a broad cultivated plain, is at the junction of routes from Tehran to Tabriz and from Resht to Hamadan and Kermanshah. North of the town the land rises steadily for 6 miles to the first Elburz foothills culminating in the Sultan Veis peak, 7,891 feet, 12 miles from Kazvin. The town is subject to earthquakes.

History. Founded by the first Sassanid king Shapur (A.D. 241–272) as Shad-i-Shapur, the town was for long a border fortress against the incursions of the Dilemite tribesmen of the Elburz, and its citizens had a reputation for courage. In the eleventh century it had a strong wall, well-stocked bazaars, and numerous craftsmen, particularly leather workers. At this time the Assassins established in Alamut were the main local menace (p. 259), until the Mongol invasion of 1257 when Kazvin was sacked, its citizens slaughtered, and its walls razed. The town recovered and was made capital of the Safawid Empire by Tahmasp I (1524–1576) and remained such until Shah Abbas I transferred the capital to Isfahan. In 1628 the town was said to be 7 miles in circumference and to contain 200,000 inhabitants. About 1725 the Afghan invaders captured Kazvin, but the townsfolk manfully ejected them. During the civil disorders of 1909 the Russians occupied the town, and remained until 1917, when British forces took their place. In the reign of Riza Shah many modern schools and other institutions were created, and the town has its share of new factories.

Description of Town. Kazvin is walled, and some of the gates are picturesque. Though most of the streets are narrow and tortuous, there has always been a carriage road through the town and a few wide avenues have recently been added. Houses are of baked or sun-dried brick and tend to be ruinous. Mosques include two of the twelfth century, the Masjid-i-Jami and the Haidariya, and the early nineteenth-century Masjid-i-Shah. The Ali Qapu palace dates from the reign of Tahmasp. Outside the town is the fine shrine of the Shahzadeh Husain, another early nineteenth-century building of great charm (photo. 290). The population includes Persians, Turks, and Armenians.

Industries and Trade. Kazvin has always been a centre of the dried-fruit trade. There is a modern drying plant, two large flour-

mills, three textile factories, and a soap-works. Other local products include wine and metal ware. Its position makes it an entrepôt for general trade and a market centre for agricultural products.

Water-supply. Though numerous short streams descend from the Elburz foothills most dry up in summer, and both town and district depend greatly upon qanats.

Communications. *Roads*: north by the Safid Rud valley to Resht (119 miles) and Pahlevi; east to Tehran (93 miles); south-west to Takistan (22 miles) and thence north-west to Tabriz (310 miles) or south-west to Hamadan (143 miles) and Kermanshah (259 miles). *Rail*: Kazvin station is on the Tehran–Tabriz line. The *landing-ground* is north-east of the town.

KERMANSHAH (34° 18′ N., 47° 04′ E.). Altitude, *c.* 4,600 feet. Population, *c.* 88,600. British, Russian, and Turkish Consulates. Hospital. Banks: Imperial, National, Ottoman, Pahlevi. Wireless station. Hotels. Garages. Cinema. Airfield.

Kermanshah stands on the great highway connecting Baghdad with Tehran. It is in the Qara Su valley of the Saidmarreh basin near the south-western end of a narrow fertile plain and enclosed by the Kuh-i-Safid, which rises to 9,139 feet on the south, and by the Kuh-i-Parau (10,992 ft.) on the north, which ends 24 miles east of the town in the famous Bisitun cliff (photo. 288).

History. There are Achaemenid tombs and inscriptions in the neighbourhood, notably those of Darius in the face of the Bisitun cliff. But the town was founded by the Sassanid king Bahram IV (A.D. 388–399), who named it Kirmanshahan in memory of his former post as Shah or Governor of Kirman.

Kavad (488–531) rebuilt the town, and another Sassanid monarch, Chosroes II (590–628), erected a palace, which was decorated partly by the celebrated architect Farhad. In 641 Kermanshah fell to the Arabs as they advanced towards the battlefield of Nihavend. Together with Hamadan, Isfahan, and Rai it became one of the four great cities of the province of Jibal, and Harun ar Rashid held his summer court there. Its prosperity lasted until in 1220 it was ravaged by the Mongols so thoroughly that 120 years later it was no more than a village, and did not revive as a town until the sixteenth century. The early Safawid kings fortified it against the Ottoman Turks, by whom it was captured more than once, but in 1639 the Treaty of Zuhab fixed the Turko-Persian boundary far to the west.

Between 1723 and 1727 Kermanshah fell to the Turks and the

Afghans in turn, but was recovered by Nadir in 1730. He refortified it and used it as a base against the Turks; later in the century it was pillaged many times by Zend tribesmen under Karim Khan. In 1813 it had 12,000 houses and was once more flourishing, but in 1830 cholera killed 12,000 persons. In the nineteenth century the town was firmly controlled by the central government despite the unruliness of the surrounding tribes. Its fortifications were strengthened by Shah Fath Ali against the Turkish menace of 1821–1823. Later the town suffered much from corrupt government, and in 1885 town and province were offered to the highest bidder with unfortunate results. But about 1900 the governor Ala-ud-Daulah greatly improved the town and established some order in the province. During the civil disturbances of 1911 and 1912 Kermanshah was looted more than once. In 1915 it was occupied by the Turks and in April 1917 by the Russians. After the Russian revolution in the same year the latter withdrew, and the town became a station on the British lines of communication to the Caspian in 1918. It has since enjoyed peace.

Description of Town. Kermanshah is like a huge Kurdish village of huts and narrow alleys with few fine houses, mosques, or public buildings. Its walls and gates have disappeared. The best houses are in the Faizabad quarter where merchants live and tribal *aghas* have their town houses. Almost the only buildings of any interest have been erected in recent years, the most imposing being the barracks. A broad road, called the National Avenue, has been cut through the town from north to south, and there is a large square or maidan on which the bazaars debouch. The inhabitants are mostly Kurds with a few Jews.

Industry and Commerce. There are mills for flour, rice, and vegetable oils, and a sugar refinery at Shahabad. A small refinery of the A.I.O.C. is fed by pipe from the Naft-i-Shah field (p. 494), and the products are distributed through Persia by lorry. Kermanshah is the market town of south Persian Kurdistan and an entrepôt for trade between central and northern Persia and Baghdad.

Water-supply. There is ample water from springs and streams, much polluted within the town.

Communications. The motor-road to Baghdad (236 miles) runs roughly south-west to the boundary of Iraq (133 miles). Eastwards the road goes to Kangavar (61 miles), Hamadan (116 miles), and Tehran (352 miles). Another road winds northwards to Senna (96 miles), Saqqiz (187 miles), Maragheh (279 miles), and Tabriz (355 miles).

KIRMAN (30° 17′ N., 57° 05′ E.). Altitude, *c.* 5,650 feet. Population *c.* 50,000. British Consulate. Hospital. Banks: Imperial, National. Hospital. Garages. Landing-ground.

Kirman, famed for its fine Persian carpets, lies in a plain walled in by high ranges (fig. 54) reaching 11,000–13,000 feet. The suburbs contain many gardens and small hamlets, immediately giving place to a bare stony desert and on the south to extensive sandhills. By reason of its altitude, its climate is not unduly hot, and cold winds from the mountains to the south often cause sudden falls in temperature.

History. The legendary origin of Kirman is connected with a sacred worm of enormous size, but the town was probably a Sassanid foundation called Beh Ardashir, a name corrupted into Bardashir by the Arabs, and may be identical with the town of Carmana mentioned by classical writers. After the Moslem conquest a large Zoroastrian community survived at Bardashir. In the early eighth century the town was well known for its manufacture of shawls, though it did not succeed Sirjan as the capital of the province of Kirman until 928. From 1049 to 1187 Bardashir was the centre of a Seljuk Turkish fief, and from 1222 to 1307 was the capital of the local Buruk Hajib dynasts, amongst whom the lady Turkan Khatun (1258–1282) is notable; over her tomb was erected the 'Green Cupola', unfortunately destroyed by an earthquake in 1896. Marco Polo in 1271 noted the skill of the local armourers, leather-workers, and the silk embroiderers. In the fifteenth century a holy man named Nimatulla founded a Dervish order and built a monastery at Mahun, outside the city. His tomb, begun in 1437 and surrounded by beautiful gardens, became a centre of pilgrimage. After a period of struggle between Turkoman dynasties the town, now called Kirman after its province, was taken in 1502 by Shah Ismail I, and under the Safawids in the sixteenth and seventeenth centuries its commerce expanded and carpet-weaving became a major industry. The English and the Dutch East India Companies opened factories, trading through the port of Gombrun (Bandar Abbas). The eighteenth century was a period of disasters. The town suffered heavily from the Afghan invasions (1720 and 1722) and was greatly impoverished by the requisitions imposed by Nadir Shah for his eastern campaigns, against whom it rebelled unwisely. Later Afghan raiders destroyed the northern quarter of the town where the Parsis lived, and because the townsmen supported the Zend dynasts the first Qajar monarch,

Agha Mohammed, in 1794 punished Kirman severely, pillaging it for three months, selling 20,000 citizens into slavery, and blinding 20,000. The town recovered slowly. It was rebuilt to the north-west of its former site, and by 1850 its carpet industry had been re-established. In 1878 it had a population of over 41,000 persons.

Description of Town. The ruins of old Kirman, to the south-east of the present town, are dominated by a limestone ridge on which stand the massive ruins of two pre-Moslem fortresses, the Qaleh-i-Ardashir, which still contains the Governor's palace, and the Qaleh-i-Dukhtar. Kirman itself is mostly enclosed by an irregular mud wall pierced by six gates (photo. 182); the mass of houses and alleys is now penetrated by a broad avenue and with its wind-traps rather resembles Yezd. On the south-west is the impressive citadel (*Arg*) adjoining a large square, and there are five mosques of the eleventh to fourteenth centuries. The Madrasa Zahir-ud-Daulah is the finest of the seminaries, and there are extensive bazaars. The town has a reputation for fanaticism and opium-smoking, though addicts are declining in numbers. The numerous Parsi community, however, is enlightened and progressive. There are also many Bahais, as at Yezd. These influences have perhaps assisted the creation of what is said to be the only modern Moslem orphanage in Persia. There is a small colony of Jews and Hindus.

At Mahun village, a summer resort of the Kirmanis, 14 miles to the south-east, is the fine domed shrine of Nimatulla (photo. 200). North-east of the Qaleh-i-Dukhtar hill are the Kirman pleasure-gardens called Bagh-i-Zirisf.

Industry and Trade. Kirman is the largest centre of the hand-made carpet industry in Persia, which has maintained itself by firmly relying on native vegetable dyes. Workshops are numerous, and wool carding is a subsidiary industry. Shawls and brass ornaments are also made, and there is a cotton mill. The town also has an entrepôt trade between the Persian Gulf ports, Khurasan, and the eastern rim of Persia; the desert route to Birjand is still used by camel caravans.

Water-supply. Qanats from the surrounding hills bring good water to the town.

Communications. Main roads south-west to Baghin (20 miles), Saidabad (118 miles), and Bandar Abbas (316 miles); north-west through Baghin to Bahramabad (102 miles), Yezd (222 miles), and Isfahan (426 miles); south-east to Bam (101 miles) and Zahidan (252 miles). Minor roads north-west to Zarand and north-east

through the mountains to Shah Dad. *Landing-ground* is west of the town.

MESHED (36° 17′ N., 59° 37′ E.). Altitude, 3,300 feet. Population, *c.* 176,400. British Consulate-General. Afghan, Russian, and Turkish Consulates. Hospitals. Banks: Imperial, National, Pahlevi, Russian. Hotels. Theatre. Cinemas. Airfield.

Meshed not only is a sacred city of Shia pilgrimage but also has considerable strategic, administrative, and economic importance. It is at the eastern end of the plain in the upper valley of the Kashaf Rud (Ab-i-Meshed), a tributary of the Hari Rud, and is surrounded by a belt of walled vineyards and orchards from ½ to 1 mile wide. The mountain foothills are about 2 miles distant to the south-west and from 10 to 15 miles to the north-east.

Moslems who make the pilgrimage to the tomb of Imam Riza are entitled Meshedi, and it is reckoned that pilgrims number about 30,000 a year.

History. Fifteen miles north-west of the present city stood the ancient city of Tus, said to have been founded in the fourth century B.C., which was the second city after Nishapur in northern Khurasan. It was razed to the ground by Shah Miran, a son of Tamerlane, in 1390, when 10,000 of its inhabitants perished, and the survivors migrated to Meshed. To-day its site is marked only by a few ruins (photo. 21).

In A.D. 809 the Caliph Harun ar Rashid died while staying at Sanabad village near Tus. Eight years later the Caliph Mamun, son of Harun, visited Sanabad with his son-in-law Riza, the eighth Imam. Riza was taken violently ill and died suddenly, and it became widely believed that he had been poisoned by his father-in-law, who was jealous of his holiness. He was buried next to Harun ar Rashid, and Sanabad was called *Mashhad* ('place of martyrdom'). Riza's tomb became an object of pilgrimage, and the town of Meshed steadily grew in size. The greater part of the original shrine was destroyed in the tenth century, but in 1009 Sultan Mahmud of Ghazni built a new domed building over the two graves. Seriously damaged by the Mongols in 1220, it was restored before 1333, and embellished by Shahrukh, son of Tamerlane, in 1404, whose wife, Gauher Shad, erected the beautiful mosque that still bears her name.

On several occasions Meshed was despoiled by Turkoman and Uzbeg invaders, but in 1587 a new period of prosperity began. Shah Abbas, anxious to discourage pilgrimages to holy places in the hands

of Sunni Turks, did everything in his power to popularize Meshed, making additions to the shrine. Nadir Shah (1736–1747) made the town his capital and was a great benefactor. He built the massive Golden Gate, his own mausoleum, and a fine minaret. Meshed had an extensive trade at this time with the Turkistan oases, with Herat and Kandahar, and by Kirman with Bandar Abbas. Its population was reckoned between 200,000 and 300,000. After Nadir's death Meshed was the capital of the small kingdom ruled by his blind grandson, Shahrukh, for nearly fifty years. The town was harried almost yearly by the Uzbegs, and by 1796 its population had fallen to 20,000. The Qajar dynasty, however, benefited Meshed. Shah Fath Ali added a new court to the sanctuary, and Meshed slowly regained prosperity in the comparative peace of the nineteenth century, although involved in a rebellion in 1847 and visited by severe epidemics of cholera in 1868, 1892, and 1904.

In October 1934 the millenary of the birth of the epic poet Firdausi was celebrated by the unveiling of a memorial on the site of Tus.

Description of Town. Meshed has a moat and a wall of dried clay with towers and several gateways. The shrine of Imam Riza is in the centre, its precincts or *Bast*, formerly open only to Moslems, being surrounded by a circular avenue from which radiate straight streets (photo. 293). Two of these, at opposite points of the compass, form the Khiaban, which has a total length of $1\frac{3}{4}$ miles. The sanctuary consists of two great courts, the old court or Sahn-i-Kuhneh and the new court or Sahn-i-Nau. The Sahn-i-Kuhneh is a quadrangle 150 yards by 75, surrounded by a double story of recessed alcoves and with an immense arched portal or *aivan* in the centre of each side. It gives access to the spacious domed tomb-chamber or mausoleum, and contains the massive Golden Gate of Nadir and two fine minarets. Riza's tomb consists of a shrine within the mausoleum; the tomb of Harun which once filled the centre has been erased. To the south of the main sanctuary is the mosque of Gauher Shad, with courtyard and domed chamber in similar style, and near by is the fine madrasa of Haji Mirza Jafar. The library of the sanctuary, built in the time of Shahrukh, contains some 3,000 volumes, mostly fine manuscripts, and all these buildings are adorned with magnificent enamelled tiles; the sanctuary is lit by electricity installed as long ago as 1893. Nadir's minaret on the south side and the Golden Gate next to the mausoleum are clearly visible from outside.

To deal with the pilgrim traffic Meshed contains a great number of

caravansarais, bazaars, and baths, and there are, or used to be, at least 20 theological colleges (*madrasas*). A great refectory within the sanctuary provides pilgrims with 3 days' free board. Mosques and cemeteries are scattered throughout the city, which contains seven principal quarters; those called Bala Khiaban, Naughan, Pain Khiaban, Idgah, and Sarrab are adjacent to the gates similarly named, Sarshur contains the main bazaar, and Cheharbagh lies between Sarrab and the precincts of the sanctuary. The main building outside is the Arg (citadel), which is in the south-west of the town beside a large *maidan*.

Under the stimulus of Riza Shah new schools, a hospital, and libraries were built, and new parks and streets laid out, so that Meshed is far less squalid than it was fifty years ago (photo. 292). To provide money for these works the endowments of the shrine have been partly secularized.

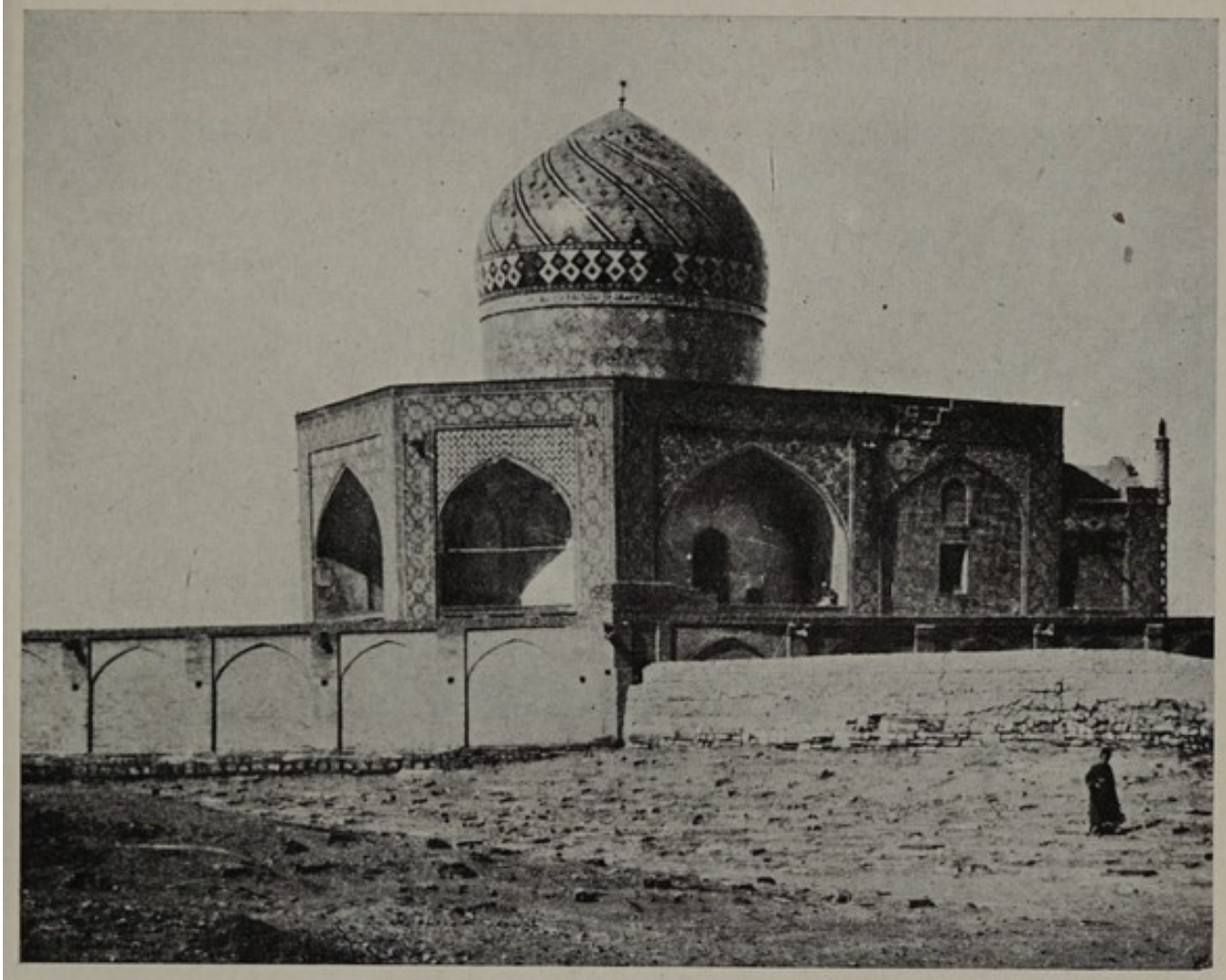
Industry and Commerce. The former transit trade with central Asia was largely destroyed, after the completion of the Trans-Caspian Railway in 1887, by the Russian imposition of heavy customs duties. To-day pilgrims provide most of the bazaar trade of Meshed, but there is also much local commerce with other parts of Khurasan. There is also some weaving and stone-working, while new factories include textile mills, canneries, flour-mills, soap-works, a distillery, and a sugar refinery.

Water-supply. Water from numerous wells is supplemented by qanats and open channels, of which the two largest draw their water from the Gilas spring, 40 miles away.

Communications. Meshed is a focus of roads. It is on the ancient highways that lead east to Herat (*c.* 239 miles), north-east to Merv (*c.* 220 miles), and Samarkand, south to Seistan and India. The southern road branches west to Nishapur (64 miles), Shahrud (287 miles), and Tehran (542 miles). The main highway of eastern Persia passes south to Turbat-i-Haidari (86 miles), Birjand (362 miles), and Zahidan (635 miles). Another road goes north-west to Quchan (83 miles), Gurgan (431 miles), and Bandar Shah (455 miles). A minor road to the south-east skirts the hills and provides an alternative route to Turbat-i-Haidari. The *airfield* is south of the town.

QUM (34° 38′ N., 50° 55′ E.). Altitude, 3,200 feet. Population, *c.* 52,600. Two hospitals. Hotel. Garage.

Qum as a pilgrim city ranks in Persian opinion second to Meshed. Its shrine is the tomb of Fatima, sister of the eighth Imam, the golden



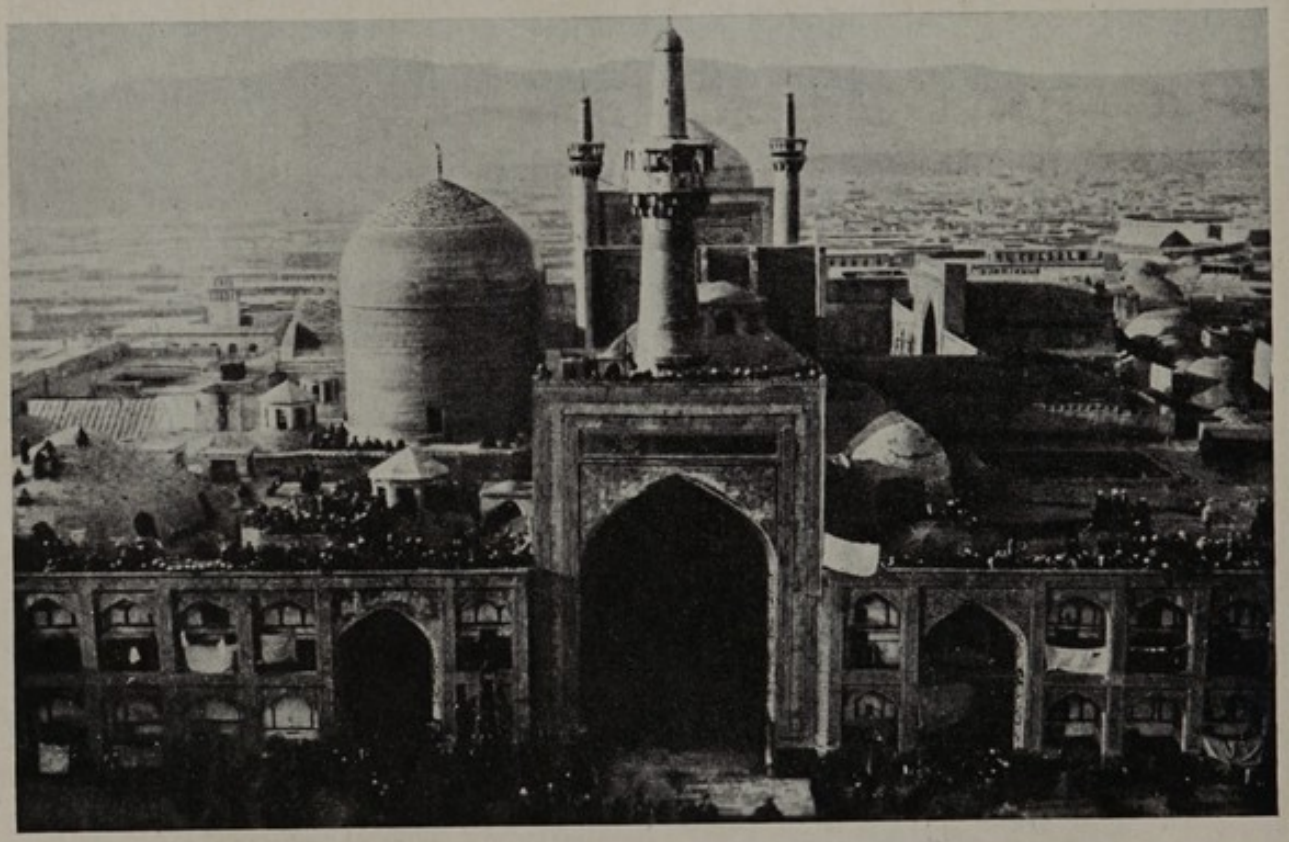
290. *Kazvin, shrine of the Shahzadeh Husain*



291. *Kashan*



292. *Avenue in Meshed*



293. *Meshed, shrine of Imam Riza*

dome of which is visible from a great distance. It is also a local market-town and a caravan-town on the main highway from north Persia to Isfahan.

The town is on both banks of the Qum (Anarbar) river in the middle of a plain within the Qum–Masileh basin (photo 294).

History. Traditionally the town was established at the former village of Kumindan by a colony of Ashari Arabs of a Shia sect, who took refuge in 720 from Omayyad persecution (p. 253). Thenceforward the inhabitants were noted Shias and often in conflict with the orthodox Sunnis of the rest of Persia. In 816 Fatima, sister of Imam Riza, died at Qum when travelling to visit him at Tus, but her tomb did not become a pilgrim centre until the seventeenth century. About 1052 Hasan-i-Sabbah, founder of the Assassins, was born at Qum. In 1221 the town was laid waste by the Mongols and most of its citizens were slain. It was again devastated by Tamerlane in 1387; but it recovered, and in 1474 was described as 'a small but handsome town, with an abundance of everything'.

Shah Abbas (1587–1629) made Qum a centre of pilgrimage, raising its sanctity to be second only to that of Meshed, and building a magnificent shrine over the tomb of Fatima. His three successors, Safi (1629–1642), Abbas II (1642–1666), and Sulaiman (1666–1694), were all buried at Qum. In the early eighteenth century the town was noted for its sword-blades and daggers. The Afghans took it twice, about 1722; but since then its peace has been almost unbroken. The Qajar Shah Fath Ali spent huge sums of money in embellishing the town. He removed the tiles from the dome of the shrine and replaced them with gold-plated copper, gave substantial presents in cash and in kind, founded a college (*madrasa*) for 100 students, and was himself buried at Qum in a splendid tomb. During his reign the population probably did not exceed 4,000, but the annual total of pilgrims possibly reached 25,000. Shah Nasir-ud-Din completed the work of Fath Ali, and in 1892 a good road, practicable for wheeled traffic, was made to Tehran; recently, in 1943, the railway reached it.

Description of Town. Fatima's shrine, which faces a large square, has two gilded domes and five minarets. The outer court is planted with trees, and from the inner court twelve marble steps lead up to the tomb. Three large doors, one of which is overlaid with silver plate, open into an octagonal chamber beneath the principal dome. The sarcophagus is shrouded in velvet and other cloths and is surrounded by a silver grating.

In many parts of the town there are tombs of holy men (*imamzadehs*), some beautiful and in good repair, others neglected. There are several madrasas, with 800 students, the Madrasa-i-Jami having twisted arches of blue faience. The bazaar with its curving line of pointed arches and great market hall, built by a local architect about 1850, is of interest. The rest of the town is undistinguished, except by the cemeteries adjoining the shrine, which provide notable open spaces (photos. 201, 295).

Industry and Commerce. One-sixth of the population is said to be directly connected with the holy places, including many mullas and sayyids, and many others provide lodgings or serve the pilgrims. Local industries include hand-made carpets, fine blue porcelain, and cotton weaving. There is a modern cotton-mill, and a distillery.

Water-supply. There is abundant water, which tends to be brackish in summer, from the river and from wells.

Communications. Qum is on the Trans-Iranian railway, being 112 miles from Tehran and 87 miles from Iraq (Sultanabad). A branch is being built to Kashan (61 miles) and Yezd (294 miles). A main road skirts the Qum lakes and kavirs to Tehran (92 miles), another runs south-west to Iraq (86 miles), a third goes up the Anarbar valley to Dalijan (56 miles) and Isfahan (173 miles), and a fourth leads direct to Kashan (*c.* 60 miles, fig. 16).

RESHT (37° 16′ N., 49° 36′ E.). Population, *c.* 121,600. Hospitals. Hotels (3). Banks: Imperial, National, Pahlevi, Russian. Consulates: British, Russian, Swedish. Cinemas. Garages. Airfield.

Resht, the principal entrepôt, with its port of Pahlevi (p. 508), for the Russian trade, is in the Gilan coastal plain about midway between the Pahlevi lagoon or Murdab and the Elburz foothills, which rise gradually to the Nuzemarz (alt. 2,517 ft.), 16 miles south of the town. The plain is densely populated and cultivated, with innumerable scattered steadings, and watered by a close network of channels derived from the Safid Rud.

History. Resht is seldom mentioned in Abbasid times, though a sizeable town existed in the fourteenth century A.D. Its importance as capital of Gilan seems to date from the southward expansion of Russia and the growth of the Russian trade in the seventeenth and eighteenth centuries, when silk was the principal product and export of Gilan. In 1723 Resht was occupied by Peter the Great, whose army cleared the forests as far as the foothills, but it was evacuated in 1734 because of the pestilent climate, and became the capital of a

local ruler of Gilan, Hidayet Khan, from 1744 until the first Qajar Shah made an end of him. In 1805 a Russian force took Pahlevi, then called Enzeli, but was defeated outside Resht. Later two disasters assailed Resht; plague in 1830–1831 nearly annihilated the population, then about 60,000–80,000, and in 1864–1869 disease nearly destroyed the silk cultivation. But the Russian trade remained in other goods, silk production was replaced by cotton and rice, later silk itself made a partial recovery, and the urban population reached 30,000 in 1890. A third less permanent disaster was the burning of the bazaars in 1899. In 1900 a Russo-Persian company opened a carriage road by Kazvin to Tehran. In 1909 Russian troops occupied Resht and Enzeli during the Persian revolution and remained until 1921; the British 'Dunsterforce' also used Resht as its base during the Baku campaign of 1918 (p. 303). The commercial supremacy of Resht was challenged when Riza Shah built the Trans-Iranian railway and created a new Caspian port at Bandar Shah, but Enzeli, renamed Pahlevi, was improved, and some modern factories were built at Resht, while the town was adorned with new thoroughfares, schools, and hospitals. In 1941 Resht was again occupied by Russia and became a stage on the Allied supply route to Russia.

Description of Town. Resht is quite unlike any town of central Persia. Much timber is used in its buildings, which have the broad verandas and steep eaved red-tiled roofs common to the Caspian provinces. Even the mosques are in this style. Broad avenues pierce the town from east to west and from north-west to south-east. The principal shops, hotels, and public buildings are on the Pahlevi Khiaban, but there are no ancient monuments of interest. The inhabitants mainly speak Gilaki Persian, though there are many Armenians and persons of Caucasian and Georgian origin. Russian is understood by many shopkeepers.

Industry and Commerce. There is a large modern jute factory, rice- and flour-mills, and tea-drying plants; soap, glass, and knitwear are also manufactured. Resht is the commercial centre of Gilan, dealing in rice, cotton, tobacco, silk, and tea, while the entrepôt trade with Russia is still considerable.

Water-supply is from wells or from channels.

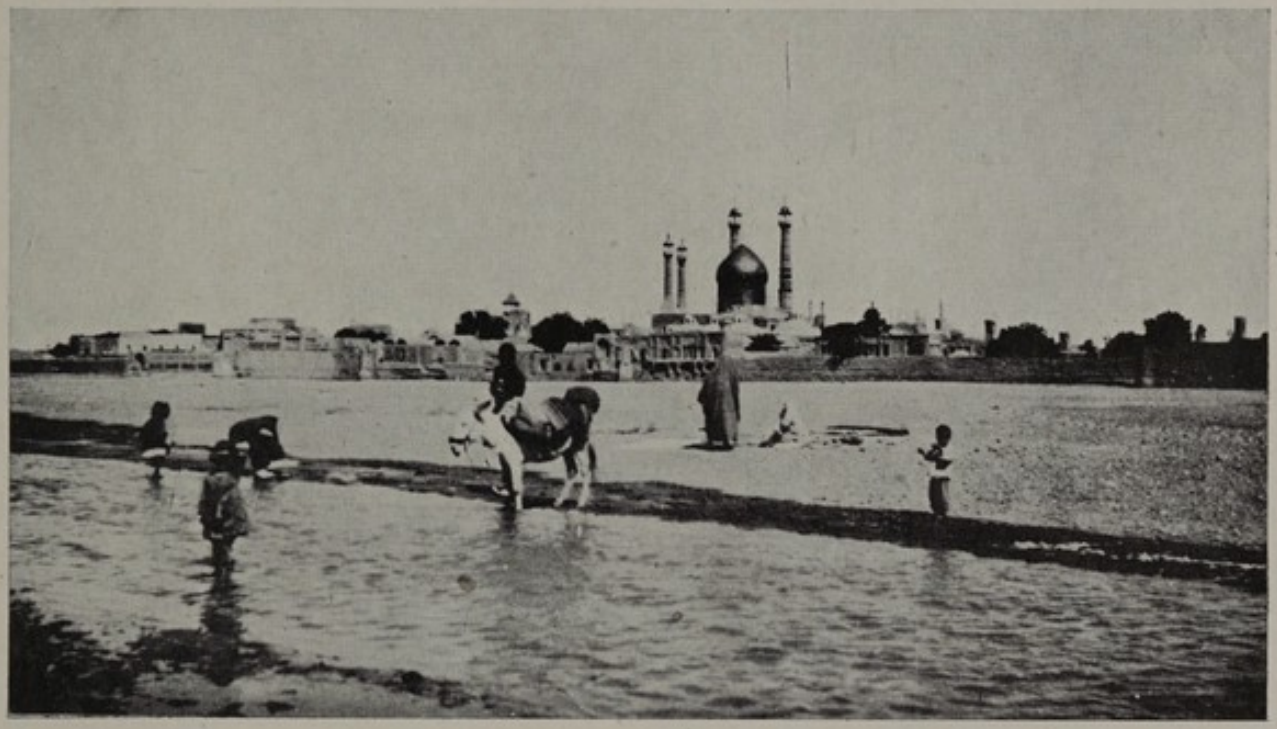
Communications. Motor-roads north to Pahlevi (32 miles); east to Babul (210 miles); south, crossing the Elburz by the Safid Rud valley, to Kazvin (119 miles) and Tehran (212 miles); west to Astara (117 miles) on the Russian frontier. Mud makes the local roads extremely bad. The *airfield* is north of the town.

SHIRAZ (29° 36′ N., 52° 32′ E.). Altitude, *c.* 5,000 feet. Population, *c.* 129,000. British and Russian Consulates. Hospital. Protestant Mission. Banks: Imperial, National, Pahlevi, Russian. Wireless station. Hotels. Cinema. Airfield.

Shiraz lies in a plain about 20 miles long and 6 miles wide, enclosed by hills. It is the centre of an isolated but important agricultural region and commands the southern entrance to the Tang-i-Allah-o-Akbar pass. Its defensible site, its agreeable climate, and the productiveness of its lands have made it prosperous since early times. Earthquakes are not infrequent, the two worst in modern times being those of 1824 and 1853.

History. A settlement existed in Sassanid times, but the town did not oust the old Iranian centre of Istakhr until the Moslem conquest. Its greatest days were in the late Abbasid period and much later when it became the capital of the Zend dynasty. About A.D. 875 Amr ibn Lais, the second Saffarid ruler, built a great mosque (now in ruins), and in the tenth century the town was surrounded by a wall. The poet Sadi was born there in 1184. It was spared by Jenghiz Khan in 1225, and Tamerlane first took it in 1386, when he had his celebrated interview with the poet Hafiz. A few years later after a local revolt Tamerlane returned, and many of the inhabitants were killed. But Shiraz continued to grow and was said to contain 200,000 inhabitants in 1474. It declined under the Safawids, although Imam Kuli Khan, Governor of Fars under Shah Abbas, beautified it. The town was severely damaged by flood in 1668 and half a century later by the Afghan invaders, but was repaired in 1729 by Nadir Shah. A revolt in 1743 by the Governor of Fars (p. 278) was quelled after a siege lasting four and a half months; plague broke out shortly afterwards and claimed 14,000 victims. Karim Khan Zend (p. 280) made the town his capital in 1751, rebuilding the stone walls and erecting a citadel, a palace, and several mosques; but the resulting prosperity came to an end with the Qajars. It was reduced to the rank of a provincial town, and its stone walls were rebuilt of mud, though the Governors of Fars who resided there were frequently members of the royal family. The Babi movement originated there and serious riots occurred in 1886, 1891, and 1901; the mullas are still noted for their intransigence. In 1904 a cholera epidemic carried off 5,000 persons. In more recent years Riza Shah effected some repairs and improvements.

Description of Town. The Arg (citadel), a fortified enclosure 80



294. *Qum, with the shrine of Fatima, from the river*



295. *Qum, street scene*



296. *The gardens of Shiraz*



297. *Shiraz, Sayyid Ahmad mosque*

yards square with mud walls and four mud and brick towers, faces the Maidan, from which access is gained to the cruciform and vaulted Bazaar-i-Vakil, 500 yards long and 120 yards wide, built by Karim Khan. The mosque called Masjid-i-Vakil also dates from his reign, and the tombs of Sadi and of Hafiz were restored by him. The latter mausoleum is about 1 mile north-east of the town and the former is not far from it. But Shiraz contains relatively few ancient or beautiful buildings. The town is divided into eleven wards. Most of the streets are narrow and the houses small; there are said to be some 50 mosques, 12 madrasas, and numerous baths and caravan-sarais, the latter being close to the Bazaar-i-Vakil (photo. 297).

There are numerous gardens on the outskirts of the town, and to the traveller they form a pleasing contrast to the arid mountains through which they are approached (photo. 296). The Shirazis, who number the poets Sadi and Hafiz amongst their most famous men, are proud of the purity of their blood and the vivacity of their wit, and claim that they speak Persian more purely and more melodiously than any other Persians. The population also contains a Jewish ward and some Armenians.

Industry and Commerce. The town has for long been famous for its inlay (*khatam*) and silver work. Industry is confined generally to the bazaars, but some larger workshops exist for the manufacture of carpets and rugs; there is a distillery, a glass factory, and, in the Marvdasht plain, a modern sugar refinery. The products of the local countryside are sold in Shiraz, which is a market for the Qashqai and Khamseh tribes. Local specialities include lambskins, wine and *khullar* grapes, roses and rose-water.

Water-supply. Numerous streams from the mountains afford ample water and many have been diverted to ornament the gardens.

Communications. The road north-north-east through the Tang-i-Allah-o-Akbar leads to Isfahan (291 miles) and ultimately to Tehran (556 miles). The other main road goes through the hills westwards to the valley of the Mand and so to Kazerun (65 miles) and Bushire (182 miles). Southwards a poor road crosses the plain for some 35 miles and climbs a pass 7,400 feet high to reach Firuzabad (68 miles). There is also a road, motorable in dry weather, north-west to Ardakan (62 miles). The *airfield* is south of the town.

TABRIZ (38° 05′ N., 46° 18′ E.). Altitude, 4,600 feet. Population, *c.* 213,500. British Consulate-General. French, German, Russian, and Turkish Consulates. Hospital. Protestant Mission. Banks:

Imperial, National, Ottoman, Pahlevi, Russian. Wireless station. Hotels. Theatres. Cinemas. Airfield.

Tabriz, the capital of Azerbaijan and second largest city in Persia, is on the left bank of the Aji Chai (Talkheh Rud) about 100 miles from the Turkish frontier and less than 60 from the Russian, and it lies on fertile terraces and fans, formed at the northern foot of the Sahand volcano, which slope gently westward to Lake Urmia, 30 miles away. It is surrounded by verdant gardens, and the outlying plain is well cultivated. Its name is said to be derived from the Pahlevi *tap-riz*, meaning 'causing heat to flow', the allusion being to the warm springs of Sahand. This mountain rises to a height of 12,138 feet and dominates the town on the south. Tabriz is much subject to earthquake shocks.

History. The early history of Tabriz is obscure, but, as Tauris, in the third century A.D. it became the capital of the Armenian king Tiridates III. In 791 it was rebuilt by Zobeida, wife of Harun ar Rashid, but 67 years later was wrecked by earthquake. Again rebuilt, most of it was destroyed by another earthquake in 1042 when no less than 40,000 persons are said to have been killed. In the thirteenth century Mongol armies took it after being twice bought off, and under Khan Ghazan (1295–1304) it became the capital of the Persian Khanate. The Khans made extensive additions to the town, including a wall, mosques, and bazaars, which were noted for their jewels. In 1392 it was sacked by Tamerlane, but it remained a provincial capital and was soon prosperous again, for in 1404 it was said to have 200,000 inhabitants and 'the finest baths in the whole world'. Thirty years later the Kara Koyun Turkomans made it their capital, and Shah Jehan (1436–1467) built the Masjid-i-Kabud ('Blue Mosque') which remains, though in partial ruin. The first Safawid, Shah Ismail I (1500–1524), made Tabriz his capital, but his successor moved to Kazvin, which was less exposed to attack from the Ottoman Turks. In the frequent warfare between Persia and Turkey Tabriz changed hands several times. In 1671 it was 'a very large and potent city' of 15,000 houses and as many shops.

In 1721 it was again wrecked by earthquake, but three years later its inhabitants stoutly resisted a Turkish siege. The Turks took it in the following year and held it until 1730. Plague in the winter of 1737–1738 killed 47,000 people, and in 1780 there was another earthquake. In 1827 Tabriz fell to the Russians, but it was restored to Persia by the peace treaty of 1828.

Despite recurrent epidemics of plague and of cholera, Tabriz

continued to flourish, and during most of the nineteenth century it was the official residence of the Heir Apparent. Its population in 1895 was estimated at 200,000.

In 1908 the revolution against Shah Mohammed II started at Tabriz. In 1909 Russian troops arrived, and the town was occupied by them for five years. When war broke out in 1914 the Turks entered Tabriz, but in January 1915 they were expelled by the Russians. In 1916 the railway from Julfa was completed. After the Bolshevik Revolution Russian troops withdrew in 1917, but returned in 1941.

Description of Town. The only two buildings of ancient importance are the Masjid-i-Kabud and the Arg (citadel) in the south-west quarter of the town. The former is still majestic even in decay, and the latter is a massive erection 120 feet high with walls 25 feet thick at their base. Most of it dates only from 1809, but parts go back to 1312. It was damaged by Russian artillery in 1911 during a local revolt against Russian rule. Tabriz is predominantly a commercial town, and in recent years many shops and offices of the European type have been built. The old town, which is a monotonous huddle of mean and dirty streets, has been improved (photo. 299). Public gardens and wide streets have been laid out, and there is a three-storied Town Hall, though for fear of earthquakes many houses have only one story. Turkish inhabitants predominate, and there is a large Armenian quarter.

Industry and Commerce. Tabriz is a minor industrial centre with the largest leather, match, and soap factories in Persia, several plants for drying fruit, textile factories, a distillery, and a brewery. Smaller establishments make boot-polish, lampwicks, and paint. Carpets are made in large workshops. There is a considerable trade in cereals, dried fruits, and other agricultural products, and much banking business is transacted. Tabriz is the entrepôt of the Russian trade in Azerbaijan, and to a smaller extent of the Turkish trade by Erzurum.

Water-supply. Many of the streams that cross the plain on their way to Lake Urmia are brackish, but though water is replenished from the slopes of Sahand, good water is scarcer than might be expected. Private individuals have built aqueducts from the hills and sell water at high prices.

Communications. The railway to Julfa (91·4 miles) has a branch to Sharif Khaneh from which place (57·4 miles from Tabriz) there are steamer services on Lake Urmia. The main road runs north-west along the edge of the plain and over the Sufian pass to Marand (40

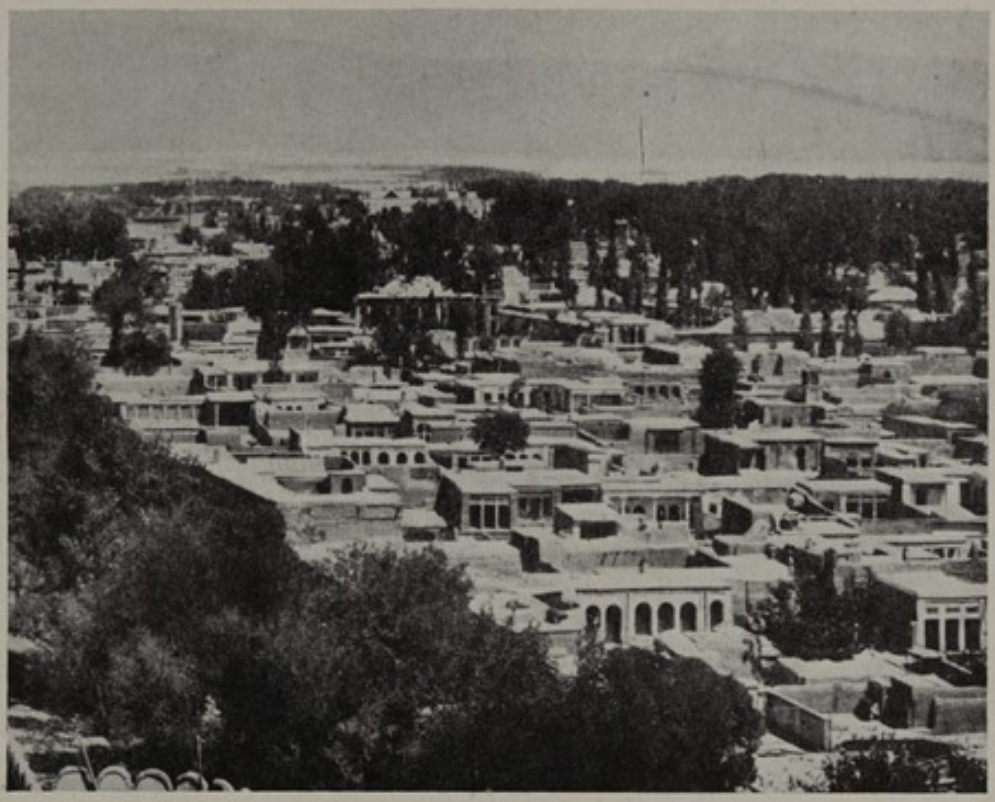
miles) and Julfa (82 miles), and south-east through the hills to Zenjan (200 miles), Kazvin (310 miles), and Tehran (403 miles). At Shibli (23 miles) there is a branch east to Ardebil (128 miles). Another road curves south-westward round the mountains to reach Maragheh (76 miles), Miyanduab (110 miles), and Kermanshah (355 miles). The direct road to Erzurum in Turkey is by Marand, Khoi (92 miles), and Maku (170 miles). The *airfield* is east of the town.

TEHRAN (35° 41′ N., 51° 27′ E.). Altitude, 3,750 feet. Population (1939) *c.* 300,000. Government Offices. Law Courts. Embassies and Legations. University. Hospitals. Orphanages. Banks. Hotels. Garages. Theatres. Cinemas. Racecourse. Airport. Wireless station.

Tehran, the capital of Persia since about 1795, lies in gently sloping ground close to the northern edge of the great northern basin. To the north it is dominated by the Elburz, with snow-capped Demavend 56 miles away clearly visible on most days of the year.

During the last twenty-five years the city has been very largely rebuilt, and it is now a modern town with broad streets and good buildings. The Court and the richer inhabitants usually spend the summer in the hill villages of the Shimran district. The population was given in 1942 as 540,000, but this includes the surrounding district and a war-time influx. (Photos. 298, 300-303.)

History. Through ancient and early Moslem times there was always a great city in the plain of Tehran at Rai (Rey, Rei, *class.* Rhagae), the Parthian capital at one time, but at Tehran itself no place of importance existed until the destruction of Rai in 1221. In 1628 Sir Thomas Herbert recorded some 3,000 houses and many beautiful women. Under the later Safawid monarchs Tehran was the occasional residence of the Court. It was taken and pillaged by the Afghans in 1721, but in 1788 the first Qajar Shah, Agha Mohammed, then ruler of northern Persia only, chose it as his capital largely because of the Russian menace. When he died in 1797 it was only 2 miles in circumference and had a population of 15,000. Fath Ali Shah embellished it considerably, and by 1807 it had a winter population of over 50,000. The city was then surrounded by a mud wall 20 feet high and 4 or 5 miles long, flanked by circular towers and with a deep wide moat. Shah Nasir-ud-Din renovated the whole city. The old walls were largely pulled down, and money sent out from England to the Persian Famine Relief Fund of 1871 was spent in digging a new earthen rampart and fosse, modelled on the



298. *Tehran, a residential quarter*



299. *Tabriz*



300. *Tehran, Anderun of the Gulistan palace*



301. *Tehran, Nasiriya Avenue*

fortifications of Paris, and forming a circuit of 11 miles, in which there were 12 gates. In October 1906 the first Majlis met in the Baharistan Palace. From 1909 to 1911 there were many civil disturbances.

Under Riza Shah many changes were made. Nasir-ud-Din's walls were pulled down and wide avenues, intersecting each other at right angles, were cut through squalid slums. Although the new Pahlevi style was largely used for exteriors, internal designs were European, and many of the architects were trained in Europe or the United States. Such buildings include the Pahlevi Palace in the north-west of the city, built of marble and onyx from Yezd.

From 27 November to 2 December 1943 Tehran was the scene of a conference between the leaders of Russia, Great Britain, and the U.S.A.

Description of Town. The avenues which intersect the huddled alleys of the old town are lined with trees and large government buildings; there are fountains at their crossings. In the centre of the city is the open space known as the Maidan-i-Sepahsalar. On its north side is the Town Hall (photo. 302), on its east side the Imperial Bank of Persia, and on its south side the Ministry of Posts and Telegraphs. Near by, in the Avenue Sepah, are the offices of the Anglo-Iranian Oil Company. The Gulistan Palace, also near the centre, was renovated by Riza Shah, and most of the Ministries are adjacent. At Jalaliyeh, to the north of the city, are the new University premises, while the impressive railway station is to the south. The most important mosques are of no great age, being the Masjid-i-Shah (1840) and the Masjid-i-Sepahsalar (1890), but the new National Museum contains a fine collection of Persian art and of historical objects. Other large buildings are the Opera House and the National Museum. Apart from the University the city contains the principal professional and technical schools of Persia. There are electric light, automatic telephones, and urban tramway services.

Six miles along the road to Qum is the shrine of Shah Abdul Azim, a Moslem saint, which is a place of weekly pilgrimage on Thursdays and Fridays for pious Tehranis (photo. 199). Other fine buildings are the thirteenth-century tower of Ala-ud-Din and the fourteenth-century mosque at Veramin, and the ruins of Rai near Abdul Azim, with many huge walls and a fine tower some 70 feet high. The population is mixed, with Persian-speaking elements preponderating over Turkish, a considerable Jewish and Armenian colony, and many Europeans.

Industry and Commerce. Tehran and the surrounding district is the principal industrial area of Persia (p. 458). The armament and chemical factories, glassworks, and tobacco factories are the largest establishments. Food products are made by flour-mills, canneries, distilleries, and breweries; there are several knitwear factories; other products include soap, razors, matches, building materials, and paint. Trade is done in bazaars and modern shops; it is the commercial centre of Persia.

Water-supply. At present water is brought 5 to 8 miles by 40 qanats from the Shimran slopes of the Elburz, and drainage consists of open channels. There is, however, a scheme (p. 430) to provide piped water.

Communications. Tehran is 574·6 miles by rail from Bandar Shahpur, 286·6 miles from Bandar Shah, and 272·7 miles from Mianeh on the uncompleted line to Tabriz. Roads lead east through the mountains to Firuzkuh (93 miles) and Shahrud (255 miles), south-westward across the plain to Qum (92 miles) and Isfahan (265 miles), and west-north-westwards along the edge of the mountains to Kazvin (93 miles) and thence through the Elburz by Manjil to Resht (212 miles). There are also numerous minor roads. The *airport* is north-east of Tehran; there are two military airfields west of the town.

YEZD (31° 54′ N., 54° 24′ E.). Altitude, *c.* 4,100 feet. Population, *c.* 60,000. Hospital. Banks: Imperial, National. Garage.

Yezd, though the most centrally situated city in Persia, is one of the most remote, and owes its importance to its position at the edge of the central deserts on the old caravan route from Bandar Abbas to Meshed. It lies in a western inland basin, almost surrounded by desert bordered by mountains. To the south and south-west is the Shir Kuh range, the highest peak of which is over 13,300 feet.

History. In former times the district was known as Yezd and the town as Katha. This, possibly identical with the classical Isatichae, in the Sassanid era was one of the principal centres of Zoroastrianism, which still survives here as at Kirman. In the tenth century it was strongly fortified and had two iron gates. Later it became the capital of a local dynasty, and in 1119 the Atabeg Ala-ud-Daulah Gurshasp built the first version of the Masjid-i-Jami. The town escaped the destructive Mongol invasions both of the thirteenth and the fifteenth centuries. When visited by Marco Polo in 1272 the name Yezd was coming into use, and he described the town as a good and noble city,

which manufactured silk. The Masjid-i-Jami was rebuilt in 1375, and when Yezd became part of the empire of Tamerlane a strong wall was built in 1395 along the south side of the city, much of which is standing to-day. In 1347 Mir Chakmuk built the mosque of that name, and in the next century Yezd began to be a centre of the textile industry. In the eighteenth century the town suffered from the Afghan invasion. In 1846 cholera killed some 8,000 persons, and there were civil disorders between 1908 and 1912. Thus until recently Yezd has been remote from political and military events, to the benefit of the trade of the town and the agriculture of the district, but to the increase of the fanaticism for which the Moslems of Yezd have been noted.

Description of Town. All round the city are ruins of ancient buildings, and a great part of the modern town, which occupies a space about 2 miles long and 1¼ miles broad, consists of abandoned houses. It is divided into two parts, Old Town and New Town, by the wall of Tamerlane. In the centre of the Old Town is a fort containing the Arg (citadel), where the Governor resides, and the Masjid-i-Jami. There are several ancient mosques and mausoleums, and the bazaar entrance is flanked by fine minarets. Yezd is unusual among Persian towns for the cleanliness of its streets and for the many ventilators (*bad-girs*) that rise above its roofs (photos. 304, 305), looking from a distance like minarets. This resemblance, and the piety of the townsmen, has given Yezd the nickname of Dar-al-Ibadeh ('House of Worship'). In the town and district there is a flourishing Parsi community numbering 5,000 to 6,000, who include many merchants with connexions in Bombay, and also a small number of Jews. Many Parsis have been converted to Bahaism.

Industry and Trade. The weaving of cotton, silk, and woollen textiles by hand loom is still a considerable industry, though much of the raw material is imported from other areas. The grinding of imported henna is also a valuable trade. Glass and knitted goods are produced, and Yezdis are also noted as diggers of qanats. The bazaar is amongst the least modernized in Persia; the old caravan trade is likely to be increased by a new motor track to Meshed by Tabas, and the railway, when completed, to Tehran.

Water-supply. Water is brought to the neighbourhood by over 70 qanats from the Shir Kuh hills, the 5 largest, 4 from Mehriz and 1 from Taft village, bringing the urban supply. It is stored in large domed reservoirs, often approached by steep flights of steps.

Communications. Yezd is on the railway under construction in

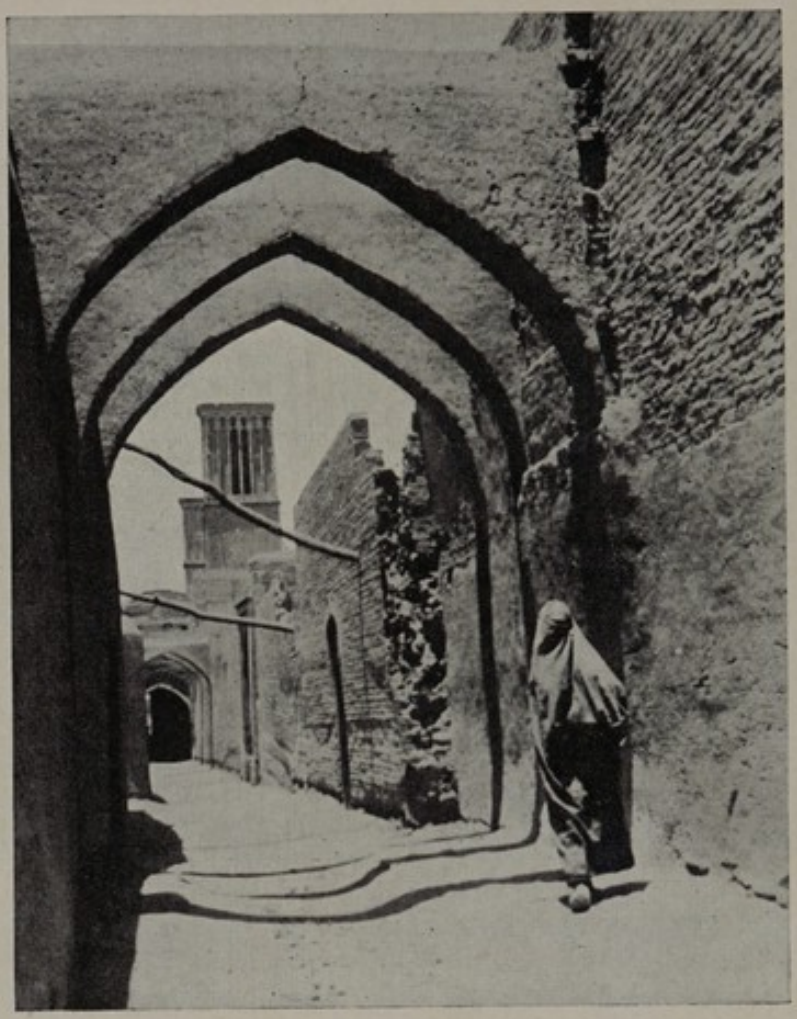
1943 from Kashan (233 miles), Qum (294 miles), and Tehran (406 miles). It is on one of the old main routes of central Persia leading north-west to Nain (101 miles) and Isfahan (204 miles), and south-east to Bahramabad (120 miles) and Kirman (222 miles). A more difficult road goes south through the mountains to Deh Bid (192 miles) and Shiraz (283 miles) and another east-south-east to Bafq (68 miles).



302. *Tehran, Sepahsalar square and municipal buildings*



303. *Tehran, the National Bank*



304. *An alley in Yezd*



305. *Yezd, roof-tops and bad-girs*

CHAPTER XIV

COMMUNICATIONS

PERSIA owes the framework of her communications to both structure and history. Before the opening of the seas to navigation, important land-routes passed through Persia linking the East with the West: migration routes from the central Asian steppes along the foothills of the Elburz skirted the Caspian and the central deserts and passed through the Araxes gap into Armenia and Europe; the royal roads of the Achaemenids passed from Babylon through Arbela (Erbil), and Ecbatana (Hamadan) to the Oxus and Jaxartes, or through Susa and by a devious route to Persepolis, engineered to avoid the worst difficulties of desert or mountain barrier; other ancient routes took the depression lines of the south-western inland basins where there was water, or the frontier lowlands from Herat to Seistan (fig. 43). These routes bound the empire together and were therefore bridged and well maintained for the use of envoys, armies, and trade. But with the opening of the sea-routes and the decline of Persia after the Mongol invasions Persia ceased to be on a major trade-route or to be a land of passage. In the sixteenth and seventeenth centuries the Safawid Shahs restored the internal route system of northern and western Persia; many Safawid bridges still survive and there are traces of their 'stone carpets' across marshes. But in and after the eighteenth century the roads were not maintained, and obstacles to movement from lack of good water in summer, from snow and mud in winter, and from tribal restlessness at all seasons made Persia's communications at the end of the nineteenth century entirely out of date. It is only within the last twenty years that Persia has been traversed by a railway and a few modern roads have been built by Riza Shah. Nevertheless it was under these forbidding conditions that supplies were passed through Persia to Russia during the last few years.

ROADS

A FEW carriage-roads were built during the last half of the nineteenth century, but modern road construction may be dated from the outbreak of the War of 1914–1918, when highways in the north-west, south-west, and east were made fit for light motor-traffic at all seasons. Persia now has about 23,000 miles of road along which motors can travel at some season of the year. This programme of

construction was initiated by Riza Shah as part of his policy of centralization and tribal control, and even before the present war motor-lorries were already beginning to replace the ancient forms of transport on the main highways. Of this mileage probably not more than 5,000 are even roughly metalled, often only with stones thrown together and roughly water-bound, but crushed hard by the passage of transport. Much of the remainder has only a light surfacing of stone or gravel, and sometimes only an improved earthen surface. On the other hand, in many parts of the country, particularly in central Persia, light cars can travel without roads in summer, the chief obstacles being sandy patches, irrigation ditches, and the kavirs. Considerable improvements have been made by British and American military engineers during the last few years, and it is probable that the Russians have constructed new roads in the north, but details are not yet available for publication.

Travel in winter is impeded by mud, rain, and snow, especially on the poorer types of road, those in the coastal plains being often impassable. Passes in the Elburz are generally kept clear of snow, but those in the Zagros may be blocked for a fortnight at a time.

In the following brief summary only the most important routes are mentioned. The mileages are approximate only and do not take into consideration many war-time developments which include new alinements, improvements to gradient, and new connexions. Roads are summarized under four headings:

(A) Through roads from south to north.
(B) Through roads from west to east.
(C) Roads across the Elburz.
(D) North-west frontier roads.

Mileages are given in brackets before the place-name to which they refer. The roads are shown in outline on fig. 60, and in most cases in more detail on the regional maps (figs. 11–22). Route numbers are given in square brackets.

(A) *Through Roads from South to North*

Route [1]. KHURRAMSHAHR–TEHRAN

(Figs. 14,[1] 16)

Distances in miles

(0) Khurramshahr. (83) Ahwaz. (155) Shushtar. (194) Dizful. (359) Khurramabad. (437) Burujird. (475) Malayer (Daulatabad). (533) Iraq (Sultanabad). (619) Qum. (711) Tehran.

[1] Road alinements have not been shown on figs. 13, 14 and 20 to avoid obscuring other detail.



306. *A camel caravan on the Kermanshah road*



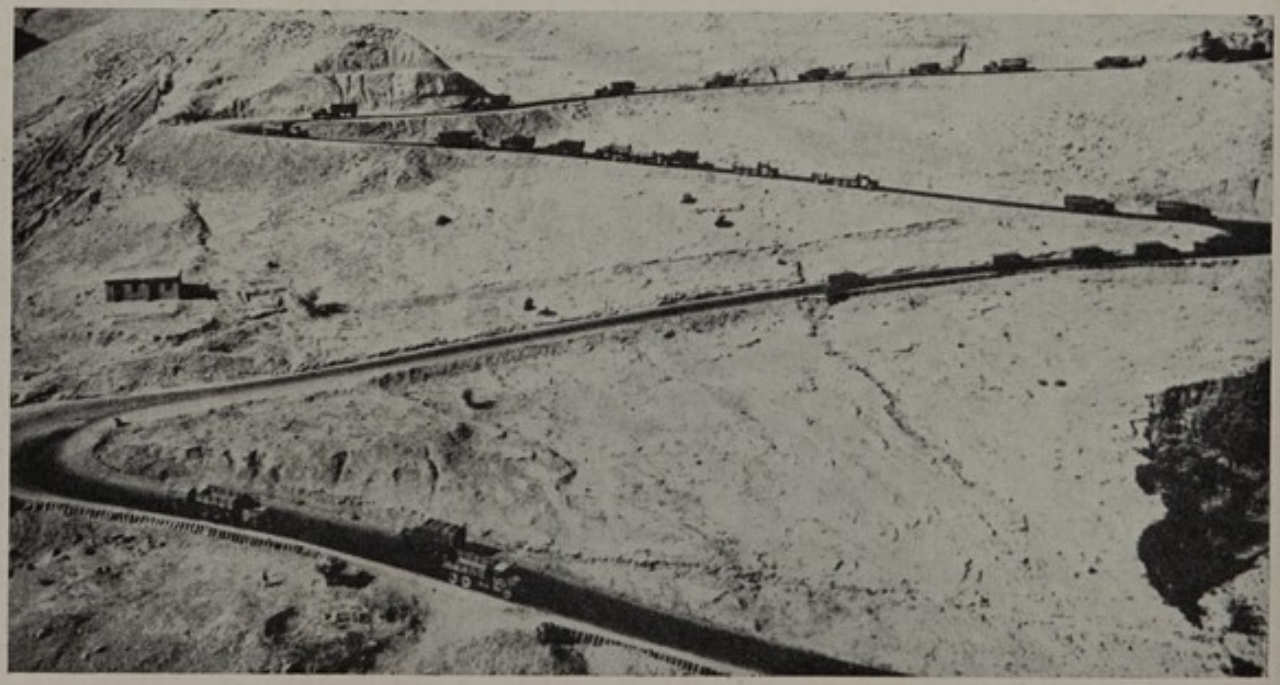
307. *A kelek ferry on the Karun*



308. *Old caravan route between Kazerun and Shiraz*



309. *Modern Persian road leading to the Kutal-i-Dukhtar, between Kazerun and Shiraz*



310. *Supplies to Russia. Lorries on the new motor-road north of Andimeshk*

From Malayer Route [5] can be reached at Hamadan by a good road (58 miles).

Route [2]. BUSHIRE–TEHRAN

(Figs. 15, 19, 16)

Distances in miles

(0) Bushire. (117) Kazerun. (182) Shiraz. (273) Deh Bid. (346) Abadeh. (393) Yezd-i-Khast. (425) Shahriza. (473) Isfahan. (590) Dalijan. (646) Qum. (738) Tehran.

Route [1] is joined at Qum.

Route [3]. BANDAR ABBAS–TEHRAN

(Figs. 15, 19, 16)

Distances in miles

(0) Bandar Abbas. (198) Saidabad (Sirjan). (316) Kirman. (538) Yezd. (639) Nain. (695) Ardistan. (765) Kashan. (825) Qum. (917) Tehran.

At Nain there is an alternative through Isfahan (103 miles), whence Route [2] can be followed to Tehran.

Route [4]. CHAHBAR–MESHED–ASHQABAD (U.S.S.R.)

(Figs. 20,[1] 22, 21, 12)

Distances in miles

(0) Chahbar. (189) Bampur. (271) Kwash. (346) Mirjawa. (398) Zahidan (Duzdap). (544) Neh. (671) Birjand. (739) Qain. (808) Juimand. (947) Turbat-i-Haidari. (1,033) Meshed. (1,116) Quchan. (1,155) U.S.S.R. frontier (Bajgiran). (1,195) Ashqabad (U.S.S.R.).

(B) *Through Roads from West to East*

Route [5]. BAGHDAD (IRAQ)–MERV (U.S.S.R.)

(Figs. 14,[1] 16, 17, 12)

Distances in miles

(0) Baghdad (Iraq). (98) Khanaqin (Iraq). (103) Iraq frontier. (236) Kermanshah. (297) Kangavar. (352) Hamadan. (473) Takistan. (495) Kazvin. (588) Tehran. (681) Firuzkuh. (724) Samnan. (794) Damghan. (843) Shahrud. (982) Sabzawar. (1,066) Nishapur. (1,130) Meshed. (*c.* 1,250) Sarakhs (U.S.S.R. frontier). (*c.* 1,350) Merv (U.S.S.R.).

Tabriz can be reached from Kermanshah (355 miles) by Route [16], Malayer on Route [1] either from Kangavar (71 miles) or Hamadan (58 miles).

[1] Road alinements have not been shown on figs. 13, 14 and 20 to avoid obscuring other detail.

Route [6]. JULFA (U.S.S.R. Frontier)–ZAHIDAN (Indian Frontier)

(Figs. 13,[1] 16, 19, 18, 22)

Distances in miles

(0) Julfa. (42) Marand. (82) Tabriz. (167) Mianeh. (282) Zenjan. (370) Takistan. (392) Kazvin. (485) Tehran. (577) Qum. (633) Dalijan. (750) Isfahan. (853) Nain. (954) Yezd. (1,176) Kirman. (1,277) Bam. (1,375) Nasratabad-Sipi. (1,428) Zahidan.

Route [7]. ASTARA–MESHED–HERAT (Afghanistan)

(Figs. 11, 12)

Distances in miles

(0) Astara. (117) Resht. (199) Shahsawar. (240) Nau Shahr. (299) Amul. (327) Babul. (431) Bandar Shah. (455) Gurgan. (607) Jajarm. (709) Bujnurd. (803) Quchan. (886) Meshed. (*c.* 993) Turbat-i-Shaikh Jam. (*c.* 1,050) Islam Kala. (*c.* 1,125) Herat.

This is the Caspian coastal road. Details of the exact alinement between Astara and Pahlevi are not known, though it is believed to keep along the coast the whole way, nor are they known between Jajarm and Bujnurd; these sections have not therefore been shown on figs. 11 and 12. Between Astara and Pahlevi the road is fit for motors only in fine weather; from Pahlevi to Gurgan it is reported good at all seasons; beyond Gurgan no recent details are available.

(C) *Roads across the Elburz*

Route [8]. TABRIZ–ASTARA

(Fig. 13)

Distances in miles

(0) Tabriz. (23) Shibli. (80) Sarab. (128) Ardebil. (168?) Astara.

Route [9]. KAZVIN–RESHT

The Manjil Road (Fig. 11)

Distances in miles

(0) Kazvin. (44) Mulla Ali. (67) Manjil. (71) Rudbar. (119) Resht.

This road crosses the Shah Rud about mile 52 and the Safid Rud at mile 68. It is the easiest of the Elburz crossings, and seldom interrupted.

Route [10]. TEHRAN–CHALUS–NAU SHAHR

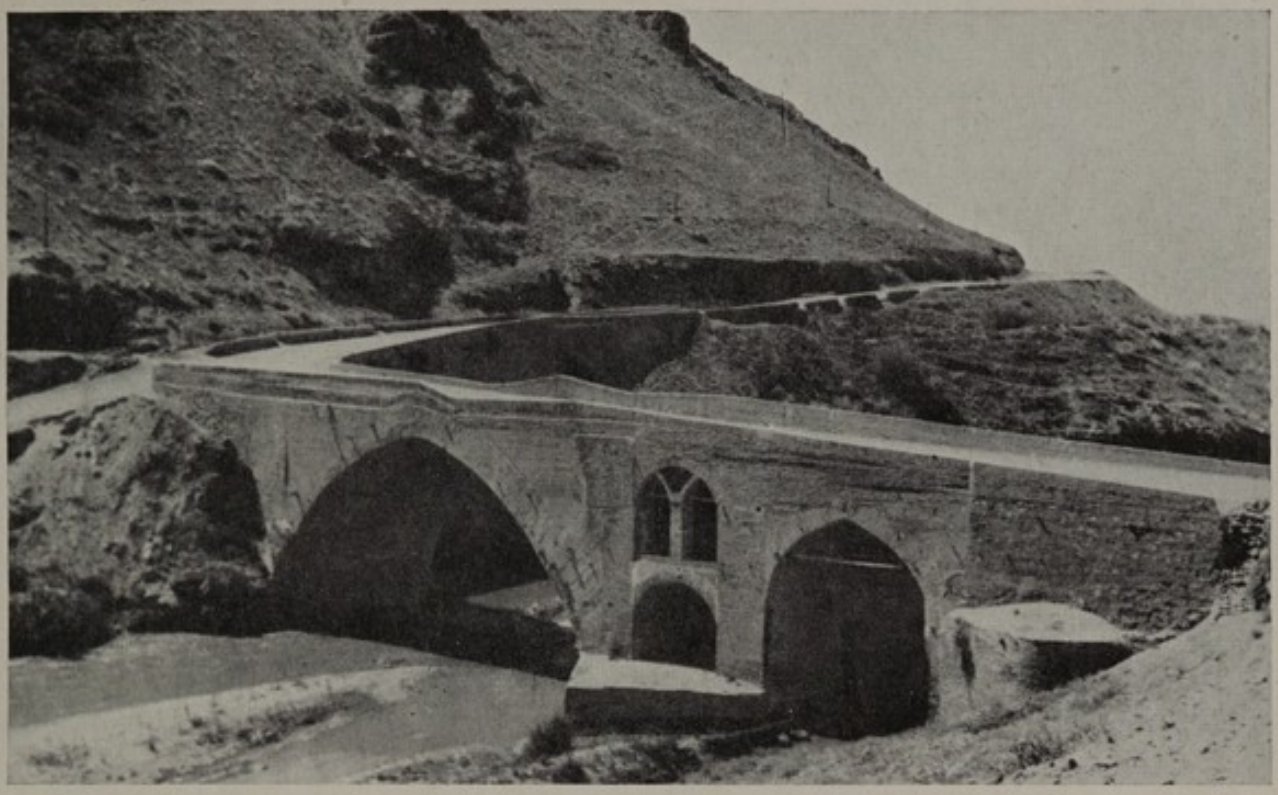
The Chalus Road (Fig. 11)

Distances in miles

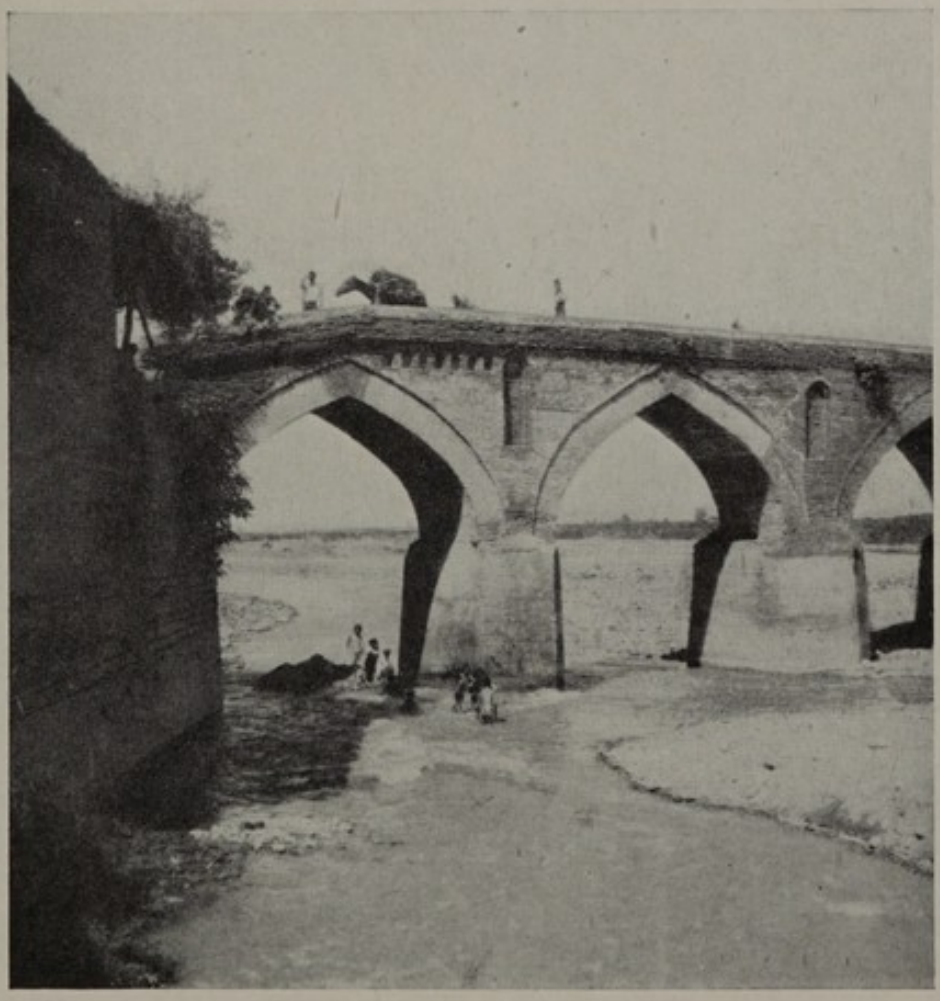
(0) Tehran. (28) Karaj. (114) Chalus. (120) Nau Shahr.

The Caspian watershed is crossed at the Kandavan pass, the crest being pierced by a tunnel more than a mile long. The highest point in the tunnel

[1] Road alinements have not been shown on figs. 13, 14 and 20 to avoid obscuring other detail.



311. *Bridge over the Karaj stream, Kazvin–Tehran road*



312. *Bridge in Safawid style over the Haraz canal near Amul, Caspian coastlands*



313. *Russian-built rest-house at Aveh on the Kazvin–Hamadan road*



314. *Motor-road at Yezd-i-Khast, between Shiraz and Isfahan*

is said to be about 8,500 feet; that of the crest of the former pass about 9,625 feet. The road is kept in good condition, but is liable to be closed by snow from December to April, generally inclusive.

Route [11]. TEHRAN–AMUL–MAHMUDABAD

The Demavend Road (Fig. 11)

Distances in miles

(0) Tehran. (34) Rudian. (48) Demavend. (109) Amul. (125) Mahmudabad.

This road climbs over the Caspian watershed 6 miles north of the village of Demavend at the Imamzadeh Hashim pass (8,700 ft.), and descends the Lar or Haraz valley along the eastern skirts of Demavend volcano. Work on converting it into an all-weather road is said to have been abandoned.

Route [12]. FIRUZKUH–SHAHI–BABULSAR

The Shahi Road (Fig. 11)

Distances in miles[1]

(0) Firuzkuh. (35) Zirab. (57) Shahi. (68) Babul. (79) Babulsar.

This road follows the general alinement of the Trans-Iranian Railway (Rly. 2). The central section along the Talar valley is shown with the railway on fig. 59. It is an all-weather road rarely blocked by snow for more than a day or two.

Route [13]. SHAHRUD–GURGAN

(Fig. 11)

Distances in miles

(0) Shahrud. (7) Bustam. (64) Gurgan.

Next to the Manjil road this is probably the easiest road across the Elburz, and can usually be kept open throughout the winter.

(D) *North-west Frontier Roads*

Route [14]. JULFA–MEHABAD–SAQQIZ

Distances in miles

(0) Julfa. (52) Khoi. (146) Rizaieh (Urmia). (188) Haidarabad. (226) Mehabad (Sauj Bulagh). (286?) Saqqiz.

Branch Route [14A]. HAIDARABAD–MOSUL (Iraq)

Mileages from Julfa

(188) Haidarabad. (244) Iraq frontier (Gowre Shinke pass). (406) Mosul (Iraq), via Ruwandiz and Erbil.

[1] Mileages appear to be underestimated.

Route [15]. TABRIZ–ERZURUM (Turkey)

Distances in miles

(0) Tabriz. (40) Marand. (92) Khoi. (170) Maku. (183) Turkish frontier at Bazargan. (409) Erzurum (Turkey).

Route [16]. TABRIZ–KERMANSHAH

Distances in miles

(0) Tabriz. (33) Gugan. (76) Maragheh. (110) Miyanduab. (168) Saqqiz. (259) Senna (Sinneh). (355) Kermanshah.

Branch Route [16A]. MIYANDUAB–MOSUL (Iraq)

Mileages from Tabriz

(110) Miyanduab. (138) Mehabad (Sauj Bulagh). (229) Iraq frontier (Gowre Shinke pass). (391) Mosul (Iraq), via Ruwandiz and Erbil.

Branch Route [16B]. SAQQIZ–SARDASHT

Mileages from Tabriz

(168) Saqqiz. (210) Baneh. (239) Sardasht.

Branch Route [16C]. SENNA–HAMADAN

Mileages from Tabriz

(259) Senna. (311) Qurveh. (364) Hamadan.

RAILWAYS

History and General Description

The isolation of Persia caused by the frontier barriers of mountain and desert and her position off the trade-routes of the world account for the almost complete lack of railways until the present century. No railway construction in Persia was undertaken before 1927, excepting a short length of line from the Caspian Sea, a 5-mile line from Tehran (completed in 1887), an extension of the Russian railway from Julfa to Tabriz built in 1916 (which remained Russian property until 1935), and the north-west railway system of India, which reached across the border into Persian Baluchistan near Zahidan (Duzdap) during the War of 1914–1918, but was afterwards abandoned. The subsequent development was due to the personal initiative of Riza Shah for political and economic reasons: to increase the control of the central Government and the internal security of the country, to distribute the agricultural products of the fertile north throughout the more arid

regions of the south, and ultimately to reduce Persia's dependence on commerce with Britain and Russia. For these purposes railway projects and road construction were planned to be complementary to each other.

In broad outline the railway system was planned to comprise the following lines. They were to be financed from Persian revenues and not by European investment.

(*a*) The Trans-Iranian line from Bandar Shahpur at the head of the Persian Gulf through Tehran to Bandar Shah at the south-eastern corner of the Caspian Sea.

(*b*) A north-western line from Tehran through Kazvin and Mianeh to Tabriz, there to connect with the Russian-gauge line to Julfa. A branch is projected to meet the Turkish system at Kotur (Qutr) near the frontier.

(*c*) A north-eastern line from Garmsar, to link Tehran with Meshed, and later with the Russian Trans-Caspian system, probably in the neighbourhood of Tejend, and possibly to be extended southwards to the Indian system at Zahidan.

(*d*) A south-eastern line from Qum, through Kashan and Yezd to Kirman, and possibly later through Bam to Zahidan.

Apart from these railways and the lines mentioned earlier, there is a short stretch 7 miles long connecting Resht with the Caspian at Pir-i-Bazar, and a light railway (gauge 2 ft. 6 in; length 36 miles), built and owned by the Anglo-Iranian Oil Company, running from Dar-i-Khazineh to Chashmeh-i-Ali, north-east of Ahwaz (p. 580).

(*a*) *The Trans-Iranian Railway*. This railway was begun in 1927 and opened for traffic in August 1938. It was constructed simultaneously in two sections, northern and southern. The northern section, which is the shorter, was entrusted to a German railway group, the southern to an American firm (Ulen). By the end of 1929 the northern section was completed from Bandar Shah to Shahi (79 miles) and the southern from Bandar Shahpur to Andimeshk (155 miles). The Persian Government then ended the existing contracts and entrusted the remaining construction to a Swedish-Danish syndicate (Konsortium-Kampsax), which sub-contracted the work to a number of British, French, Swiss, Italian, German, and Persian companies. Ninety-five per cent. of the workmen were Persians, mainly because of the prevalence of malaria in the north and the great heat in the south; but even so work in the south was only possible in the late evening, night, and early morning during the hottest months, while in

the north snow interrupted work altogether for short periods in winter. The whole line, 286·6 miles long in the north and 574·6 miles in the south, was completed in 11 years. A general description of the route is given on pp. 558–9, 567–8.

(*b*) *The North-western Line*. The second line to be undertaken was the north-western. The difficulties of construction were very much less in the first sections and the line was opened to Kazvin (90 miles) in March 1940, to Zenjan (total 196 miles) in October the same year, and to Mianeh (total 273 miles) by the end of 1942. This line is being constructed section by section by contract under the Ministry of Communications, and there is much more difficult country to be penetrated before Tabriz is reached. No work appears to have been started yet on the branch-line to link with the Turkish system, but it is proposed to take it from a point between Mianeh and Maragheh by Rizaieh (Urmia) and Shahpur (Dilman) to Kotur. The Turkish line will be dependent on a train-ferry across Lake Van. A general description of the route from Tehran to Tabriz is given on p. 572; that of the old Russian line from Tabriz to Julfa on pp. 574–5.

(*c*) *The North-eastern Line* is also being constructed by contract under the Ministry of Communications. The line was completed to Shahrud (195 miles) by the end of 1941 and, except for laying the rails, to Shahr-i-Staneh, 125 miles beyond Shahrud. Construction was then proceeding on the remaining portion to Meshed (pp. 576–9).

(*d*) *The South-eastern Line* will take off from Qum, earthworks have been completed to within 40 miles of Yezd, a survey has been made as far as Kirman, and a preliminary reconnaissance to Zahidan, but no track has yet been laid. Certainly at present there would be insufficient peace-time traffic to warrant an extension to Zahidan, but it is possible that such a through route might stimulate trade between India and Persia and it has been suggested that it would tap certain prospective mining areas. At present south-eastern Persia is best connected with Tehran by the eastern highway through Birjand (Routes [4], [5]).

Progress since 1940

The crisis in Middle Eastern affairs caused by the fall of France in 1940, the fighting in Syria and Iraq and the German attack on Russia in 1941, and the infiltration of German agents into Persia, all combined to necessitate intervention in Persian administration by both Russia and Great Britain. The single line of railway from the Persian Gulf to the Caspian became of immediate importance as a supply route to Russia. By the end of 1941 a British Transportation Direc-



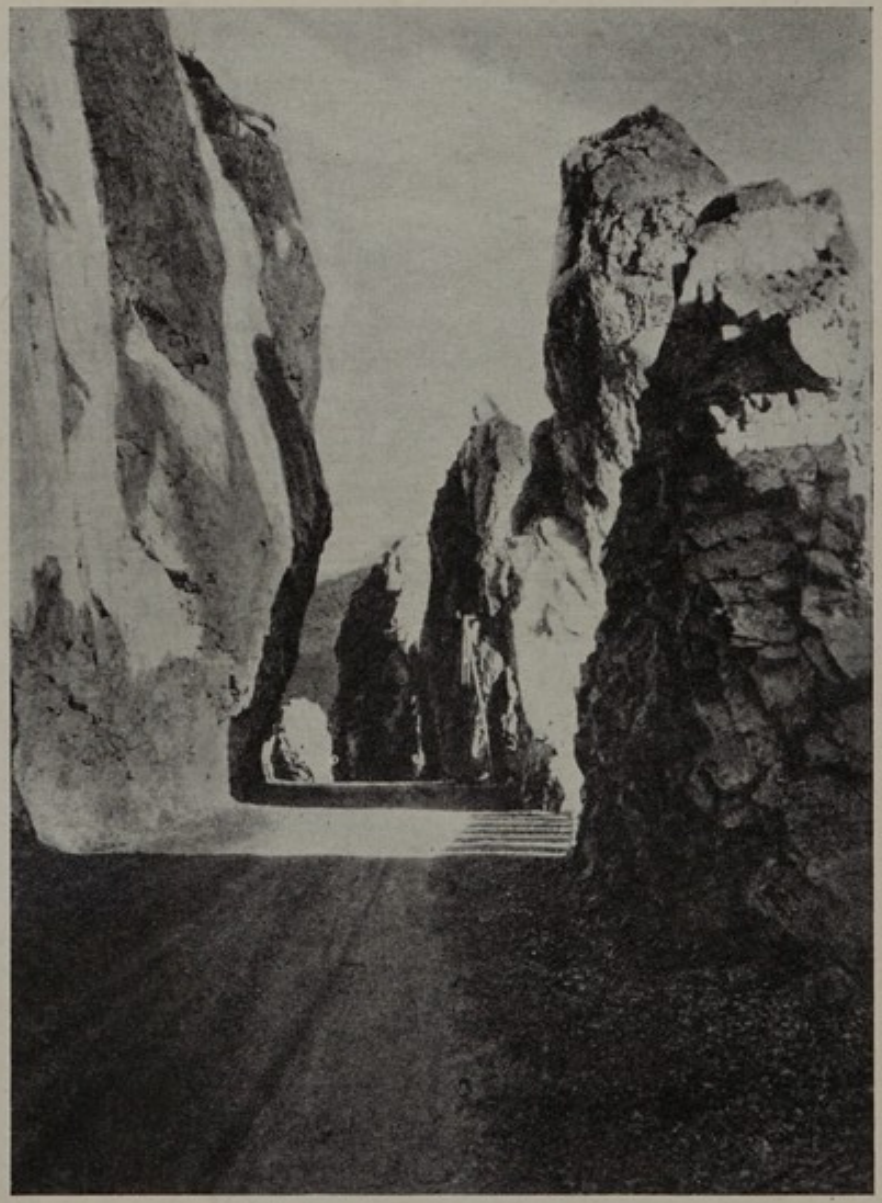
315. *Desert road near Samnan*



316. *Road through the Mazanderan forest in the Caspian coastlands*



317. *The Chalus road in the Karaj valley*



318. *The Chalus road in the Elburz*

torate had been set up at Tehran to manage and improve the southern section of the Trans-Iranian Railway from Bandar Shahpur to Tehran, while the Russians undertook responsibility for the northern lines from Tehran to Bandar Shah, Mianeh, and Shahrud, as well as that from Tabriz to Julfa.

Details of construction since that date are not available for publication. With the exception of the two new termini at ports in the south —at Khurramshahr at the junction of the Karun and Shatt al Arab, and at Tanuma opposite Basra in Iraq—which were connected by British military engineers by railway to the southern section at Ahwaz, it is believed that no permanent way has been laid on new routes since the middle of 1942. But greatly increased facilities on existing lines, particularly at stations, have been added in order to improve capacity and efficiency, so that the details given in the present account should be taken as understatements.

The British Transportation Service in Persia comprised three Royal Engineer operating-companies, one railway construction company, one railway transportation stores company, one railway workshop company, and one mobile workshop, with a total strength of about 2,500 men. Besides building the lines from Ahwaz to Khurramshahr and Tanuma, the construction company built many sidings and spurs all over the British section and was responsible for line maintenance. The stores company was stationed at Ahwaz, and the workshop company at Tehran in charge of the central shops where all heavy repairs for both British and Russian sections were carried out. The workshop company was also responsible for erecting new locomotives, cranes, and machinery at Ahwaz. The mobile workshop unit carried out light repairs as required anywhere on the railway. An Indian engineer company, attached to the Directorate, erected at Ahwaz several thousands of wagons of all types received from America, and a small R.E. unit at the same place put together nearly 1,000 four-wheeled wagons sent out from Great Britain.

When they were taken over the Persian railways were only equipped and staffed for very light traffic, carried by not more than one freight-train a day. Though there were sufficient locomotives and stock for this work, a very large percentage was laid up for repair or was unsuitable for increased and continuous work on a difficult line with severe gradients and in country with such extremes of climate. In order to raise the immediate capacity of the Trans-Iranian line, it was decided to increase the carrying-power of each train rather than the number of trains. Banking was at first widely used, but was after-

wards replaced almost entirely by double-heading.[1] Only on the steepest gradients was banking retained and then in addition to double-heading. Meanwhile new locomotives were ordered from both the United Kingdom and from America. These unfortunately turned out to be far from suitable, particularly as regards brake-equipment, sanding and draw gear, and wheels. The causes of some of these troubles are inherent in the country and therefore deserve attention.

The intense heat, besides becoming almost unbearable for drivers in the southern plains and gorges, caused constant trouble with injectors and excessive wheel-slipping due to leakage of oil from wagon axle-boxes on to the track. 'Sanding' is therefore essential, and since the normal sanding-gear on the locomotives was insufficient, a brake-van had usually to be marshalled in front of the leading locomotive and manned as a 'sand-van'. The arid nature of the country and the great shortage of water throughout the route, except in spring and early summer, limited the number of trains to eight double-headed steam trains a day, in spite of the improvement of existing sources of supply and storage reservoirs and the boring of new wells. Finally it was decided to order 56 diesel-electric locomotives (1,000 h.p.), and to use both oil and steam traction.

Other troubles were caused by shortage of trained Persian staff, their easy-going habits, and language difficulties, which affected in particular both the loading and marshalling of trains, and the control of traffic. For the latter, cards of different colours (white, pink, yellow, orange) indicating cautions, speed-restrictions, or line-clear instructions were issued to British train-crews by Persian station-masters. Gradually the difficulties were overcome as the Persians became better trained and more reliable, and the capacity of the line was increased by the elimination of delays. This is shown by the increase of tonnages hauled during the year 1942 while the line was operated by the British.

1st quarter	88,000	net tons
2nd ,,	106,500	,,
3rd ,,	122,000	,,
4th ,,	143,000	,,
Total for 1942	459,500	,,

In the early part of 1943 the British Royal Engineers handed over the line to American troops, who arrived in great numbers at the same

[1] 'Banking' is the term used when an additional engine is attached to the rear of a train to push; 'double-heading' when it is added to the front.

time as the new diesel-electric locomotives, and soon after the putting into service of 96 new steam locomotives. By September 1943 the net daily tonnage averaged 5,400, and by July 1944 it had risen to 5,528 tons a day.

Organization and Personnel

Until the end of 1941 the principal railways were controlled by the Persian Government as Iran State Railways, an organization created by law in 1935, when the Tabriz–Julfa line was also taken over from the Russians. The Board of Management comprised a General Manager, Chief Engineer, Chief Accountant and one other member, and was supervised by the Ministry of Communications. The main administrative offices were in Tehran with sectional head-offices at Tehran, Ahwaz, and Tabriz.

Even in 1941 there was a shortage of trained Persian personnel. Twenty per cent. of the locomotive crews were European, mostly Swiss and Czech; all were underpaid and insufficiently trained, labour conditions were bad and working-hours long, and the standard of maintenance of locomotives and rolling-stock was extremely low. The result was that the number of derailments was high. The experience gained under British and American tutelage should lead to much greater efficiency and better management after the war.

Under British and Russian control the line from Bandar Shahpur to Bandar Shah was split up into 4 divisions, with headquarters at Sari, Tehran, Arak (Iraq, Sultanabad), and Ahwaz. The headquarters of the Julfa–Tabriz line which was under complete Soviet control was at Tabriz.

Locomotives and Rolling-stock

On the arrival of British railway administration in December 1941, the following locomotives were owned by the State Railways:

49 German 2–8–0's with double-bogie tenders.
16 German 2–10–0's " "
12 Swedish 2–8–2's " "
5 Beyer-Peacock 2–8–0's with double bogie tenders (photo. 319).
4 Beyer-Garratt 4–8–2+2–8–4 articulated engines (photo. 320).
20 or more shunting locomotives.

The 49 German 2–8–0's were made by Krupps (24), Henschel (16), and Esslingen (9); the 16 German 2–10–0's by Henschel; the 12

Swedish by Nydqrist and Holm; the shunting and other old engines were of various origins and included some purchased second-hand from Austrian Federal Railways. All the German and Swedish locomotives were out of commission when the British took over, while the Beyer-Garratts required new fire-boxes, and the Beyer-Peacocks 2–8–0's required complete overhaul.

When the Americans assumed charge in 1943 the following additional locomotives had already arrived from abroad:

39 Coal-burning British 'W.D.' 2–8–0's.
104 Oil-burning ,, 2–8–0's.
96 Oil-burning U.S.A. 2–8–2's.
6 German 2–10–2's diverted from China.
3 Kitson 2–6–4 and 4–6–4 tank engines from the Kowloon–Canton railway.
22 Diesel shunting-engines from U.S.A.

Of these the 'W.D.' engines were hardly powerful enough for the exacting conditions in Persia, and conversion from coal to oil-burning carried out under war conditions in the United Kingdom was unsatisfactory. The American 2–8–2's were suitably designed, but metals used were of poor quality so that maintenance costs may be expected to be high. All this stock will have been severely strained by heavy pressure of traffic during 1943 and 1944, and no estimate can be made of what will remain serviceable after the war. The experience gained, however, if properly analysed should lead to the elimination of unsuitable types and to greater efficiency than in pre-war days.

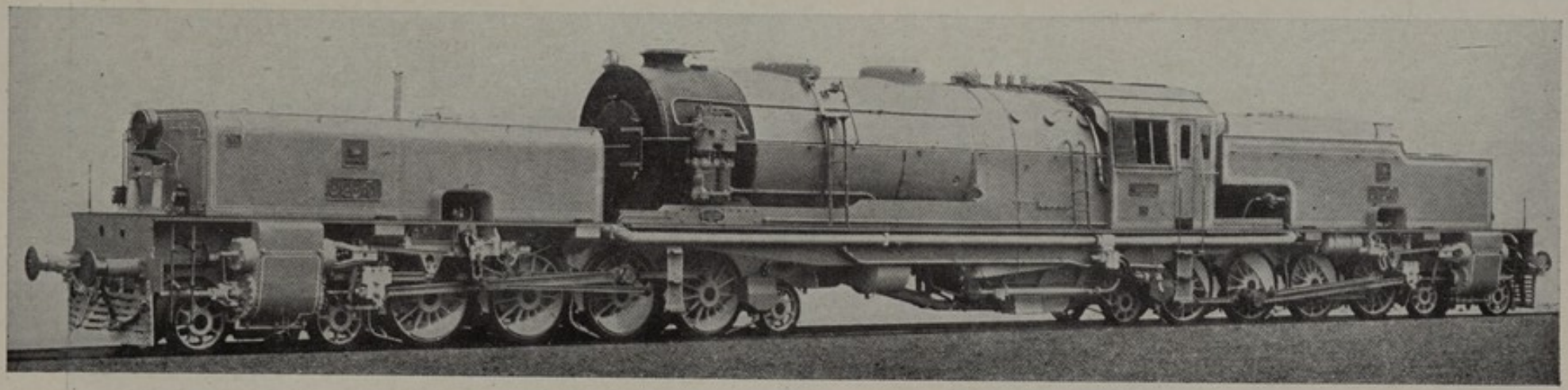
As regards rolling-stock, so many goods wagons have been added during the war that there is likely to be more than enough for all purposes for many years to come. Five snow-ploughs (3 Swiss, 1 rotary Nohab, 1 small Nohab) were maintained for winter use, and these, if properly cared for, should be sufficient for existing lines.

Workshops

The central workshops at Tehran are well laid out and fitted with modern equipment. Under the British the programme was to overhaul 65 locomotives a year, and doubtless this has been exceeded under the Americans. A considerable amount of lighter repair work used to be done also at Ahwaz, where the workshops were equipped with German machine tools, but during the war most of the facilities there were used for erecting engines and rolling-stock received from abroad. Workshops probably are to be found at Tabriz.



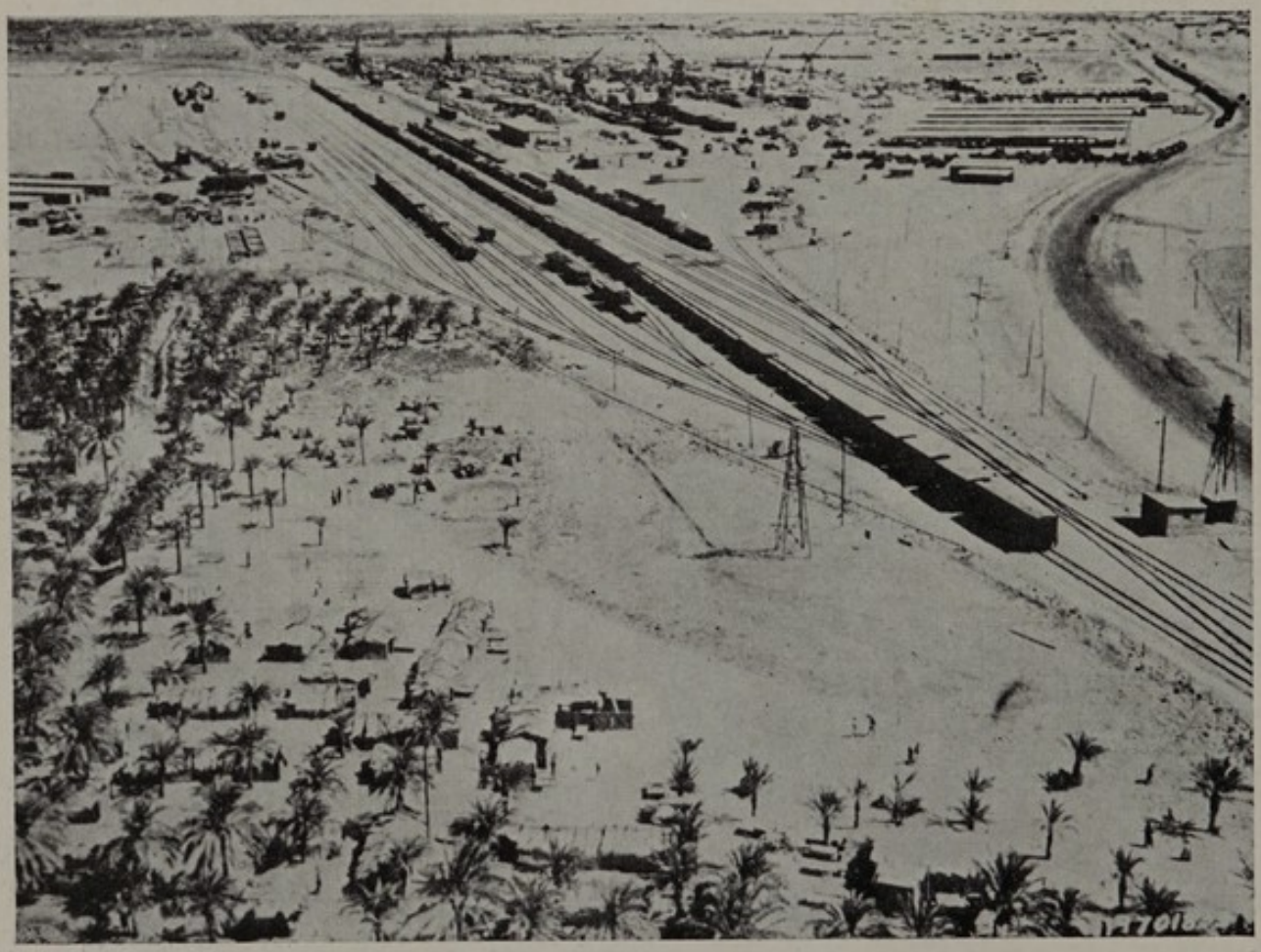
319. *Beyer-Peacock 2–8–0 at Balarud station, 24 miles north of Andimeshk*



320. *Beyer-Garratt 4–8–2+2–8–4 locomotive, designed to haul 400 gross tons up the 1 in 36 grade between the Caspian Sea and Tehran*



321. *Bandar Shahpur–Tehran railway. Steel bridge, 1,165 yards long, over the Karun river at Ahwaz*



322. *Khurramshahr station yards*

Fuel

Both oil and coal are used on Persian railways. Oil is supplied from the Persian oilfields and stored in reservoirs at various towns along the lines. The principal are at Bandar Shahpur, Ahwaz, Andimeshk, Durud, Arak, Qum, Tehran, Bun-i-Kuh, Pul-i-Safid, and Bandar Shah; others are being established on the newer lines. Coal is produced locally, and since the arrival of W.D. locomotives has also been imported; adequate stacks are maintained at the chief stations.

Water-supply

Water-supply is the bugbear of Persian railways. It is neither very good nor utterly bad in quality, but capacity of working is more dependent on water than on almost any other factor. Water-softening plants were at first installed in most of the watering stations, but when the British took over control the plants had been badly maintained and there was a shortage of chemicals. After considerable experience the British management concluded that south of Arak inclusive it was unnecessary to soften the water, but that in the north waters were harder and most required softening. At Kazvin the water is particularly hard and softening is essential. When the British handed over to the Americans, all softening-plants south of Andimeshk had been shut down, 6 were in operation between Andimeshk and Tehran, and 5 between Tehran and Bandar Shah; others were to be installed on the line to Tabriz. Chemicals were then imported from the United Kingdom. Another difficulty is that in many parts of the country the water, particularly in summer, is saline. At one time, during the summer of 1942, the water-supply on one section of the line failed completely, and water-trains of travelling tanks had to run, sometimes for great distances, to make operation possible. Additional wells were sunk, tank capacities increased, and more tank-wagons erected and put into use.

In general, water is stored in water-towers built within the station areas or on the hill-side above the station. It is drawn from wells or streams, generally by various types of centrifugal pump driven by petrol motor, except at Pul-i-Safid, Bun-i-Kuh, Tehran, Qum, and Arak where the pumps are driven electrically. The water-softening plants are of German manufacture and work on the lime-soda principle, with a nominal capacity of 2,700 gallons per hour.

Train Services

During 1942 supplies for Russia had priority, and the target of 8

daily freight trains averaging 1,000 tons gross load was set. This was not quite reached, because of shortage of locomotives and lack of water and of repair facilities, but the foundations were laid by the British for this target to be greatly exceeded during 1943. Broadly, the British practice was to run trains of 850 gross tons drawn by 2–8–0 W.D. locomotives south of Andimeshk, to double-head trains of 700 gross tons between Andimeshk and Tehran, and to give up double-heading in the northern section as more locomotives became available, and to limit the trains in this section to 350 gross tons.

Four passenger trains a week were normally run each way between Ahwaz and Tehran, and three between Bandar Shah and Tehran, between Tehran and Mianeh, and between Tehran and Shahrud. There were also a few local mixed trains fitted in as required.

Station Names

The Roman spellings of station names are more than usually chaotic. This is because the lines are so new, and because they were laid out by the engineers of six European countries, all having different systems of transliteration or no system at all. Soon afterwards, as a result of Persian nationalism, romanized spellings, even as alternatives, were abolished. When the British and Russians took over, each country adopted its own variations, and some changes seem to have been again made by the Americans. In this account an attempt has been made to co-ordinate the names with those in the rest of the book, giving in brackets other variants where they differ materially. Some on the newest lines, especially those under construction, have been impossible to locate on existing maps.

Description of Railways

The description which follows is divided into three parts: (*a*) details of the line as a whole, distances, branch-lines, junctions, permanent way, &c.; (*b*) general description of the route; (*c*) details of the stations and their facilities and of the chief engineering works. Some of these are from construction plans and have not been checked since completion, and may therefore be incorrect. Heights of stations are almost invariably taken from the construction profile, and have not been co-ordinated with the topographical maps of the country.

As already mentioned, great changes have occurred since 1941, but the need for increased capacities reached in 1943 and 1944 has now passed, and many of the additional passing-loops, sidings, marshalling

yards, &c., will no longer be required. Details of train-schedules or capacities, and lengths of siding accommodation have not therefore been given.

The following abbreviations are used in the last column:

W.	Watering facilities are shown in brackets after the letter W.
(T.5,000 gls.)	Water tank, capacity 5,000 gallons.
(Cr.)	Water crane.
PL.(1,640 ft.)	Passing-loop, length 1,640 feet.
SP., EP.	Side-loading platform, end-loading platform.
ES. (6)	Engine-shed for 6 locomotives.
RpS.	Repair sheds.
PS.	Power station.
Tbl.(72 ft.)	Turntable, diameter 72 feet.
Tr.	Turning triangle.
Sdgs.	Sidings.[1]
MY.	Marshalling-yards.
RC.	Reinforced concrete.
PW.	Permanent way.

1. BANDAR SHAHPUR–TEHRAN

(*completed 1938*)

Route

Bandar Shahpur–Ahwaz	69·6 miles	112·0 kilometres
Ahwaz–Andimeshk	85·8 ,,	138·0 ,,
Andimeshk–Arak (Sultanabad)	220·4 ,,	354·6 ,,
Arak–Qum	86·9 ,,	139·8 ,,
Qum–Tehran	111·9 ,,	180·4 ,,
	574·6	924·8

Branch-lines

1A. Khurramshahr Port–Ahwaz	76·0 miles	122·2 kilometres
1B. Tanuma (Iraq)–Ahwaz	77·0 ,,	123·9 ,,

Permanent Way and Stations

Gauge, 4 ft. 8½ in. Single track. Steam and diesel traction. Flat-bottom rails, 67 and 78 lb. per yd., screwed to hard wooden sleepers (generally from Mazanderan), or bolted to steel sleepers.

Maximum axle-load, 18·5 metric tons; minimum radius of curves, 190 metres between Andimeshk and Durud, elsewhere 220 metres; maximum gradient, 1 in 66.

[1] Some of these are little more than turn-outs from the main line, the intention being to build the sidings later.

Maximum distance between passing-loops, 25 kilometres.

Marshalling yards at Bandar Shahpur, Ahwaz, Andimeshk, Durud, Arak, Qum, and Tehran.

Engine-sheds: Bandar Shahpur, Ahwaz, Andimeshk, Durud, Arak, Qum, and Tehran.

GENERAL DESCRIPTION

This line and that from Bandar Shah to Tehran (Rly. 2) together form the Trans-Iranian Railway. Their construction was one of the most difficult feats of railway engineering in the world. The southern section from the Persian Gulf to Tehran is best described in five parts.

(*a*) *South of Ahwaz.* There are now three southern termini, Bandar Shahpur, Khurramshahr, and Tanuma, the last being in Iraqi territory opposite Basra. There are no gradients on any of the lines to Ahwaz, but all have to be raised on embankments to be clear of winter floods. The line from Bandar Shahpur crosses the tidal mud-flats at first and then ground liable to flood from the Jarrahi distributaries; the others cross drier ground; but all have numerous culverts. The line from Tanuma (Rly. 1B) joins that from Khurramshahr at Hosseinieh (Rly. 1A), and all unite at Ahwaz junction west of the Karun, after the line from Bandar Shahpur has crossed that river by a steel bridge nearly 1,200 yards long. The railway station at Ahwaz is also connected with the old town on the left bank by a welded steel suspension road-bridge.

(*b*) *Ahwaz–Andimeshk.* The line passes northwards between the Diz and Karkheh rivers at first over desert sparsely covered with bushes, then over better cultivated ground to Shush. Between here and Andimeshk the ground is more broken. Dizful, 5½ miles distant, is connected by motor-road with Andimeshk.

(*c*) *Andimeshk–Arak.* This is the most difficult section of the whole line. It first follows the Bala Rud, but soon crosses to the Diz valley, which it reaches at Shahbazan. Almost at once it enters the difficult gorge, and from here onwards to Durud (km. 458), a distance of 129 miles from Andimeshk, the line climbs over 4,000 feet and passes through 125 tunnels totalling over 35 miles. More than one-quarter of this stretch is therefore in tunnels; from Shahbazan to Durud the proportion is even higher—nearly 30 miles of tunnel in 83½ miles of track. Moreover, the line where not in tunnels frequently has to be carried over ravines and gorges by large bridges or viaducts, and crosses the Diz or Sehzar river nine times. Perhaps the most interesting feat of engineering in this section is where the line tunnels for a mile, making a double spiral loop 2½ miles long, during which it rises 167 feet. At one point the line goes nearly 2 miles to cover 328 yards in a direct line. Beyond Durud the landscapes are more open, but the line passes through short defiles beyond Kuh-i-Darband (km. 485) and before Shahzand (km. 571).

(*d*) *Arak (Iraq)–Qum.* At Arak (Iraq) the line enters the northern out-

lying basin of the Isfahan–Sirjan group of basins and skirts the southern edge of its kavir (fig. 16). Thereafter there are no serious engineering difficulties, and many of the bridges, though long, are made up of many short spans. The chief difficulty in this section is one caused by the shortage and bad quality of the water.

(*e*) *Qum–Tehran.* From Qum the line skirts the western side of the Qum lakes over open ground, crossing a number of stream beds draining into the Masileh kavir, the largest bridge being over the Rud-i-Shur.

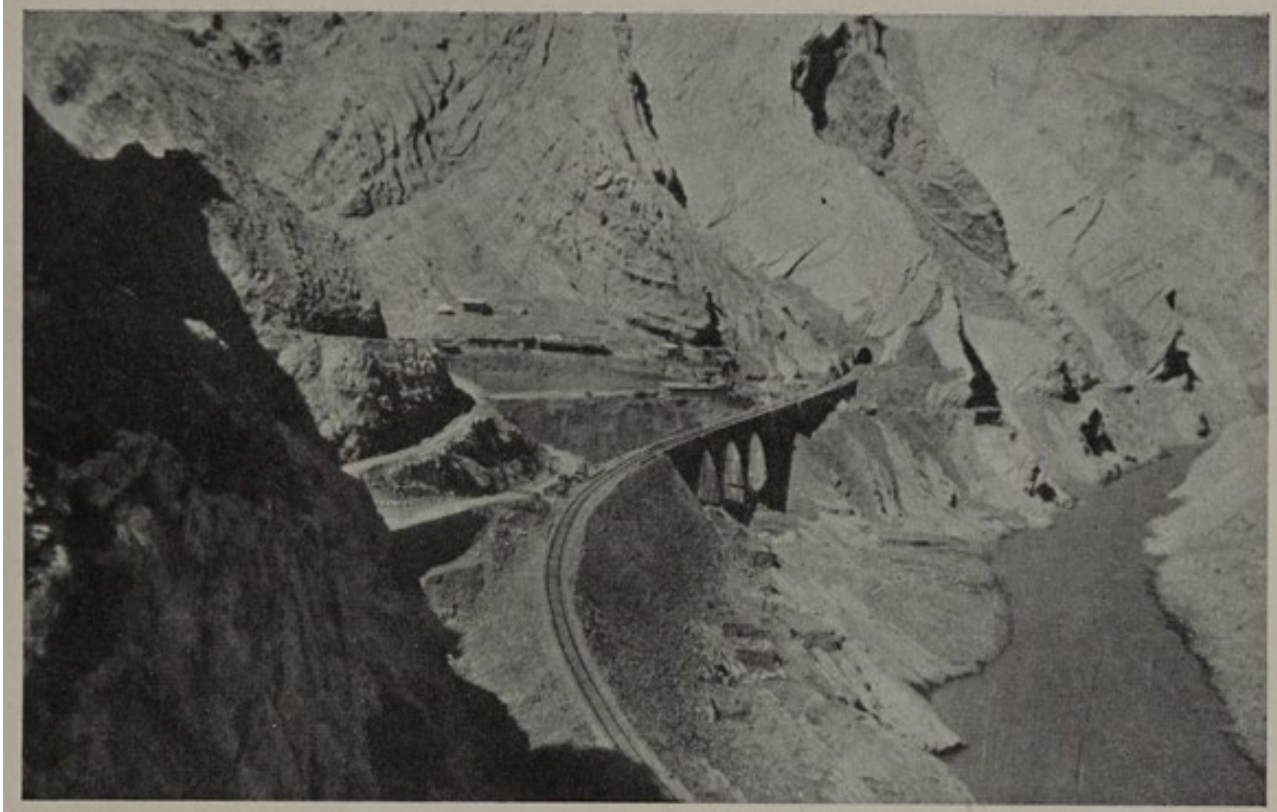
DETAILED DESCRIPTION

Km. from Bandar Shahpur	*Stations*	*Remarks*
0·0	BANDAR SHAHPUR	Alt. 13·8 ft. above MSL. of Persian Gulf. W. (T., Cr., softening-plant); ES.(6); RpS.; Tbl.(115 ft.); coal; oil; MY. sdgs.; PW. post. Direct access to Old and New Jetties (p. 501). Line goes N. over tidal flats partly covered at high water. 6 bridges.[1]
12·5	SAR BANDAR HALT	Alt. 14·2 ft. PL.(1,640 ft.). 3 bridges.
28·5	MARGHZAR HALT	Alt. 27·3 ft. PL.(1,640 ft.). Line crosses land liable to flood from overflow of irrigation ditches drawing water from Jarrahi (Marun) river. 9 bridges.
39·6	GARGAR (GORGOR HALT)	Alt. 34·8 ft. PL.(1,640 ft.); W. (T.40,000 gls., Cr.).
41·0	..	Bridge (3 × 82·5 ft. + 6 × 17 ft.) over Jarrahi river. Land on either side of line liable to flood in winter. 8 other bridges.
59·8	MANSUREH (MANSOURI HALT)	Alt. 28·1 ft. PL.(1,640 ft.).
76·8	KHUSROVIEH (KHOSROVI HALT)	Alt. 32·3 ft. PL.(1,640 ft.). 6 bridges.
95·8	MIYAN DASHT (MIANE DACHT HALT)	Alt. 39·7 ft. PL.(1,640 ft.).
99·8	..	Line crosses pipe-line of Anglo-Iranian Oil Company. 4 bridges.
107·0	HALT	Alt. 60·7 ft. PL.(1,640 ft.).
108·2	..	Line crosses pipe-line of A.I.O.C. Bridge (4 × 16 ft.).
109·0	..	Bridge (2 × 82·5 ft. + 2 × 10 ft.).
110·0	..	Steel bridge (51 × 68·5 ft.) over Karun (photo. 321). Line turns south into Ahwaz station. Direct

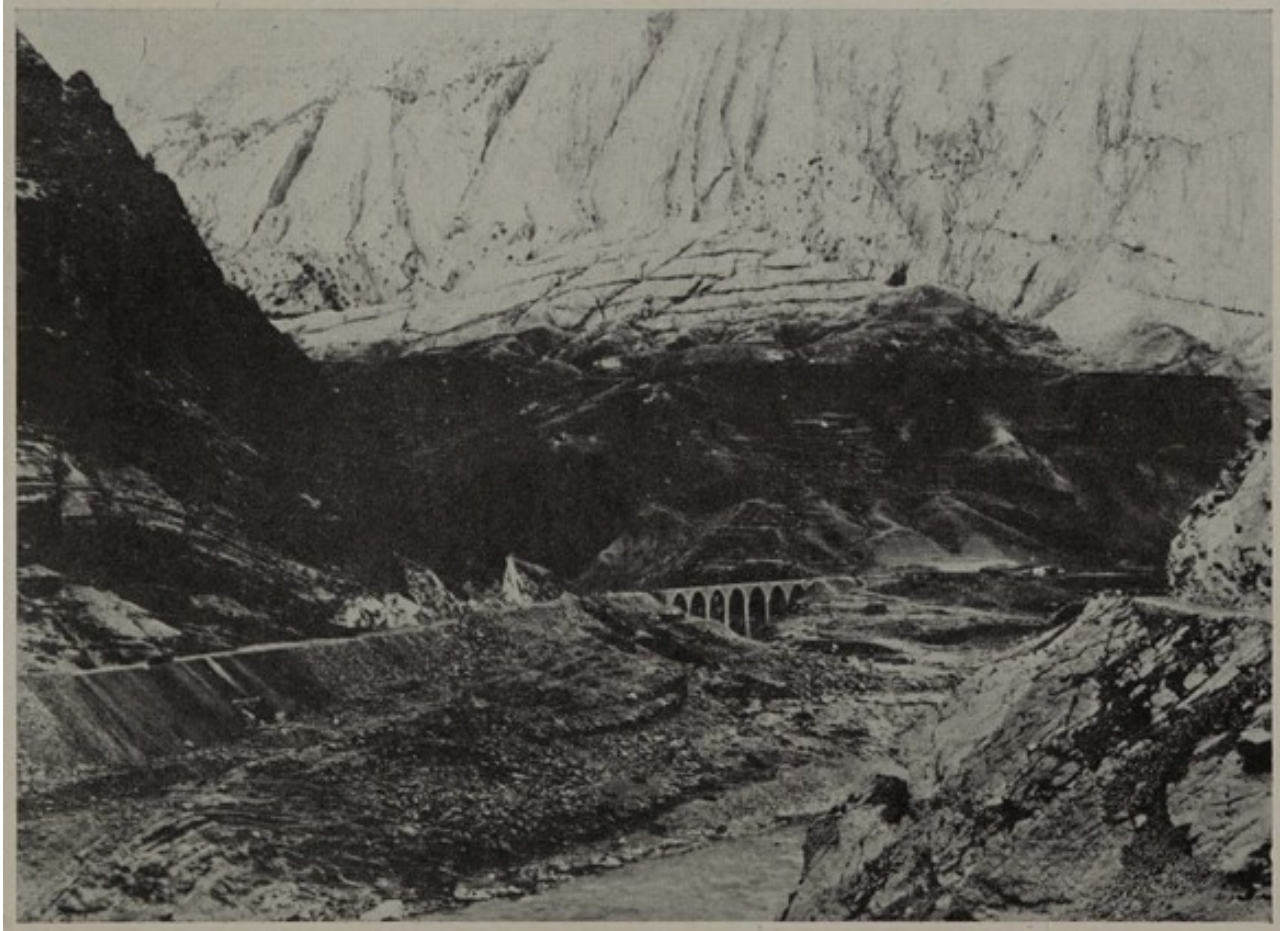
[1] Only bridges 30 feet long or more are included throughout these descriptions.

Km. from Bandar Shahpur	*Stations*	*Remarks*
		line omits this station by turning north after crossing the Karun bridge.
112·0	AHWAZ	Alt. 63·7 ft. PL.(several); W. (Ts.,40,000 gls., 22,000 gls., from river reservoirs 220,000 gls.; Crs.); ES.(18); RpS.; ER.; Tr.; Tbl.(115 ft.); PS.; weighbridge; coal; oil; PW. post. Line to barge quays (photos. 280, 281). Town description (pp. 514–16). Junction of line from Tanuma (Basra) and Khurramshahr (pp. 565, 566). 2 bridges.
125·7	NIZAMIEH[1] HALT (KHAVAR)	Alt. 66·3 ft. PL.(1,640 ft.). 10 bridges.
141·3	KHAVAR HALT[1] (QALEH SHAHR)	Alt. 81·9 ft. PL.(1,640 ft.). Line goes north between Diz and Karkheh. 4 bridges.
150·1	BAMDEH (BAMDEJE HALT)	Alt. *c.* 86 ft. PL.(1,640 ft.); W. (T.26,500 gls., Cr., well).
155·3	DIZ (DEZ HALT)	Alt. 90·6 ft. PL.(1,640 ft.). 3 bridges.
173·2	AHU DASHT (AHWAZ DACHTE HALT)	Alt. 110 ft. PL.(1,640 ft.).
185·0	..	Bridge (28 × 17 ft.).
188·3	MIYANAB (MIANE-AB HALT)	Alt. 131 ft. PL.(1,640 ft.). 3 bridges.
204·1	HAFT TEPE (HAFT TAPPEH)	Alt. 258 ft. PL.(1,640 ft.).
207·0	..	Bridge (3 × 14 ft.).
219·4	SHUSH (CHOUCHE HALT)	Alt. 285 ft. PL.(1,640 ft.); W. (T.26,500 gls., Cr., well).
230·0	..	Bridge (2 × 66 ft.).
234·4	SABZAB	Alt. 319 ft. PL.(1,640 ft.). 4 bridges.
247·0	..	Bridge (26 × 40 ft.) over Bala Rud.
250·0	ANDIMESHK (ANDIMECHK, formerly SALEHABAD)	Alt. 480 ft. PL.(1,640 ft.); W. (T.55,000 gls., Cr., softening-plant); ES.(7); RpS.; PS.; weighbridge; Tbl.(115 ft.); ER., coal; oil; MY.; sdgs.; PW. post. Station for Dizful which is 5½ miles distant. Line keeps along left bank of Bala Rud.
262·8	DUKUH (DO KUH)	Alt. 733 ft. PL.(1,560 ft.); W. (tank wagon). 4 bridges (all 2 × 17 ft.) at km. 265, 267, 268, 271, and a tunnel 240 yards long at km. 279·3 appear in the project drawings; but it is uncertain whether they were constructed, or whether the line takes a different route.
282·0	..	Tunnel (236 yds.).

[1] According to one report the halt at km. 125·7 is known as Khavar, that at km. 141·3 as Qaleh Shahr.



323. *Bandar Shahpur–Tehran railway. The Diz gorge between Tang-i-Panj and Tang-i-Haft*



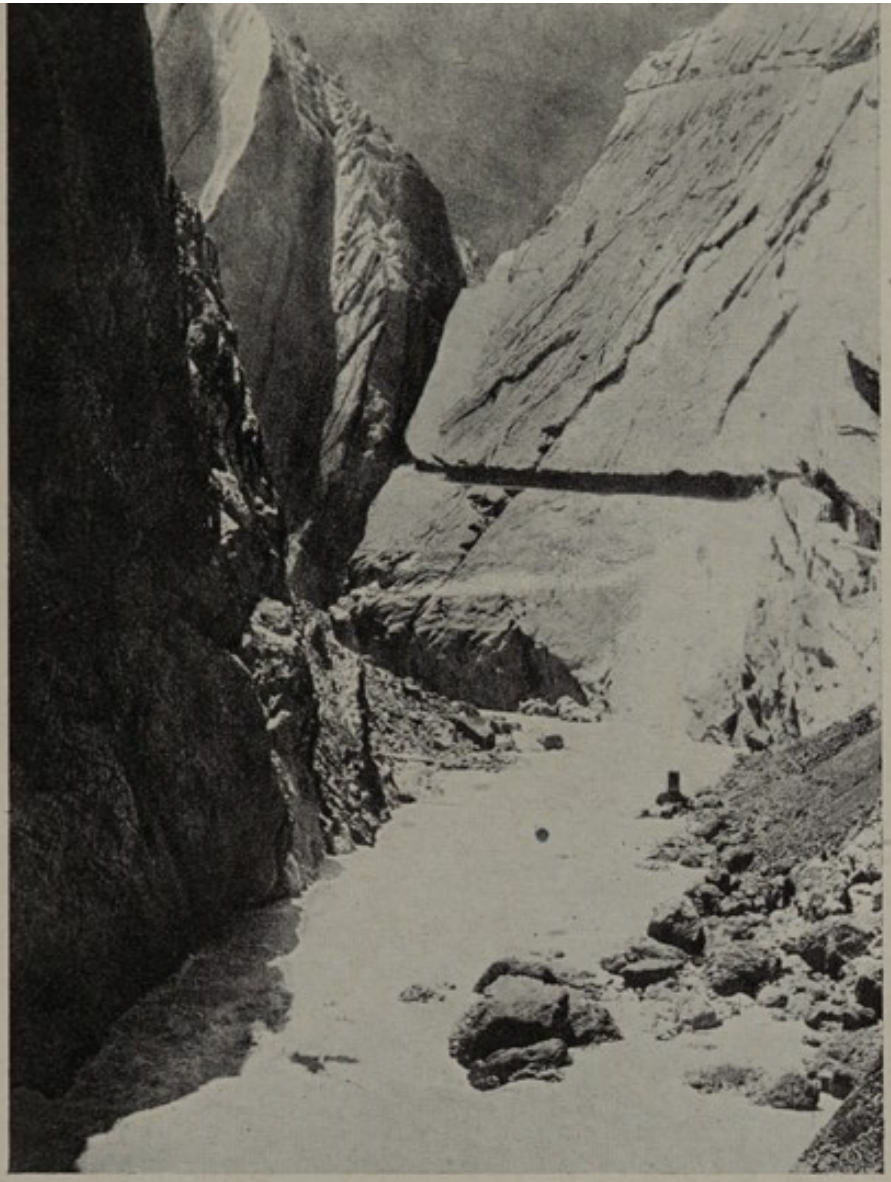
324. *Bandar Shahpur–Tehran railway. Ab-i-Tadi bridge at km. 350·5*

Km. from Bandar Shahpur	*Stations*	*Remarks*
287·9	BALARUD	Alt. 1,426 ft. PL.(1,560 ft.); W. (T.55,000 gls., 2 Cr., well, softening-plant); PW. post.
295·0	..	Tunnel (152 yds.).
307·0	..	Bridge (82-ft. stone arch, height 36 ft.).
307·5	MAZU	Alt. 1,428 ft. PL.(1,560 ft.); W. (T. 26,500 gls., 2 Cr.); coal; PW. post.
309·0	..	Bridge (82-ft. stone arch, height 36 ft.).
313·0	..	Dom-Dom bridge (stone arches, 33 ft.+5×71 ft.+33 ft.; height 33 ft.).
		6 tunnels totalling 884 yards.
323·0	..	Darreh Shahbazan bridge (stone arches, 36 ft. +5×71 ft.+2×36 ft.; height 197 ft.).
325·5	SHAHBAZAN	Alt. 1,487 ft. PL.(1,390 ft.); W. (tank wagon); 3 sdgs.(500 ft.); PW. post.
		Line enters the Diz gorge, passing through tunnels or over bridges most of the way.
324–328	..	5 tunnels, totalling 4,538 yards.
330·0	..	Bridge (8×33 ft.; height 39 ft.).
330·1	..	Tunnel 2,196 yards.
332·0	..	Bridge (4×33 ft.+2×98 ft.+33 ft.; height 102 ft.) over Tuba ravine.
334·0	..	Tunnel, 78 yards, with open gallery 42 yards.
335·0	..	Bridge (7×20 ft.; height 62 ft.).
335·2	..	2 tunnels (78 yds., 1,670 yds.).
337·2	TAL-I-ZANGU (TALEH-ZANG)	Alt. 1,566 ft. PL.(1,580 ft.); W. (T.26,500 gls., 2 Cr., well); coal; 3 sdgs.(2,340 ft); PW. post.
		Line climbs steadily through the Diz gorge, passing through 13 tunnels totalling 10,000 yards, and over many bridges of which the following are the most important; all are of masonry.
338·0	..	Ab-i-Diz I bridge (4×33 ft.+197 ft.+5×33 ft.; height 105 ft.).
338·4	..	Ab-i-Souri bridge (2×16 ft.+115 ft.+2×16 ft.; height 89 ft.).
350·5	..	Ab-i-Tadi bridge (7×39 ft.; height 69 ft.) (photo. 324).
352·4	..	Ab-i-Diz II bridge (2×23 ft.+2×106 ft.+ 2×23 ft.; height 98 ft.).
354·8	TANG-I-PANJ (TANG-PANDJ)	Alt. 1,849 ft. PL.(1,560 ft.); W. (spring); 1 sdg.(370 ft.); PW. post.
		Line follows up the Ab-i-Sehzar branch of the Ab-i-Diz through country no less difficult than before (photos. 323, 325). 15 tunnels total 10,270 yards. 12 massive stone-arch bridges include
355·8	..	Ab-i-Sehzar I bridge (5×33 ft.+217 ft.+2× 33 ft.; height 82 ft.).
365·0	..	Ab-i-Sehzar II bridge (2×33 ft.+131 ft.+ 4×33 ft.; height 121 ft.).

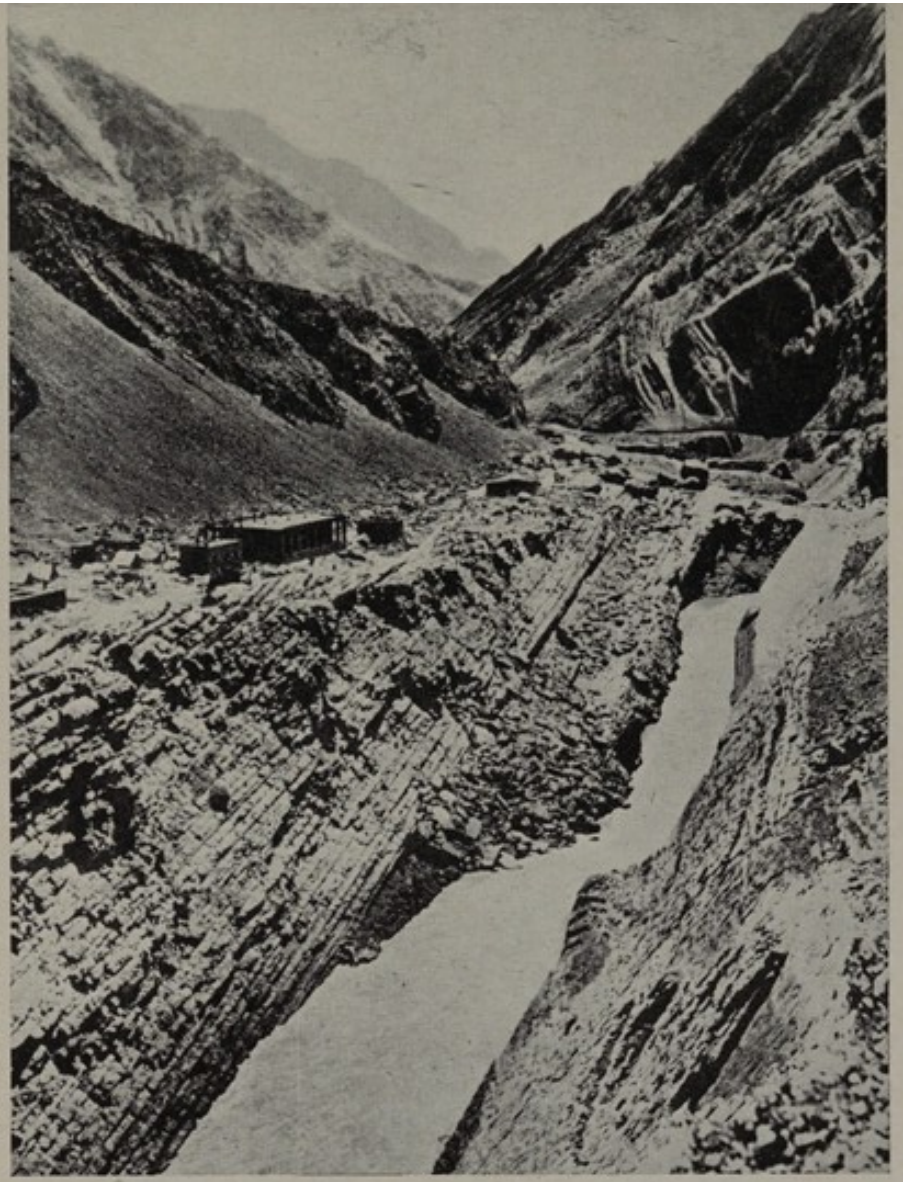
Km. from Bandar Shahpur	*Stations*	*Remarks*
368·8	..	Ab-i-Sehzar III bridge (5×33 ft.+69 ft.+131 ft.+69 ft.+2×33 ft.; height 115 ft.).
370·3	TANG-I-HAFT	Alt. 2,152 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 Cr., well); 1 sdg.(370 ft.); PW. post (photo. 326).
		Alinement continues as before through Ab-i-Sehzar defile. 13 tunnels total 5,780 yards, some being connected by open galleries. The 8 major bridges include
374·8	..	Bridge (3×33 ft.+2×70 ft.+2×33 ft.; height 115 ft.).
382·5	..	Ab-i-Sehzar IV bridge (2×33 ft.+2×99 ft.+3×33 ft.; height 85 ft.) (photo. 328).
		Ab-i-Sehzar V bridge (39 ft.+157 ft.+2×26 ft.; height 108 ft.).
383·8	..	Ab-i-Keshwar bridge (20 ft.+131 ft.+2×20 ft.; height 102 ft.).
383·8	KESHWAR	Alt. 2,455 ft. PL.(1,560 ft.); W. (T.13,500 gls., 2 Cr., spring); 1 sdg.(210 ft.); PW. post.
		14 tunnels total 4,400 yards. The largest of 4 major bridges is
387·8	..	Bridge (39 ft.+66 ft.+39 ft.; height 66 ft.).
398·9	CHAM SANGAR	Alt. 2,792 ft. PL.(1,560 ft.); W. (T.13,500 gls., 2 Cr., springs); 1 sdg.(370 ft.); PW. post.
		19 tunnels total 4,088 yards. The largest of 2 major bridges is
402·8	..	Bridge (2×39 ft.+3×82 ft.+2×39 ft.; height 82 ft.).
416·8	SAFID DASHT	Alt. 3,467 ft. PL.(1,560 ft.); W. (spring); 1 sdg.(320 ft.); PW. post.
		9 tunnels total 5,483 yards. The largest of 4 major bridges is
c. 430·0	..	Bridge (8×39 ft.+36 ft.; height 85 ft.).
430·2	BISHEH DARAZ	Alt. 4,004 ft. PL.(1,560 ft.); W. (T.13,500 gls., 2 Cr., spring); 1 sdg.(370 ft.); PW. post.
		Defile again becomes extremely difficult.
		16 tunnels total 10,234 yards. 5 major bridges include
441·0	..	Ab-i-Sehzar VI bridge (3×30 ft.+80 ft.+3×30 ft.; height 39 ft.).
443·7	..	Ab-i-Sehzar VII bridge (131 ft.+39 ft.; height 39 ft.).
446·8	GHARUN	Alt. 4,457 ft. PL.(1,570 ft.); W. (spring); 1 sdg.(250 ft.); PW. post.
		8 tunnels total 1,823 yards. There is only 1 bridge over 30 ft. (reinforced concrete).
458·0	DURUD (DORUD)	Alt. 4,770 ft. PL.(2,100 ft.); W. (T.40,000 gls., 3 Cr., spring); ES.(6); small RpS.; PS.; ER.; coal; oil; weighbridge; 22 MY. sdgs.(11,150 ft.); PW. post.

Km. from Bandar Shahpur	*Stations*	*Remarks*
		Station is at edge of Durud plain and at mouth of gorge between Kuh-i-Khirsin and Kuh-i-Ushtarinan.
		Line crosses open plain, mostly embanked; there are no tunnels and only 1 major bridge.
459·2	..	Bridge (5 × 85 ft.), steel girders, concrete piers.
470·2	RUDAK	Alt. 5,251 ft. PL.(1,560 ft.); W. (well); 3 sdgs. (680 ft.); PW. post.
		Line passes over open country, with only one bridge over 30 ft. (3 × 20 ft.).
485·0	KUH-I-DARBAND	Alt. 5,710 ft. PL.(1,560 ft.); W. (T.40,000 gls., 2 Cr., 2 wells); 3 sdgs.(680 ft.); PW. post.
		Line passes through a short defile with 5 tunnels totalling 1,181 yards.
506·1	AZNA	Alt. 6,106 ft. PL.(2,280 ft.); W. (Ts.33,000 gls., 9,000 gls., 3 Cr., softening-plant, 2 wells); 17 sdgs.(14,550 ft.); PW. post.
		No major engineering works.
523·1	MAMUN	Alt. 6,322 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 wells); 3 sdgs.(680 ft.); PW. post.
		4 RC. bridges over 30 ft.; tunnel 168 yards.
536·3	SAFID CHASHMEH (FOWZIEH)	Alt. 6,729 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 Cr., well); coal; 3 sdgs.(670 ft.); PW. post.
		3 tunnels totalling 471 yards.
549·0	..	Line reaches highest point of its course, at 7,253 ft., on the Diz watershed.
552·0	NURABAD	Alt. 7,120 ft. PL.(1,560 ft.); W. (well); 3 sdgs. (700 ft.); PW. post.
		RC. bridge (2 × 20 ft.).
		Line descends through defile.
571·3	SHAHZAND (CHAZAND)	Alt. 6,217 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 Cr.; 2 wells); 3 sdgs.(680 ft.); PW. post.
		RC. bridge (20 × 20 ft.).
587·6	SAMENGHAN	Alt. 6,421 ft. PL.(1,570 ft.); W. (well); PW. post.
		1 RC. bridge (2 × 20 ft.); 2 stone-arch bridges (7 × 26 ft.; 4 × 16 ft.).
604·6	ARAK (IRAQ, SULTANABAD)	Alt. 5,751 ft. PL.(2,080 ft.); W. (T. 53,000 gls., 3 Cr., spring, well, softening-plant); ES. (20); small RpS.; PS.; Tbl.(65 ft.); coal; oil; weighbridge; 41 MY. sdgs.(21,560 ft.); PW. post.
		Line crosses open sandy desert south of Tuzlu Kavir, a salt-lake which dries in summer.
		RC. bridge (3 × 16 ft.).
620·5	MUTABAD (MATABAD)	Alt. 5,473 ft. PL.(1,560 ft.); W. (well); PW. post.
639·2	MUSHKABAD (MACHKABAD)	Alt. 5,508 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 Cr., spring, 2 wells, softening-plant); 3 sdgs. (680 ft.); PW. post.
659·2	NAH-I-GIRD (NANGERD, NANE-GUERD)	Alt. 5,951 ft. PL.(1,560 ft.); W. (well); PW. post.

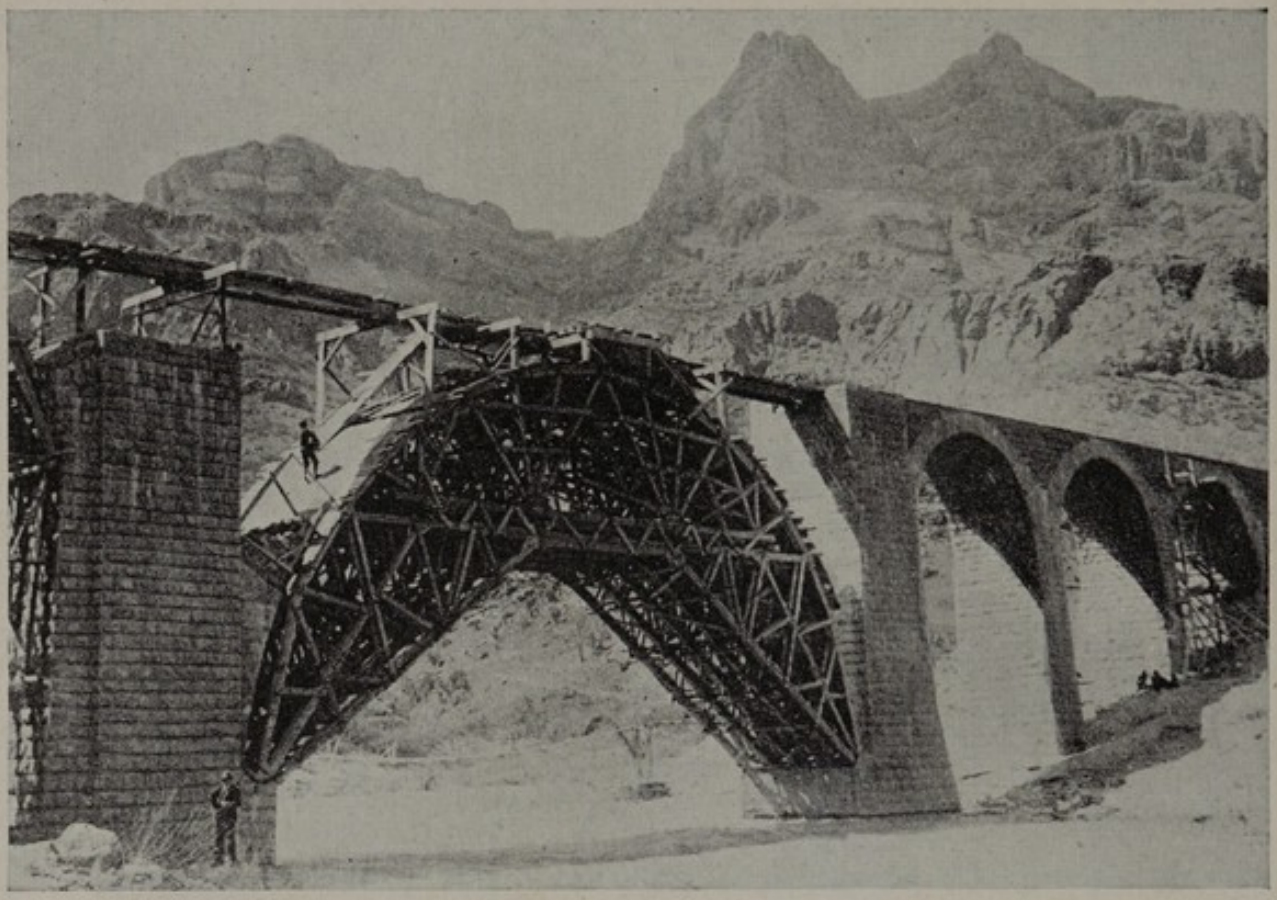
Km. from Bandar Shahpur	*Stations*	*Remarks*
		Line begins descent to Qum basin over desert country.
		Concrete-arch bridge (5 × 20 ft.).
677·1	RAHGIRD (RAHDJERD)	Alt. 5,556 ft. PL.(1,570 ft.); W. (2 wells); 3 sdgs.(680 ft.); PW. post.
		3 RC. bridges (2 × 20 ft.; 2 × 20 ft.; 3 × 20 ft.).
		3 stone-arch bridges (3 × 16 ft.; 3 × 16 ft.; 12 × 20 ft.).
690·4	SAVARIAN	Alt. 5,009 ft. PL.(1,560 ft.); W. (T.26,500 gls., 2 Cr., spring); coal; PW. post.
693·6	..	Concrete-arch bridge (10 × 16 ft.; height 26 ft.).
695·6	..	Concrete-arch bridge (9 × 16 ft.; height 30 ft.).
701·6	..	RC. bridge (3 × 20 ft.; height 13 ft.).
702·6	..	2 steel bridges (2 × 20 ft.; 6 × 20 ft.).
		Concrete-arch bridge (7 × 16 ft.; height 26 ft.).
704·5	BAGHAK	Alt. 4,420 ft. PL.(1,560 ft.); W. (T.40,000 gls., Cr., supplied from Savarian); PW. post.
		Country becomes rougher; bridges include a concrete-arch bridge (3 × 16 ft.) and 8 RC. bridges, the 2 largest being 15 × 26 ft. and 12 × 26 ft.
724·5	ZAGHEH	Alt. 3,597 ft. PL.(1,560 ft.); W. (tank wagon); PW. post.
		2 stone-arch bridges (6 × 20 ft.; 3 × 26 ft.); 1 RC. bridge (6 × 20 ft.).
744·4	QUM	Alt. 3,049 ft. PL.(2,080 ft.); W. (T.33,000 gls., 3 Cr. well, softening-plant); ES.(6); small RpS.; PS.; Tbl.(65 ft.); coal; oil; weigh-bridge; 21 MY. sdgs.(9,670 ft.); PW. post. Junction for new line under construction to Yezd (Rly. 6). Town description, p. 530.
		Line turns NNW., crossing tributaries of the Masileh kavir by steel bridges (9 × 20 ft.; 3 × 20 ft.; 5 × 20 ft.).
760·3	PELL	Alt. 3,030 ft. PL.(1,560 ft.); W. (tank wagon); PW. post.
		5 RC. bridges (all 2 × 20 ft.); 1 steel bridge (8 × 20 ft.); 1 concrete-arch bridge (4 × 66 ft.).
776·9	NAUDIZ (NOWDEGE)	Alt. 2,949 ft. PL.(1,560 ft.); W. (tank wagon); PW. post.
791·8	ANJILAVAND	Alt. 3,119 ft. PL.(1,560 ft.); W. (tank wagon); 3 sdgs.(680 ft.); PW. post.
		1 RC. bridge (10 × 20 ft.); 1 stone-arch bridge (6 × 26 ft.); 2 steel bridges (3 × 20 ft.; 2 × 20 ft.).
808·4	KUH-PENK	Alt. 3,776 ft. PL.(1,560 ft.); W. (Ts.33,000 gls., 9,000 gls., 2 Cr., spring, softening-plant); coal; PW. post.
		3 steel bridges (3 × 20 ft.; 4 × 20 ft.; 2 × 20 ft.); 2 stone-arch bridges (7 × 33 ft.; 6 × 20 ft.).



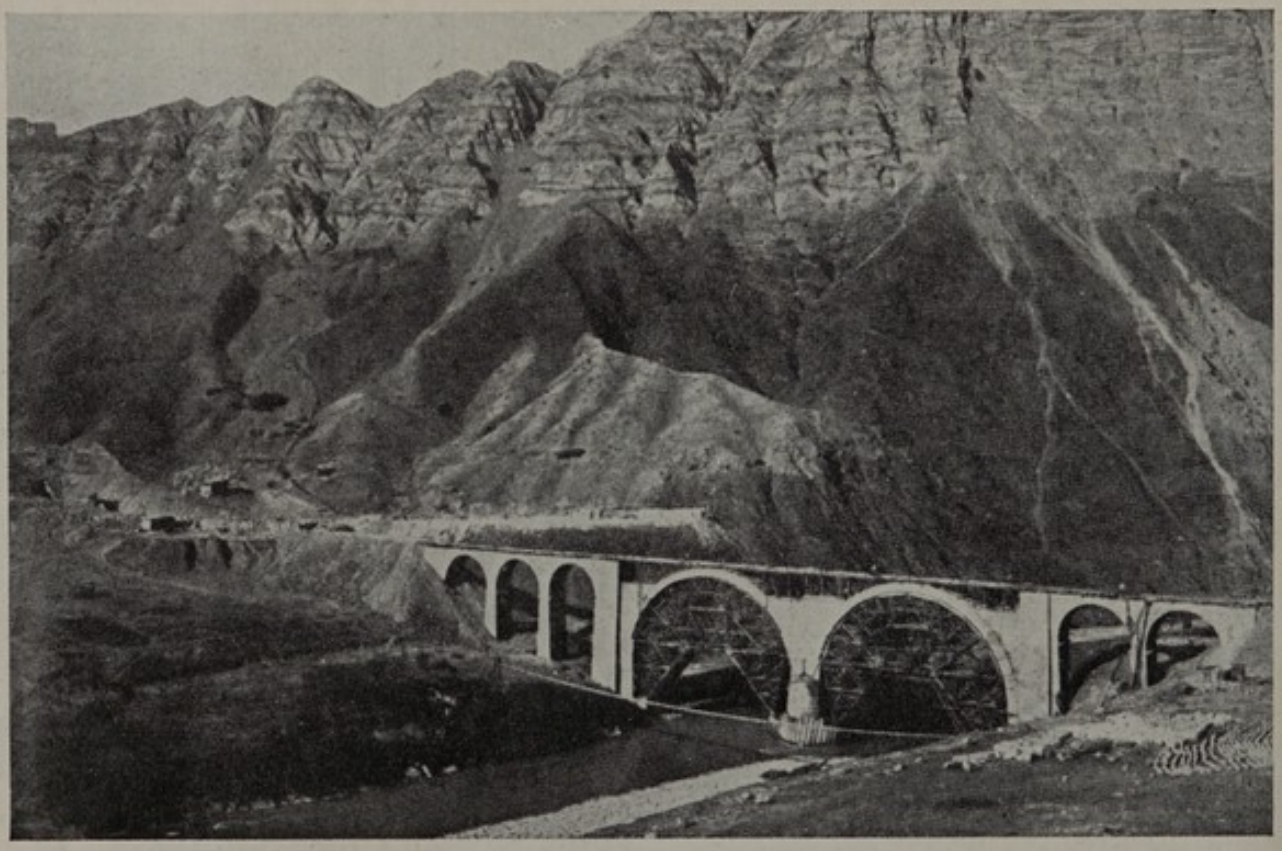
325. *Diz river (Ab-i-Sehzar) gorge between Tang-i-Panj and Tang-i-Haft, at about km. 365*



326. *Tang-i-Haft railway station*



327. *Masonry bridge under construction near Keshwar station*



328. *Bandar Shahpur–Tehran railway. Ab-i-Sehzar IV bridge at km. 382·5 under construction*

Km. from Bandar Shahpur	*Stations*	*Remarks*
826·1	NAHID	Alt. 4,132 ft. PL.(1,560 ft.); W. (well, tank wagon); PW. post.
		3 steel bridges (3×20 ft.; 2×20 ft.; 3×20 ft.); 1 stone-arch bridge (4×20 ft.); 3 concrete-arch bridges (5×20 ft.; 3×20 ft.; 10 ft.+82 ft.+10 ft.). The last-mentioned is over the Rudkhaneh-i-Sarud (Ab-i-Sarud).
842·5	PARANDAK	Alt. 3,875 ft. PL.(1,560 ft.); W. (tank wagon); 3 sdgs.(680 ft.); PW. post.
		1 steel bridge (3×20 ft.); 2 concrete-arch bridges (3×20 ft.; 4×26 ft.).
865·8	RUD-I-SHUR	Alt. 3,642 ft. PL.(1,560 ft.); W. (tank wagon); PW. post.
		13 concrete-arch bridges, mostly from 3 to 6 spans of 20 feet. The Rud-i-Shur is crossed by a steel-girder bridge (92 ft.+4×118 ft.+92 ft.) on concrete piers 59 ft. high.
888·7	SHAHRIAR	Alt. 3,408 ft. PL.(1,560 ft.); W. (T.33,000 gls., 2 Cr., 2 wells, softening-plant); coal; 3 sdgs. (680 ft.); PW. post.
		3 concrete-arch bridges (5×20 ft. (two); 2×66 ft.); the latter is over the Karaj at km. 901·8.
904·3	AYRIME	Alt. 3,500 ft. PL.(1,560 ft.); W. (well); 3 sdgs. (680 ft.); PW. post.
		2 concrete-arch bridges (4×20 ft.; single-span 66 ft.); the latter is over the Kand at km. 911·8.
914·7	TEPE SAFID (TAPPEH SEFID)	Alt. 3,595 ft. PL.(1,560 ft.); W. (well); 3 sdgs. (680 ft.); PW. post.
924·4	..	Concrete and steel bridge, 206 ft.
924·8	TEHRAN	Alt. 3,640 ft. Junction with lines to Bandar Shah, Tabriz, and Shahrud (for Meshed) (Rlys. 2, 3, 5). W. (T.40,000 gls., 2 Cr., 2 wells); ES.(9); Main RpS.; 2 Tbl.(115 ft., 65 ft.); coal; oil; large MY.; goods depot. Large new station is south of town. Town description, pp. 538–40.

Branch 1A. KHURRAMSHAHR–AHWAZ

Distance: 76·0 miles; 122·2 kilometres (built 1942).

Km. from Khurramshahr Port	*Stations*	*Remarks*
0·0	KHURRAMSHAHR PORT	Deep water and lighterage berths on Shatt al Arab. Port description, pp. 504–6.
1·4	KHURRAMSHAHR TOWN	PL.(1,640 ft.); W. (T.50,000 gls., 2 Cr.); ES.(6); MY.; sdgs.; Tr.; coal; oil (photo. 322).

Km. from Khurramshahr Port	*Stations*	*Remarks*
2·2	..	Bridge (2 × 17 ft.).
21·1	GARMDASHT	PL.(1,640 ft.).
41·2	HOSSEINIEH	PL.(1,640 ft.); W. (Ts.40,000 gls., 4,000 gls., Cr.). Junction with branch line to Tanuma (Rly. 1 B).
61·2	AHU (AHOU)	PL.(1,640 ft.).
81·2	HAMID	PL.(1,640 ft.); W. (Ts.40,000 gls., 4,000 gls., Cr.).
102·2	AB-I-TAIMUR (AB-I-TAYMOUR)	PL.(1,640 ft.).
122·2	AHWAZ	See Rly. 1, p. 560.

Branch 1 B. TANUMA–AHWAZ

Distance: 77·0 miles; 123·9 kilometres (built 1942).

Km. from Tanuma	*Stations*	*Remarks*
0·0	TANUMA	PL.(2,500 ft.); W. (T.17,000 gls., reservoir 80,000 gls., pumped from Shatt al Arab, 2 Cr.); ES.(4); MY.; sdgs.; oil. Small branches to Tanuma lighter basin and to interchange point with Basra metre-gauge line passing over Hull bridge to Basra.[1]
22·7	AKELA	PL.(1,600 ft.); sdgs.
c. 24·5	..	Line crosses Iraq boundary into Persia.
42·9	HOSSEINIEH	PL.(1,600 ft.); W. (Ts.40,000 gls., 4,000 gls., cistern wagon supply, Cr.). Junction with branch to Khurramshahr (*above*).
62·9	AHU (AHOU)	*See above* Rly. 1 A.
82·9	HAMID	
103·9	AB-I-TAIMUR (AB-I-TAYMOUR)	
123·9	AHWAZ	*See* Rly. 1, p. 560.

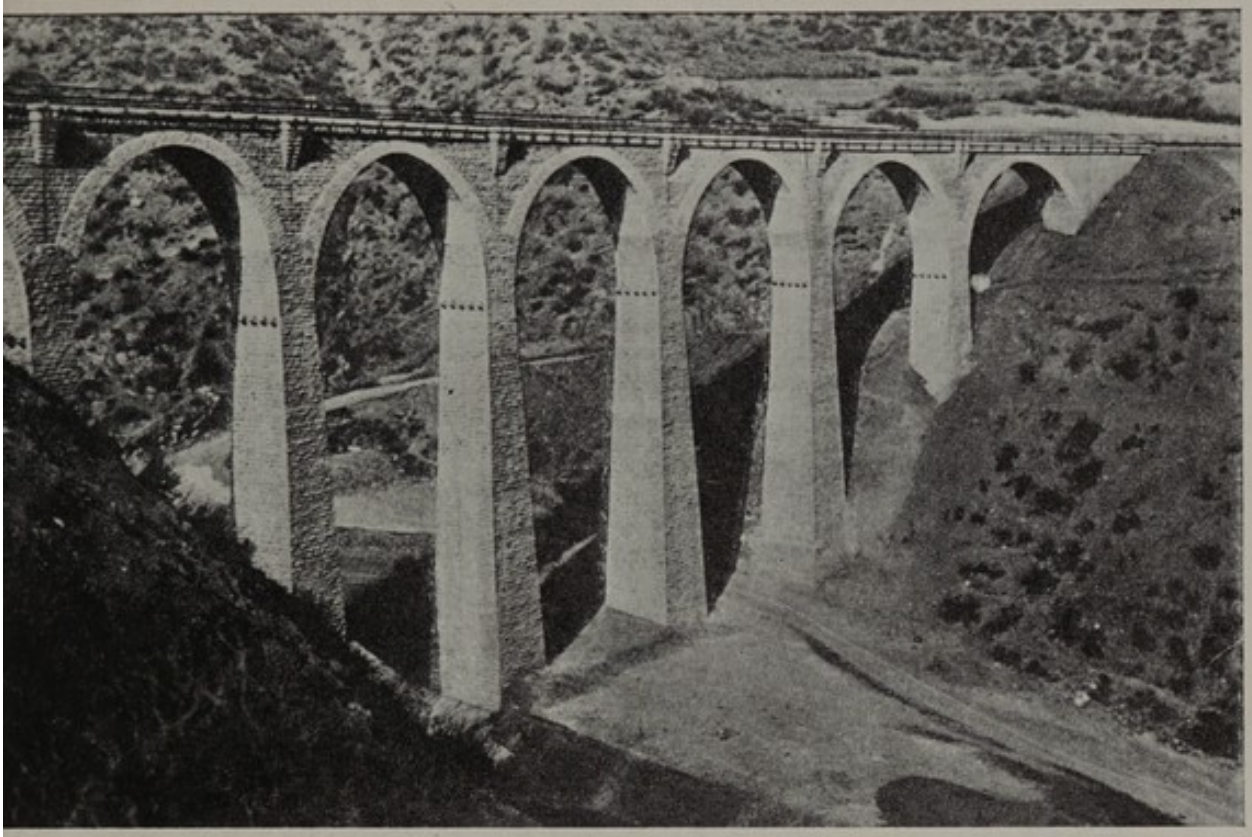
2. BANDAR SHAH–TEHRAN

(Completed 1938)

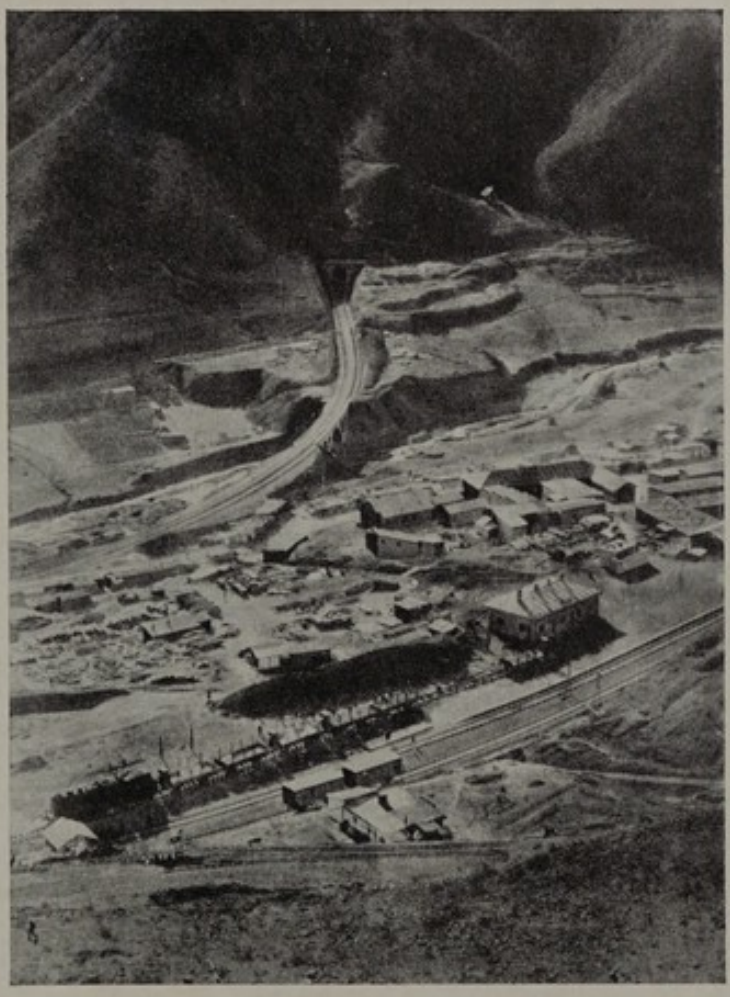
Route

Bandar Shah–Garmsar . . .	215·4 miles	346·7 kilometres
Garmsar–Tehran	71·2 ,,	114·5 ,,
	286·6	461·2

[1] The Hull bridge is described in BR. 524, *Iraq and the Persian Gulf*, pp. 588–9.



329. *Bandar Shah–Tehran railway. Parou bridge at km. 190*



330. *Bandar Shah–Tehran railway. Surkhabad station at km. 201·8, with the line crossing the Talar Rud at km. 200*



331. *Bandar Shah–Tehran railway. Motor-road passing under railway bridge (span 82·5 feet) near Vresk station*



332. *Bandar Shah–Tehran railway. Ourin bridge under construction at km. 209·3*

Permanent Way and Stations

Gauge 4 ft. 8½ in. Single track. Steam and diesel traction. Flat-bottom rails, 67 and 78 lb. per yd., screwed to hard wooden sleepers, or bolted to steel sleepers.

Maximum axle-load, 18·5 metric tons; minimum radius of curves, 220 metres; maximum gradient, 1 in 36.

Maximum distance between passing-loops, 27 kilometres.

Marshalling yards at Tehran; engine-sheds at Bandar Shah, Pul-i-Safid, Firuzkuh, Bun-i-Kuh, Tehran.

GENERAL DESCRIPTION

The line from Bandar Shah to Tehran, though much shorter than the southern section of the Trans-Iranian Railway, has a much greater climb to make in a shorter distance. In the first section the line keeps almost level along the Caspian plain to Shahi, where it turns up the valley of the Talar Rud. Beyond Shirgah (km. 147·5) the real ascent begins. The horizontal distance between Shirgah and the crest of the Elburz is about 30 miles, and the rise over 6,000 feet, giving an average theoretical gradient of about 1 in 26. By following the course of the Talar Rud, the route is rather longer, but the natural gradient of the upper part of the river-bed is even greater and averages 1 in 23 for 22 miles. To make the ascent it was therefore necessary to increase this length by 19 additional miles, making 41 miles in all; and even this meant a gradient of 1 in 36 in the open. In order to add this mileage beyond Pul-i-Safid, no fewer than 11 spiral tunnels had to be driven, the line sometimes proceeding down the valley in order to gain height. In three parts of the valley the track runs at three levels, one above the other, climbing the hill-side by going down and up the valley alternately (fig. 59, photos. 335, 336). Within the spiral tunnels the gradient is

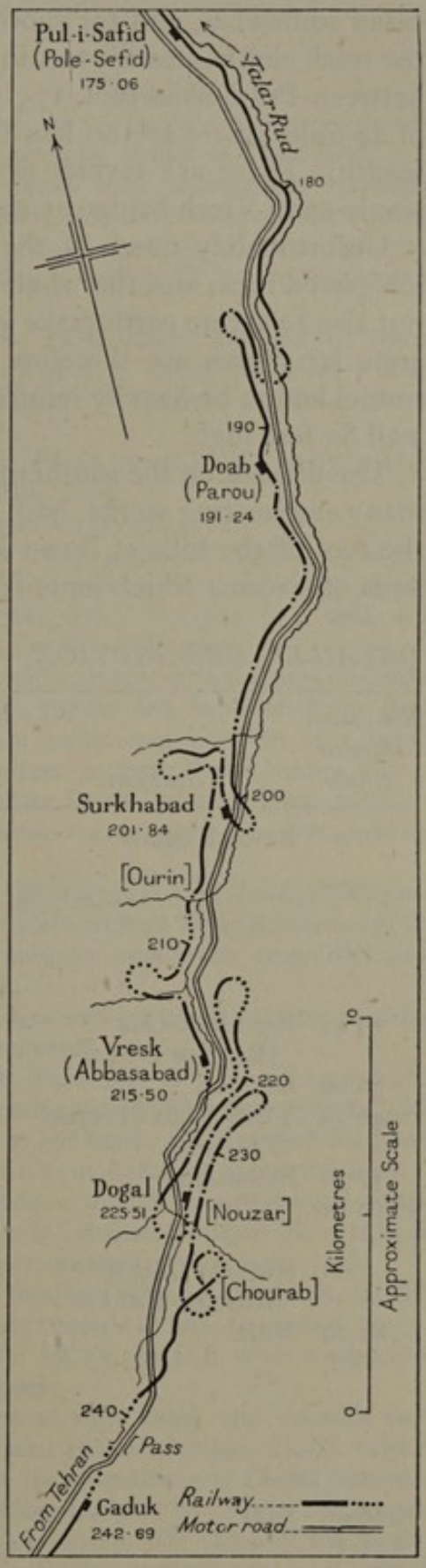


FIG. 59. *Bandar Shah–Tehran Railway between kilometres 175 and 243: Pul-i-Safid to Gaduk*

eased somewhat, and for short distances at stations it is level. Elsewhere the track climbs steadily at 1 in 36 until it enters the summit tunnel. In all, between Pul-i-Safid (km. 175) and Gaduk (km. 242·7), a crow-fly distance of 22 miles, there are no less than 69 tunnels totalling nearly 12 miles in length. There are several fine bridges, the most spectacular being the single-span Vresk bridge at about km. 220 (photo. 333).

Unfortunately much of the mountain side is composed of badly disintegrated rock, and the whole region is subject not only to heavy rainfall, but also to severe earthquake shocks. Very heavy retaining walls and concrete structures are therefore necessary. In one place a concrete-lined tunnel had to be heavily reinforced with rails and supported by a retaining wall 80 feet high.

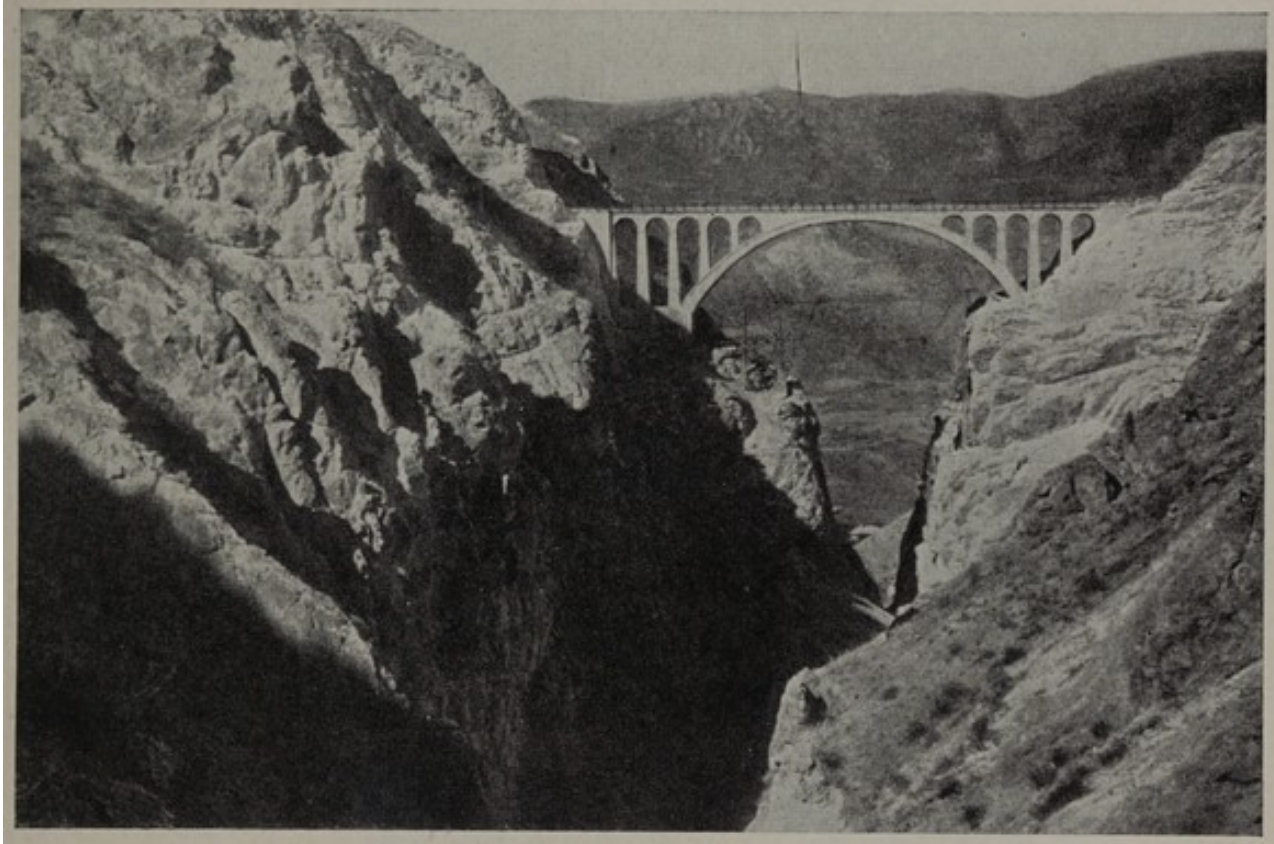
The descent on the southern side of the Elburz is less steep but there are many engineering works, both bridges and tunnels, before the line reaches the foot of the hills at Bun-i-Kuh. Thereafter the only obstacles are the beds of streams which issue from the hills.

DETAILED DESCRIPTION

Km. from Bandar Shah	*Stations*	*Remarks*
0·0	BANDAR SHAH	W. (T.26,500 gls., Cr., softening-plant); ES. (6); PS.; RpS.; Tbl.(115 ft.). Direct transhipment to and from vessels at landing-stage (4,500 ft.) with crane (pp. 510–11, photo. 277). Line keeps close to SE. shore of Caspian with 1 major bridge (2×66 ft.), over the Qara Su.
19·44	BANDAR-I-GAZ (BANDAR GUAZ)	PL.; W. (T.26,500 gls., 2 Cr.). Narrow-gauge line connects with quay (p. 513).
32·00	GALUGA	PL.; W. (well).
40·34	TIJIR TASH (TIDJIR-TOUCHE)	PL.; W. (well).
57·58	BEHSHAHR	PL.; W. (T.26,500 gls., 2 Cr.); PS.; PW. post.
c. 68·00	..	Line diverges from coast, following edge of Elburz foothills.
—	RUSTAM QALEH (ROSTAM KALA)	PL.; W. (well).
81·22	NIKA	PL. only. Line crosses Nika Rud at km. 81·5 by single-span bridge (119 ft.), Dar Rud at km. 92, and Tajam Rud at km. 104 (both bridges 2×23 ft.). These are perennial streams draining to the Caspian.
106·66	SARI	PL.; W. (T.26,500 gls., 2 Cr.); PS.; Tbl.; coal; PW. post.
124·00	..	Line crosses the Mei Rud by single-span bridge (69 ft.) near Namuh sugar factory.
127·03	SHAHI	Alt. 171 ft. PL.; W. (T.26,500 gls., well); weighbridge; coal; oil; sdgs.; PW. post.

Km. from Bandar Shah	*Stations*	*Remarks*
		Line turns south up valley of Talar Rud.
		5 major bridges over tributaries, including Karkhun (single-span ferro-concrete, 99 ft.).
147·51	SHIRGAH (CHIRGAH)	Alt. 765 ft. PL. (1,570 ft.); W. (T.13,200 gls., pumped from 2 wells, 2 Cr.); 3 sdgs.(550 ft.); PW. post.
148·50	..	Bridge over Talar Rud (double-span ferro-concrete, 2×99 ft.). Valley closes in; 7 other major bridges; 8 tunnels totalling about 1,050 yards.
164·29	ZIRAB	Alt. 1,388 ft. PL.(1,550 ft.); W. (well); 3 sdgs. (430 ft.); PW. post.
		3 bridges (at km. 165, 170, 171).
175·06	PUL-I-SAFID (POLE-SEFID)	Alt. 1,864 ft. PL.(1,470 ft.); W. (T.26,500 gls., pumped from well, 3 Cr.; softening-plant); ES.(6); RpS.; PS.; Tbl.(115 ft.); coal; oil; 18 sdgs.(6,690 ft.); PW. post.
		Line begins difficult ascent to the pass of Gudar Guduk (fig. 59) by left bank of Talar Rud, with almost continuous gradient of 1 in 36.
		3 major bridges include Parou bridge (7×53 ft.) just before Doab station (photo. 329).
		3 tunnels total 1,410 yards, the last 2 being spiral.
191·24	DOAB (PAROU)	Alt. 2,976 ft. PL.(1,550 ft.); W. (well); PW. post.
		Line keeps to left bank of Talar Rud most of the way, but tunnels under the river bed near Surkhabad.
		6 major bridges and 12 tunnels, latter totalling about 3,100 yards.
201·84	SURKHABAD (SORKHABAD)	Alt. 3,832 ft. PL.(1,600 ft.); W. (T.13,200 gls., 2 Cr., softening-plant); PW. post. (photo. 330).
		Line keeps to left bank. Site levelled for intermediate station at Ourin at about km. 208.
		8 major bridges including single-span Ourin bridge (211 ft.) and single-span (82·5 ft.) just before Vresk station (photos. 331, 332).
		19 tunnels, totalling about 4,530 yards, include 2 long spiral tunnels at km. 204·4 and 211·5.
215·50	VRESK (VERESK, VARSAK, ABBASABAD)	Alt. 4,882 ft. PL.(1,550 ft.); coal; 2 sdgs.(200 ft.); PW. post.
		Line crosses to right bank and doubles back down stream, passes through spiral tunnel, and climbs back upstream to Dogal station.
		3 major bridges include the Vresk single-span bridge at km. 219·9 (181 ft.) and the 5-span Dogal bridge at km. 223·2 (23 ft.+3×50 ft.+ 23 ft.) (photos. 333, 334).
		14 tunnels total 4,040 yards and include 2 long spiral tunnels (fig. 59).

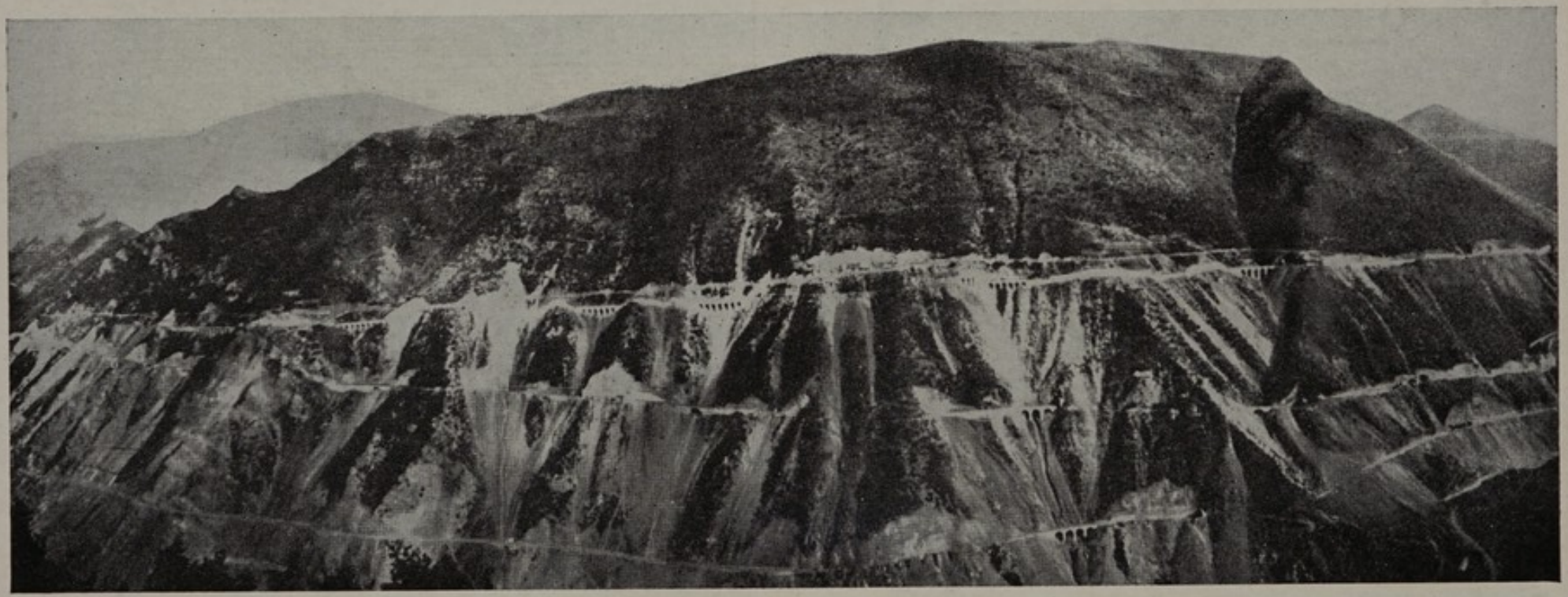
Km. from Bandar Shah	*Stations*	*Remarks*
225·11	DOGAL	Alt. 5,687 ft. PL.(1,200 ft.); W. (T.13,200 gls., 2 Cr.); PW. post.
		Line goes down valley gaining height, loops through another spiral tunnel, and doubles back upstream at a higher level (photos. 335, 336). At km. 232·11 a site is levelled for Nouzar station, but this has not yet been built. Beyond this point the line makes a figure of eight, beginning about km. 235 and includes 2 spiral tunnels (942 yds., 659 yds.), passes another unbuilt station site (Chourab) at about km. 236, and enters the summit tunnel (3,168 yds.) at km. 239·3. The highest point of the line, 6,924 ft., is reached inside the tunnel.
		Altogether in this stretch there are 11 bridges and 21 tunnels, the latter totalling 7,836 yards.
242·69	GADUK (GUDUK)	Alt. 6,920 ft. PL.(1,550 ft.); PW. post.
		The line descends through much easier country, with only 1 major bridge between Gaduk and Firuzkuh.
258·45	FIRUZKUH	Alt. 6,311 ft. PL.(1,470 ft.); W. (T.26,500 gls., 3 Cr., pumped from wells); PS.; ES.(2); Tbl. (99 ft.); weighbridge; coal; 10 sdgs.(4,820 ft.).
		Line continues descent along Shuristan valley, with 7 major bridges and 2 tunnels (60 yds., 228 yds.).
272·50	MAHABAD	Alt. 5,679 ft. PL.(1,560 ft.); W. (well); PW. post.
		Line continues descent; 4 major bridges and 5 tunnels (totalling 465 yds.).
287·22	ZARIN DASHT (ZARINE-DACHTE)	Alt. 5,167 ft. PL.(1,560 ft.); W. (well); 3 sdgs. (680 ft.); PW. post.
		Line continues descent; 4 major bridges (including one 264 ft. long at km. 297 (photo. 337)) and 2 tunnels (60 yds., 65 yds.).
299·24	SIMIN DASHT (SIMINE-DACHTE, MAHMUDABAD)	Alt. 4,777 ft. PL.(1,560 ft.); W. (2T. (each 13,200 gls.), 2 Cr., softening-plant, 2 wells); coal; 3 sdgs.(300 ft.); PW. post.
		Line continues descent; 10 major bridges; 2 tunnels (330 yds., 794 yds.).
313·70	KABUTAR DARREH (KABOUTAR DARREH)	Alt. 4,118 ft. PL.(1,540 ft.); W. (supplied by tank wagon); PW. post.
		Hills close in and line passes through the defile Tang-i-Nahar; 8 major bridges; 7 tunnels totalling about 1,840 yards.
332·60	BUN-I-KUH (BONEKOUH)	Alt. 3,302 ft. PL.(1,470 ft.); W. (2T. (each 13,200 gls.), 3 Cr., softening-plant, well); ES. (6); RpS; PS.; Tbl.(115 ft.); coal; oil; 17 sdgs.(7,620 ft.); PW. post.



333. *Bandar Shah–Tehran railway. Vresk bridge, span 181 feet, at km. 219·9*



334. *Bandar Shah–Tehran railway. Dogal bridge at km. 223·2*



335. *Bandar Shah–Tehran railway at three levels on the hillside between kms. 221 and 231, climbing nearly 1,000 feet in 7 miles at maximum gradient of 1 in 36*

Km. from Bandar Shah	*Stations*	*Remarks*
		Line enters more open country; 5 bridges and 1 tunnel.
346·72	GARMSAR	Alt. 2,776 ft. Junction of new line to Shahrud (Rly. 5). PLs.(1,380 ft., 1,320 ft.); W. (tank wagon); weighbridge; sdgs.(2,247 ft.); PW. post.
		Line runs along plain at foot of Elburz foothills, crossing 10 bridges.
373·02	KAVIR	Alt. 2,599 ft. PL.(1,560 ft.); W. (tank wagon); PW. post.
		3 bridges.
396·62	ABARDEH (ABARDEJE)	Alt. 2,712 ft. PL.(1,560 ft.); W. (tank wagon); 3 sdgs.(680 ft.); PW. post.
		Line turns NW. across more populated country.
408·50	PISHVAH (PICHVA)	Alt. 2,953 ft. PL.(1,560 ft.); W. (2T. (each 13,200 gls.), 2 wells); coal; 3 sdgs.(680 ft.); PW. post.
417·29	VERAMIN	Alt. 3,026 ft. PL.(1,560 ft.); W. (well); weighbridge; 3 sdgs.(680 ft.).
427·00	..	Single-span metal bridge (132 ft.).
434·74	BAHRAM	Alt. 3,180 ft. PL.(1,560 ft.); W. (tank wagon); 3 sdgs.(680 ft.); PW. post.
451·30	RAI (REY)	Alt. 3,428 ft. PL.(1,560 ft.); W. (well); 9 sdgs. (3,850 ft.); PW. post.
461·25	TEHRAN	Alt. 3,639 ft. *See* Rly. 1, p. 565.

3. TEHRAN–TABRIZ

(Completed to Mianeh 1941)

Route

Tehran–Kazvin	89·8 miles	144·5 kilometres
Kazvin–Zenjan	105·8 ,,	170.3 ,,
Zenjan–Mianeh	77·1 ,,	124·2 ,,
	272·7	439·0
Mianeh–Tabriz (under construction 1942)	188·5 ,,	303·4 ,,
	461·2	742·4

Permanent Way

Gauge, 4 ft. 8½ in. Single track. Steam and diesel traction. Flat-bottom rails, 67 and 78 lb. per yd. Wooden sleepers.

Maximum axle-load, 18·5 metric tons; minimum radius of curves, 300 metres; maximum gradient, 1 in 100.

Maximum distance between passing-loops, 20 kilometres.

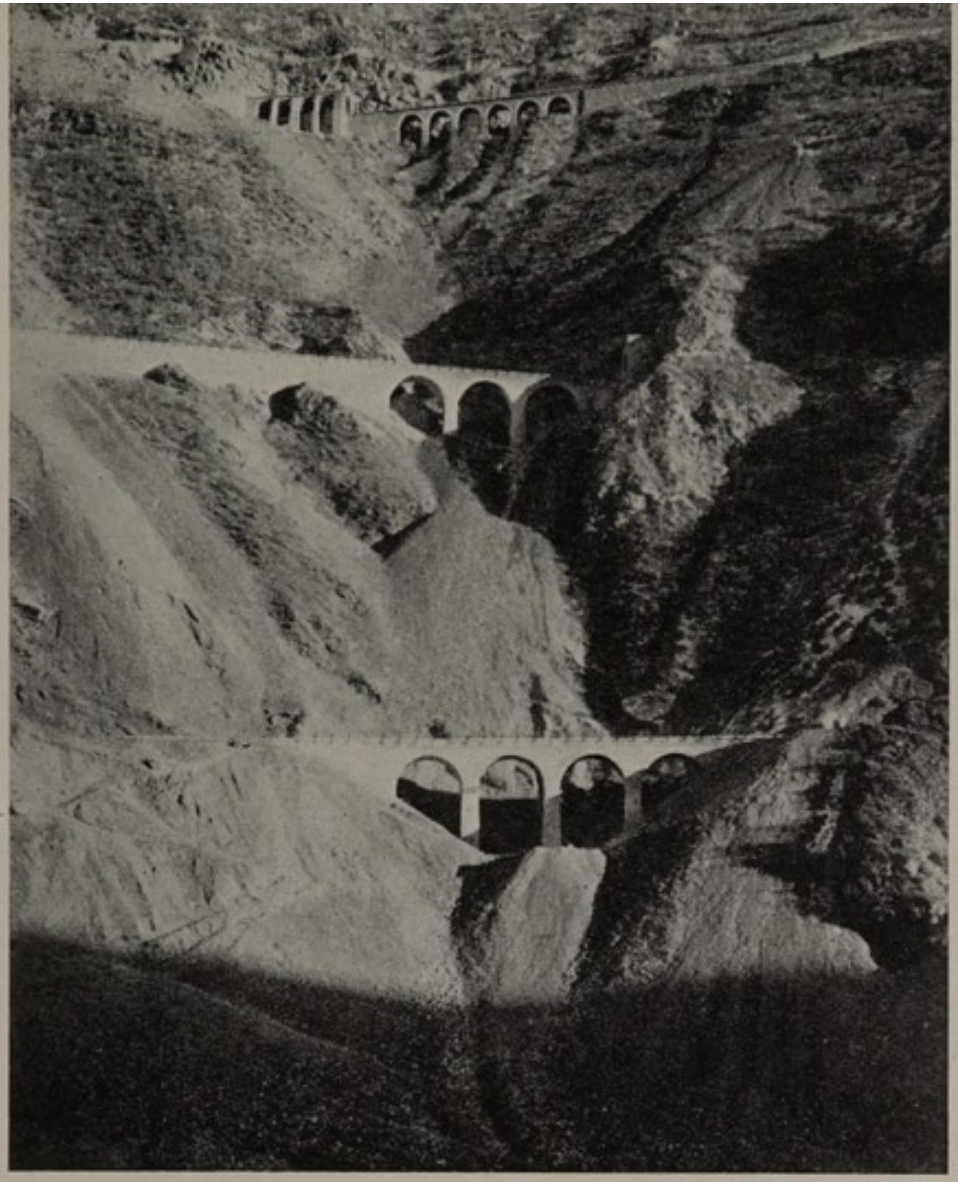
GENERAL DESCRIPTION

From Tehran to Kazvin this line follows the general alinement of the motor-road, the only major engineering works being a number of reinforced concrete bridges over streams issuing from the Elburz. The largest is that over the Karaj river at km. 38. In this section the line is almost level. Beyond Kazvin it turns south-west to ascend the open valley of the Abhar Rud with easy gradients to the watershed of the Zenjan Chai near Sultaniyeh, at just under 6,000 feet. There are no engineering difficulties as far as Zenjan (km. 314·8), but the Zenjan Chai increases its fall as it approaches the Qizil Uzun, and the valley is constricted near Mianeh, necessitating a tunnel nearly $\frac{3}{4}$ mile long. Beyond Mianeh, where the line is still under construction, the difficulties increase as the lower southern slopes of the Sahand volcano have to be crossed before Maragheh is reached. The shores of Lake Urmia are reached between here and Danalu (km. 650), after which the line turns north to Tabriz.

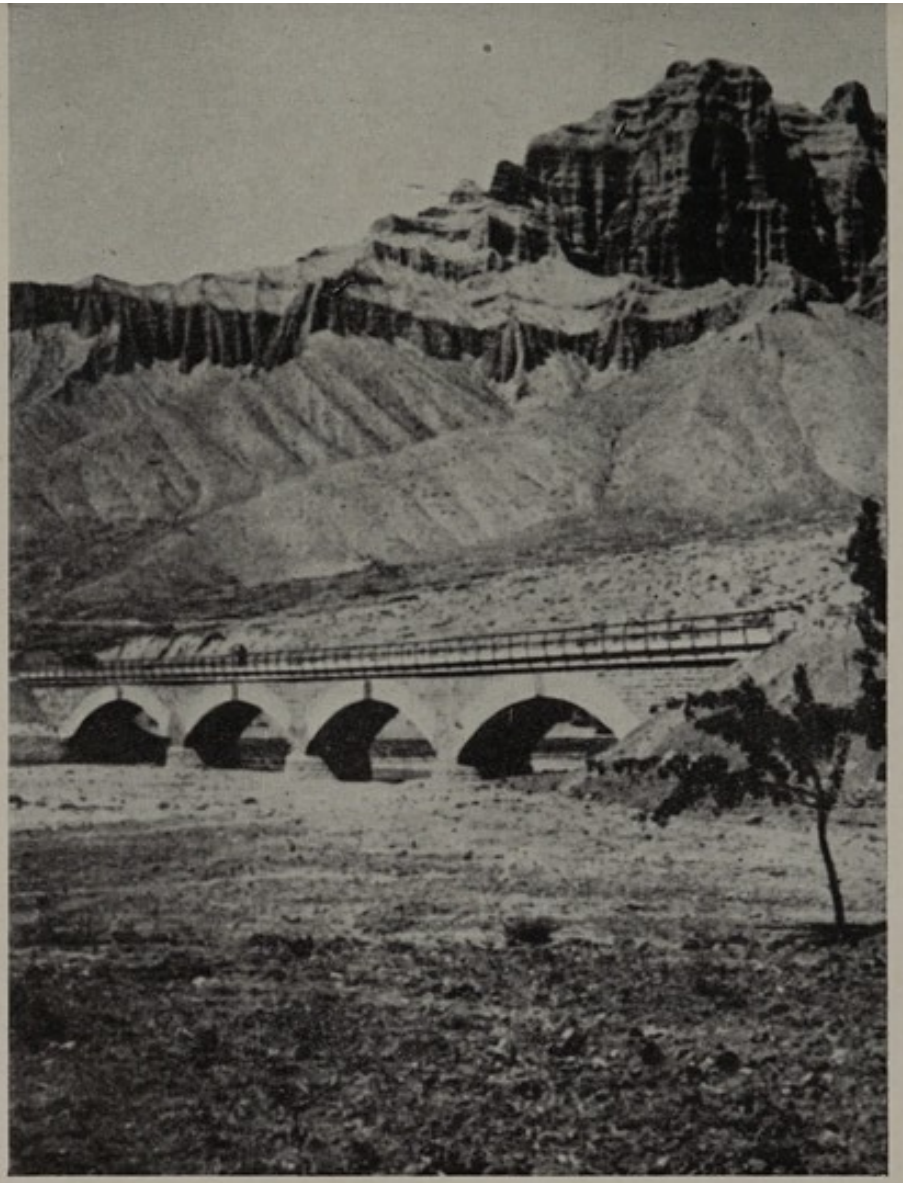
DETAILED DESCRIPTION

Km. from Tehran	*Stations and passing-loops*	*Remarks*
0·0	TEHRAN	Alt. 3,640 ft. *See* Railway 1, p. 565. Line goes west over well-cultivated country.
9·9	MEHRABAD	Alt. 3,853 ft. 2 RC. bridges.*
23·7	SHAHABAD	Alt. 3,904 ft.
38·0	..	RC. bridge over Ab-i-Karaj (7×70 ft.).
40·7	KARAJ (KEREJ)	Alt. 4,285 ft.
58·5	GARDAN (KURDAN)	Alt. 4,114 ft.
75·3	HASHT GORD	Alt. 4,091 ft.
92·3	ABIAK (AB YAK)	Alt. 4,005 ft. W. Abiak coal-mines are in the hills about 5 miles to north. 3 RC. bridges.
108·8	ZIARAN	Alt. 4,128 ft. 2 RC. bridges.
126·7	KAVANDEH (KAVANDAJ)	Alt. 4,268 ft. 1 RC. bridge.
144·5	KAZVIN	Alt. 4,221 ft. W. (T., well, softening-plant). Town description, p. 523. Line turns SW.
162·2	SIAH CHASHMEH (SIAH TCHECHMEK)	Alt. 4,123 ft.
178·1	TAKISTAN (TAKESTAN)	Alt. 4,156 ft. Line gradually bends west to enter valley of Abhar Rud. 1 RC. bridge (2×20 ft.).
194·3	SIAH BAGH	Alt. 4,529 ft. Line ascends valley of Abhar Rud. 1 RC. bridge (5×20 ft.).

* Bridges and viaducts of less than 30 feet length are omitted; the term 'viaduct' is used hereafter for structures other than of reinforced concrete



336. *Bandar Shah–Tehran railway. Bridges at kms. 221·9, 225·7, and 230·6*



337. *Bandar Shah–Tehran railway. Bridge at km. 297*

Km. from Tehran	*Stations and passing-loops*	*Remarks*
210·4	QURVEH (KOUVEH)	Alt. 4,896 ft.
227·3	KHURRAMDARREH (KHORRAM DARRE)	Alt. 5,214 ft.
231·4 240·5	..	2 RC. bridges (10 × 13 ft.).
244·7	SAIN QALEH (SAIN GHOLE)	Alt. 5,552 ft. Valley begins to close in.
249·6 259·0	..	2 RC. bridges (8 × 13 ft.).
261·1	PIR ZAGHE	Alt. 5,913 ft. Line crosses watershed into valley of Zenjan Chai.
263·5	..	RC. bridge (4 × 13 ft.).
280·9	SULTANIYEH (SOLTANIEH)	Alt. 5,845 ft. 4 RC. bridges within 5 km. of Banab.
298·1	BINAB (BANAB)	Alt. 5,599 ft. 2 RC. bridges; 1 viaduct.
314·8	ZENJAN	Alt. 5,330 ft. W.; ES.; Tbl.; oil. Line descends Zenjan valley.
330·4	HAMAYAM (SARAM SAKHLI, SAREMSAGHLEN)	Alt. 5,026 ft.
348·3	NIKPEH (NIKPEI, NIKPAY)	Alt. 4,665 ft.
366·2	KAHAB (KOHAB, AGHMEZAR)	Alt. 4,291 ft.
383·8	SARCHAM (SARTCHAM)	Alt. 3,970 ft. W. (T.2,000 gls., well).
401·7	REJIN (RAJIN)	Alt. 3,711 ft.
421·6	PUL-I-DUKHTAR (POLE-DOKHTAR)	Alt. 3,547 ft.
433·0	..	Tunnel, 1,236 yards.
438·9	MIANEH	Alt. 3,514 ft. W. (T.2,000 gls., from qanat); ES.; Tr.

Stations beyond Mianeh; line under construction to Tabriz; distances are approximate.

454·8	SHEKTERABAD (ABAK)	Alt. 3,776 ft.
470·7	QALEH SHAIKH (KALAJAKH, GALADJAKH)	Alt. 4,157 ft.
487·4	BIZINI	Alt. 4,600 ft.
(495·0	DOLMEH)	(Station site alternative to Khorassanli.)
502·3	KHORASSANLI	Alt. 4,997 ft.
514·5	AQ DAGH (AGH-DAGH)	Alt. 5,095 ft.
527·5	KATANGU	Alt. 5,282 ft.
538·2	ZUL-KADAR (ZOLGHADR)	Alt. 5,643 ft.
548·5	JUGUL	Alt. 6,050 ft.
560·9	JIBINI (TSIBINI)	Alt. 5,837 ft.
569·9	GHALASHI (KHALACHI)	Alt. 5,604 ft.
583·4	GOL	Alt. 5,574 ft.
593·9	DOCHATAN (KUTCHAIKH)	Alt. 5,272 ft.
601·3	KIMINEH (KIMNAI, CHIKAN)	Alt. 5,033 ft.

Km. from Tehran	*Stations and passing-loops*	*Remarks*
608·9	MARAGHEH	Alt. 4,702 ft.
623·7	..	Alt. 4,485 ft. Station name not known.
638·6	KHOSZERLU	Alt. 4,298 ft.
650·2	DANALU	Alt. 4,321 ft. Line reaches eastern shore of Lake Urmia.
662·4	GARGA-BAZAR	Alt. 4,718 ft.
675·6	KHANEGAN (KHANAGA)	Alt. 4,236 ft.
692·5	AZAR SHAHR	Alt. 4,245 ft.
708·9	KHASAVAR	Alt. 4,301 ft.
726·0	YANGI KAND (ENGHY-KENDEH)	Alt. 4,350 ft.
742·4	TABRIZ	Alt. 4,462 ft. Sdgs. Town description, pp. 535–8.

4. TABRIZ–JULFA

(*Completed 1916*)

Route

Tabriz–Sufian	24·5 miles	39·4 kilometres
Sufian–Julfa	66·9 ,,	107·6 ,,
	91·4	147·0

Branch-line

Sufian–Sharif Khaneh . . .	32·9 miles	53·0 kilometres

Permanent Way and Stations

Gauge, 5 ft. 0 in. Single track. Flat-bottom rails, 62 lb. per yd., screwed to wooden sleepers.

Maximum axle-load, 16·5 metric tons; minimum radius of curves, 341·7 metres; maximum gradient, 1 in 35.

Maximum distance between passing-loops, 11·4 kilometres.

Marshalling yards at Tabriz and Julfa; engine-sheds at Tabriz, Julfa, and Podgurskaya.

GENERAL DESCRIPTION

The line crosses low ground north-westwards to the mouth of the Sufian valley, climbs by a stiff gradient of 1 in 35 for a short distance to the watershed just under 6,000 feet, and descends steeply at the same gradient to Marand (km. 79). Thereafter there are no difficulties as the line crosses the trough of the Zilbir Chai, until at about km. 115 it enters the Qaragez gorge and commences the steep descent to the Aras valley and Julfa. The branch-line from Sufian to Sharif Khaneh meets with no difficulties on its

gentle descent to the northern shore of Lake Urmia, but towards the end it crosses swampy ground.

DETAILED DESCRIPTION

Km. from Tabriz	*Stations and passing-loops*	*Remarks**
0·0	TABRIZ	Alt. 4,462 ft. Sdgs. Town description, pp. 535–8.
4·3–5·1	..	4 bridges over streams.
10·5	..	Masonry bridge over Aji Chai, length 150 yards (about 12 arches).
14·0	..	Bridge over stream.
16·4	..	Bridge over Kömür Chai.
16·5	SAHALAN (SAVALAN)	Alt. *c.* 4,480 ft.
25·5–27·9	..	Line traverses swampy ground.
28·0	..	Bridge over stream.
39·4	SUFIAN	Alt. *c.* 4,900 ft. Station is about 1 mile from the town.
40·0	..	Branch-line leaves for Sharif Khaneh (Rly. 4 A). Line begins ascent to Aras watershed by Sufian stream.
46·2	SHORDERE	Alt. *c.* 5,500 ft.
51·3	..	Bridge over Sufian stream.
52·0	SIAVAN	Alt. *c.* 5,800 ft.
56·5, 63·0	..	2 bridges over streams.
66·7	KULLI	Alt. *c.* 5,450 ft.
72·5	SHUJA NIZAM HALT	Alt. *c.* 4,800 ft.
77·5	..	Bridge over motor-road.
79·0	MARAND	Alt. *c.* 4,400 ft.
84·6	..	Bridge over Zilbir Chai.
86·5	SAMBURAN HALT	Alt. *c.* 4,300 ft.
94·0	CHIRCHIR HALT	Alt. *c.* 4,320 ft.
94·2	..	Bridge over Zunus Chai.
98·0	..	Single-span masonry bridge over Harzan Chai.
99·7	ALIAKI	Alt. *c.* 4,800 ft.
100·3–108·3	..	3 bridges.
115·0	QARAGEZ HALT	Alt. *c.* 4,300 ft. Line enters gorge.
117·0	..	Daradiz (Qaragez?) tunnel, 150 yards long.
124·5	ZAL HALT	Alt. *c.* 3,750 ft. Country opens out.
124·7	..	Bridge.
130·0	GERGER	Alt. *c.* 3,350 ft.
131·0, 131·8	..	2 bridges.
135·8	LAVERJAN HALT	Alt. *c.* 2,900 ft.
139·0	..	Bridge.
143·7	PODGURSKAYA	Alt. *c.* 2,500 ft. W.; ES.; Tbl.
145·4	..	Bridge over Aras R.
147·0	JULFA	Alt. *c.* 2,500 ft. W.; ES.; Tbl.; numerous sdgs.

* Heights for this line are from Russian maps and are very approximate.

4 A. Branch-line: SUFIAN–SHARIF KHANEH

Km. from Sufian	*Stations and passing-loops*	*Remarks*
0·0	SUFIAN	Alt. *c.* 4,900 ft.
0·6	..	Branch-line leaves main line and descends with even gradient from *c.* 4,900 ft. at Sufian to *c.* 4,300 ft. at Sharif Khaneh.
5·5	..	Bridge over Sufian stream.
11·7	NEIMATULLAH HALT	..
40·0	SHINDIVAR (DIKEH)	Line runs within half a mile of the shore of Lake Urmia and is embanked over swampy ground.
53·0	SHARIF KHANEH	Alt. *c.* 4,300 ft.

5. GARMSAR–MESHED

(Completed to Shahrud 1941)

Route

Garmsar–Shahrud	195·6 miles	314·8 kilometres
Shahrud–Meshed (under construction 1942)	308·4 „	496·3 „
	504·0	811·1

Permanent Way and Stations

Gauge, 4 ft. 8½ in. Single track. Steam and diesel. Flat-bottom rails.

Maximum axle-load, 18·5 metric tons; minimum radius of curves, 300 metres; maximum gradient, 1 in 66.

Maximum distance between stations, 24 kilometres.

Marshalling yards at Garmsar and Meshed (under construction).

GENERAL DESCRIPTION

The line keeps to the approximate alinement of the motor-road from Garmsar to Samnan with a ruling gradient of 1 in 100, though generally very much less. In this section there are a number of reinforced concrete and some masonry arch viaducts over streams issuing from the Qara Aghach hills to the north. Soon after leaving Samnan the line turns south-east to circumvent the Rion Kuh, rising steadily with a regular gradient of 1 in 65 to beyond Haft Khan (km. 178), and then descending the north-east flank. There are no difficulties beyond to its present terminus at Shahrud.

After Shahrud the line under construction leaves the course of the motor-road through Sabzawar and is alined farther north. It crosses the Kul-i-Mura at Pul-i-Abrisham and gradually ascends the Juvain valley. A large number of bridges are under construction, but none are important. They are summarized in the detailed description and may not be accurate.

DETAILED DESCRIPTION

Km. from Garmsar	*Stations and passing-loops*	*Remarks*
0·0	GARMSAR	Alt. 2,776 ft. Junction with Bandar Shah–Tehran line (Rly. 2). PLs.(1,380 ft., 1,320 ft.); W. (tank wagon); weighbridge; sdgs. (2,247 ft.); PW. post. Line goes east over distributaries of the Hableh Rud. 6 RC. bridges.*
16·7	YATRI	Alt. 2,820 ft. PL.(1,470 ft.); SP. Line keeps south of the foothills of the Kuh-i-Qara Aghach. 2 RC. bridges.
38·6	DEH NAMAK (DEHNAMAK)	Alt. 2,712 ft. PL.(1,470 ft.). Line begins to swing NE.
55·0	..	Viaduct (6 × 20 ft.).
56·8	SURKH DASHT (SORKH-DACHTE)	Alt. 2,854 ft. PL.(1,470 ft.).
70·0	..	Viaduct (12 × 20 ft.).
73·8	LASGIRD (LAHURD)	Alt. 3,278 ft. PL.(1,470 ft.).
94·9	BIABANAK	Alt. 3,447 ft. PL.(1,470 ft.). 6 RC. bridges.
112·8	SAMNAN (SEMNAN)	Alt. 3,462 ft. PL.(1,675 ft.); W. (T.33,000 gls., 3 Cr.); ES.(6); Tr.; oil. Line begins to swing E. to make detour round Rion Kuh climbing with maximum gradient of 1 in 65.
127·0	..	RC. bridge (2 × 20 ft.).
131·3	MIAN DARREH	Alt. 4,016 ft. PL.(1,470 ft.). 3 RC. bridges; 1 viaduct.
147·6	AB-I-GARM (ABE-GARM)	Alt. 4,556 ft. PL.(1,470 ft.). 1 RC. bridge; 3 viaducts.
163·4	GERDAB (GUERDAB)	Alt. 5,079 ft. PLs.(1,470 ft., 1,270 ft.); W. (T.8,500 gls., 2 Cr.); ES. (6); SR. 1 RC. bridge; 3 viaducts.
178·5	HAFT KHAN	Alt. 5,468 ft. PL.(1,470 ft.). Line reaches highest point of the line, *c.* 5,530 ft., and turns NW. to descend from Rion Kuh. 5 RC. bridges; 2 viaducts.
192·5	LARISTAN (LARESTAN)	Alt. 5,003 ft. PL.(1,460 ft.). 5 RC. bridges.
205·3	BEHEVAR (BENEVAR)	Alt. 4,424 ft. PL.(1,470 ft.); W. (T.33,000 gls., 2 Cr.).
208·8	..	RC. bridge (3 × 20 ft.).
218·8	AMRAVAN	Alt. 3,819 ft. PL.(1,460 ft.). Line completes the descent and crosses open desert plain. 2 viaducts.
234·8	SURKHDEH (SORKHDEH)	Alt. 3,593 ft. PL.(1,460 ft.).
249·2	DAMGHAN	Alt. 3,692 ft. PLs.(1,500 ft., 1,390 ft.); SP.

* Bridges and viaducts of less than 30 ft. length are omitted; the term 'viaduct' is here used for structures other than reinforced concrete.

Km. from Garmsar	*Stations and passing-loops*	*Remarks*
252·4	..	RC. bridge (6×20 ft.).
272·1	ZARRIN	Alt. 3,566 ft. PL.(1,460 ft.).
294·9	KALAT-I-KHAN	Alt. 3,830 ft. PL.(1,460 ft.).
(295·9)	(KALE-MIL)	4 RC. bridges.
314·8	SHAHRUD	Alt. 4,597 ft. PLs.(2,160 ft., 1,660 ft.); W. (T.33,000 gls., 3 Cr.); oil.
316·0	..	RC. bridge (3×13 ft.).

Stations beyond Shahrud: formation complete to Shahr-i-Staneh; construction in progress to Meshed (end of 1942).

		1 RC. bridge; 2 viaducts.
334·4	KHAIRABAD (KHEIRABAD)	Alt. 4,314 ft. PL.(1,460 ft.). 3 viaducts.
354·7	SHIRIN CHASHMEH (CHIRIN CHECHMEH)	Alt. 3,924 ft. PL.(1,460 ft.). 1 viaduct.
373·0	GILAN	Alt. 3,488 ft. PL.(1,460 ft.). 2 viaducts.
393·7	BOKRAN (BEKRAN)	Alt. 3,291 ft. PL.(1,460 ft.). W. (T.33,000 gls., 2 Cr.). 4 RC. bridges; 4 viaducts.
415·9	JAHANABAD	Alt. 3,320 ft. PL.(1,460 ft.). 7 RC. bridges.
435·6	PUL-I-ABRISHAM (POLE-ABRICHAM)	Alt. 2,910 ft. PL.(1,460 ft.). Line crosses the Kul-i-Mura and ascends the Juvain valley. 6 RC. bridges.
457·8	AMIRABAD	Alt. 2,995 ft. PL.(1,460 ft.). 7 RC. bridges.
477·9	AZADVAR	Alt. 3,176 ft. PL.(1,460 ft.); W. (T.33,000 gls., 2 Cr.); ES.(6); SP.; oil. 9 RC. bridges.
497·4	RAH-I-CHAMAN	Alt. 3,386 ft. PL.(1,460 ft.). 6 bridges.
516·7	SHAHR-I-STANEH (CHARESTANAK)	Alt. 3,566 ft. PL.(1,460 ft.). 1 viaduct.
539·9	TAHBAND (NEGHAB)	Alt. 3,639 ft. PL.(1,460 ft.). 1 RC. bridge.
560·4	HOKMABAD	Alt. 3,635 ft. PL.(1,460 ft.); W. (T.33,000 gls., 2 Cr.).
580·7	OUSA	Alt. 3,707 ft. PL.(1,460 ft.).
603·3	SABZAWAR	Alt. 3,878 ft. PL.(1,460 ft.); SP. The station appears to be at least 20 miles north of Sabzawar town. 5 RC. bridges.
627·0	BETAB (BATAU)	Alt. 4,062 ft. PL.(1,460 ft.). 2 RC. bridges; 2 viaducts.
650·6	AQ QALEH (AGHGALEH)	Alt. 3,819 ft. PL.(1,460 ft.). 2 RC. bridges; 2 viaducts.
672·6	NISHAPUR	Alt. 3,865 ft. PLs.(1,960 ft., 1,410 ft.); W. (T.33,000 gls., 3 Cr.); ES.(6); SP.; oil. 2 RC. bridges.

Km. from Garmsar	*Stations and passing-loops*	*Remarks*
694·9	HASHIMABAD (HACHEMABAD)	Alt. 4,032 ft. PL.(1,460 ft.). 5 RC. bridges; 1 viaduct.
717·8	DISBAD-I-PAIN (DISBAT-PAIN)	Alt. 4,236 ft. PL.(1,460 ft.). 3 RC. bridges.
735·2	SAIDABAD	Alt. 4,511 ft. PL.(1,460 ft.); W. (T.33,000 gls., 2 Cr.). 2 RC. bridges; 1 viaduct.
754·1	BAGHCHEH	Alt. 4,173 ft. PL.(1,460 ft.). 3 viaducts.
772·1	ROBAT	Alt. 3,668 feet. PL.(1,460 ft.). 1 RC. bridge; 2 viaducts.
791·2	JIMABAD	Alt. 3,254 ft. PL.(1,460 ft.).
811·1	MESHED	Alt. 3,186 ft. W. (no details); EP.; SP.; ES.(8); Tbl.(72 ft.); RpS.; oil. Town description, pp. 528–30.

6. QUM–YEZD

(*Under construction 1943*)

Distance: 294·1 miles, 473·3 kilometres.

In 1942 the formation of this line was said to be completed to within 40 miles of Yezd, but no track had been laid. A survey of the extension from Yezd to Kirman and a preliminary reconnaissance from Kirman to Zahidan had been made. The gauge throughout was to be 4 ft. 8½ in.; the maximum gradient to Yezd was 1 in 166; engine sheds and marshalling yards at Qum, Kashan, Nain, and Yezd. A list of stations to Yezd is given below; there are several varieties in their spellings and some cannot be identified on existing maps. Those marked with an asterisk were only projected in 1942. The names shown in brackets are doubtful or incorrect.

List of Stations with distances in kilometres from Qum

0·0	QUM
16·2	*LANGRUN (LENGUEROUN)
33·1	SHURAB
49·3	*FIRUZABAD
65·1	DEHNAU (DEHNAR)
81·9	*(*Not known*)
97·9	KASHAN
113·8	*GAZ
130·3	KARGHUL (KORKHGOL)
146·5	*DEHABAD
162·3	BAD
179·1	MOGHAR (MUGHAR)
195·5	*(SOUMIKH, HASANABAD)
211·7	ZAVAREH
227·9	*AMIRABAD
243·5	SARAB
260·2	*(MERA?)
276·3	(SOHBIL?)
293·8	*(CHASHMEH-I-GALLEH?)
310·0	NAIN
325·8	*SARGAZ
341·5	NAU GUNBAD (NOH GONBAD)
346·7	*(CHACH-I-NOW?)
372·9	SARV
388·6	*HAFTALAN
404·0	ARDAKAN
417·6	MAIBUD (MEIBOD)
432·2	JALALABAD
445·2	*(*Not known*)
462·0	NASRATABAD
473·3	YEZD

7. DAR-I-KHAZINEH–CHASHMEH-I-ALI

Distance: 35·8 miles, 57·6 kilometres.

Permanent Way

Gauge, 2 ft. 6 in. Single track. Steam traction. Flat-bottom rails, 30 lb. per yard, keyed to steel sleepers.

Minimum radius of curves, 120 metres; maximum gradient, 1 in 30; maximum distance between passing-loops, 18 km.

GENERAL DESCRIPTION

This narrow-gauge line, the property of the Anglo-Iranian Oil Company, leaves Dar-i-Khazineh on the Karun, about 50 miles by motor north of Ahwaz, and follows the Masjid-i-Sulaiman metalled motor-road to Tembi, where it diverges past the pumping-station. There are three main bridges with Hopkins-type truss spans (105 ft., 120 ft., 120 ft.), and many smaller ones and culverts. The line is well maintained.

Stations and distances from Dar-i-Khazineh

0·0	Dar-i-Khazineh	43·2	Tembi
c. 10·0	Gavsawar	51·2	Masjid-i-Sulaiman
19·2	Abgah	57·6	Chashmeh-i-Ali
25·6	Batwand		

8. TEHRAN–REY (SHAH ABDUL AZIM)

(*Completed 1887*)

Distance: 5·6 miles, 9·0 kilometres.

Permanent Way

Gauge, 3 ft. $3\frac{3}{8}$ in. Single track. Steam traction. Flat-bottom rails, *c.* 30 lb. per yd., length *c.* 16 ft. Wooden sleepers.

GENERAL DESCRIPTION

This is only a short local line, used mostly by passenger trains on Fridays to serve the shrine at Shah Abdul Azim.

DETAILED DESCRIPTION

Km. from Tehran	*Stations and passing-loops*	*Remarks*
0·0	Tehran	PL.; W.; ES.(4).
4·5	Daulatabad	PL.
6·5	..	Level crossing over Trans-Iranian railway. Cement works.
9·0	Rey (Shah Abdul Azim, Rai)	PL.; W.

WATERWAYS

RIVERS are of little use for communications in Persia, though skin rafts (*kellek*) are employed on some of the western rivers, mainly for ferries (photo. 307). The Karun after it has left the mountains is the only river which is navigable for larger vessels. Its regime has been described in Chapter II (p. 27). Low water at Ahwaz is from August to mid-November, but occasionally early rain causes considerable rises in the latter month (fig. 9), and thereafter until the end of January there may be violent fluctuations from rainfall. Spring floods from melting snow often begin at the end of February and maintain the river at high level until April or May, when a steady fall begins. The difference between the normal high and low monthly figures is 10·2 feet, but the actual difference between high and low water is often much greater and has been as much as 20 feet.

Karun Navigation

As far as Bandar Nasiri, 1½ miles below Ahwaz and 112 miles by river from Khurramshahr, the Karun is navigable by vessels of 5-foot draught in ordinary years, while vessels of 12-foot draught can reach Salmaneh bend, 17 miles above Khurramshahr. From here to Saiyid Abud there are some bends, but thence to beyond Dorquain navigation along a straight reach is easy. After Ali ibn al Husain, about 34 miles from Khurramshahr, there are several tortuous reaches and the navigable channel is very narrow at the bends, but the local pilots are skilful and can negotiate them even at night. Tides are felt as far as Dorquain. The current runs at from 4 to 6 knots at high river and about 2 knots at low.

Between Bandar Nasiri and Ahwaz the bed rises by rocky sills which form five rapids. The chief obstacle to navigation is the second rapid where a reef projects from the left bank and leaves a channel only 100 yards wide. This channel is broken by rocks into separate passages, the broadest being only 50 yards wide, through which the water rushes with a fall of 1 in 50. Though native vessels can be dragged through these rapids at most seasons, light-draught steamers can only be passed through during the high-water months of April and May, and only then if they are sufficiently powerful.

The Karun from Ahwaz to Dar-i-Khazineh is navigable for light-draught steamers, but the river is winding and narrow. Steamers can tow two barges except during the low-water season between July and November, when loads have to be cut by half. The current runs at

from 6 to 9 knots in the high-river season and at 3 knots when the river is low.

Times: Basra–Bandar Nasiri–Basra: 2 days 6 hours (with barges); 1 day 14 hours (without barges).

Ahwaz–Dar-i-Khazineh–Ahwaz: 1 day 12 hours (with barges); 1 day 4 hours (without barges).

All times are subject to river conditions and may be increased considerably in times of flood. For safety in the low-river season steamers should not exceed 3 feet in draught and barges 2 ft. 9 in.

Shatt al Arab

The channel of the Shatt al Arab is in Iraq and is navigable for steamers throughout, but the draught of ships is limited by bars. The Rooka channel across the outer bar is dredged to a minimum depth of 23 feet at mean low-water springs and has a maximum depth of 33 feet at high-water springs. The western channel across the outer bar has a minimum depth of 8 feet and is used by shallow-draught and sailing vessels. The inner bar, east-north-east of Ras al Bisha, is dredged to a minimum depth of 23½ feet. The Karun bar, south of the confluence of the Karun, is dredged to a minimum depth of 20 feet at mean low-water springs and has a maximum depth of about 27 feet at high-water springs. The navigable channel is lighted and buoyed by the Port of Basra authorities, so that navigation is possible by night.

EXTERNAL COMMUNICATIONS

By Sea

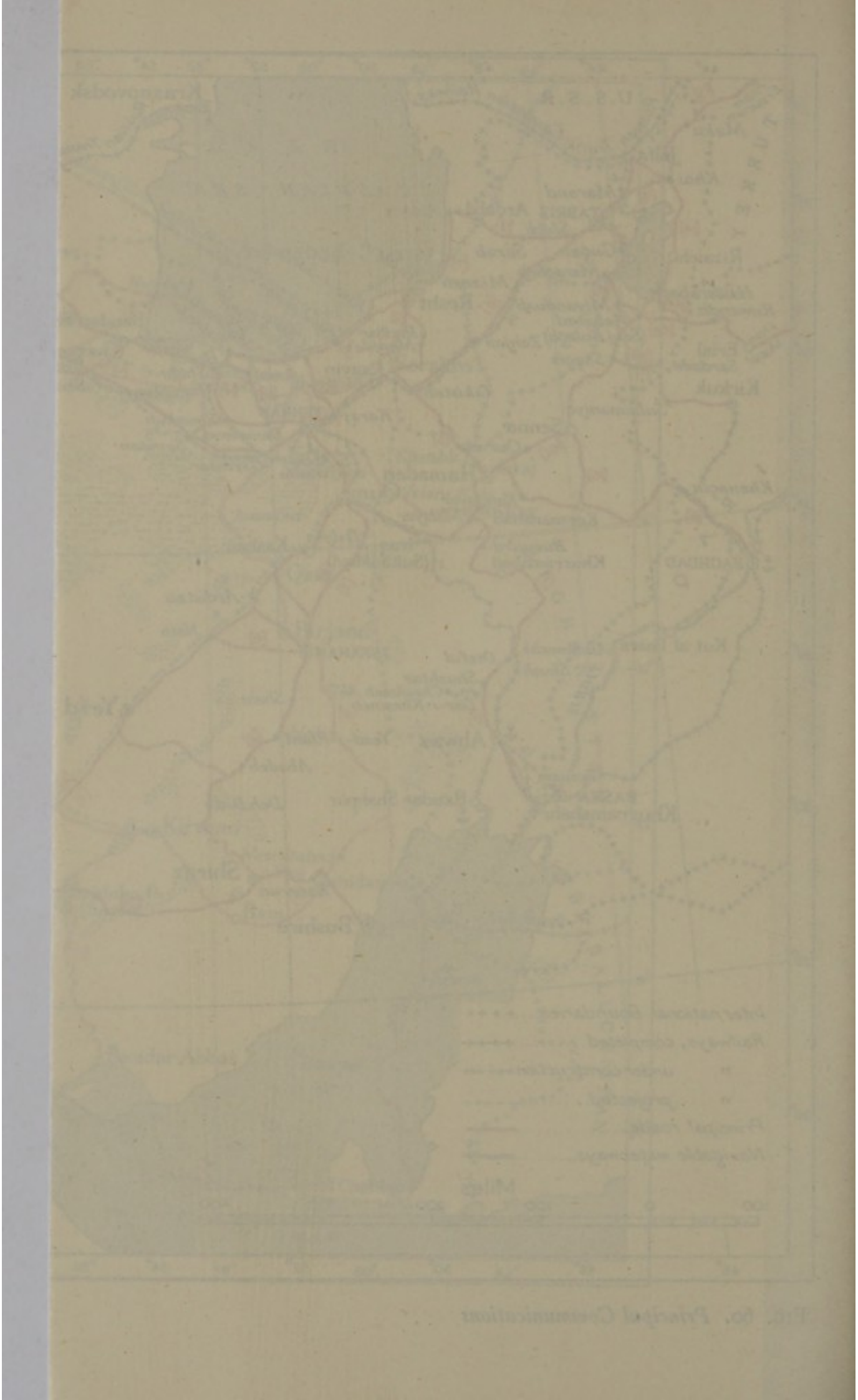
Communications along the Gulf coast are maintained by steamers of the British India Steam Navigation Company, which provides a weekly fast mail service between Basra, Bushire, Karachi, and Bombay, and, before the war, a weekly slow mail service between Khurramshahr, Kuwait, Bushire, Manama (Bahrein), Bandar Abbas, Muscat, and Karachi, also calling at Lingeh, Jask, and Chahbar when cargo was available. In war-time the slow mail service is operated about once every three weeks.

By Air

French and Dutch air-lines formerly called at Bushire and Jask on their way to French Indo-China and the Dutch East Indies. The



FIG. 60. *Principal Communications*



British air route to India followed the Persian coast until 1932, when it was transferred for political reasons to the Arabian coast. Special services have been flown when required since the outbreak of war.

By Rail

The Russian railways in the Caucasus connect with the Persian system at Julfa; north-east Persia is within motorable distance of the 'Turk-Sib' line at Ashqabad, Tejend, and Merv. The North-west Railway of India from Quetta ends at Mirjawa, the extension to Zahidan (Duzdap) having been abandoned. From Mirjawa, Tehran can be reached by motor via Birjand.

Cables and Telegraphs

The Gulf is an important link in the telegraph system between Europe and India. There is a direct submarine cable from Fao (in Iraq) to Bushire (Rishahr), Jask, and Karachi. There are also cables between Bushire, Henjam, Jask, and Chahbar. Land-lines run along the coast from Jask to Karachi, with stations at Chahbar and in Baluchistan. All these lines were controlled by the Indo-European Telegraph Department of the Indian Government until 1931, when they were taken over by the Persian Telegraph Administration (which operates the internal telegraph system mostly along main roads), except for the land-line between Jask and the Indian frontier which is now controlled by the Imperial and International Communications Company. The Persian Government has wireless stations at Khurramshahr, Bushire, Lingeh, and Jask.

APPENDIX A

METEOROLOGICAL TABLES

TABLE I. *List of Principal Stations*

Station	*Lat.* N.	*Long.* E.	*Alt.*† *(in feet)*	*Length of record (years)*
Abadan	30° 20′	48° 35′	7	6–12
Ahwaz	31° 20′	48° 48′	200	6
Ashuradeh	36° 52′	53° 50′	−82	4
Astara*	38° 27′	48° 53′	−69	1–3
Bushire	29° 00′	50° 50′	14	3–53
Chahbar (Charbar)	25° 08′	60° 19′	26	4–10
Chikishliar*	37° 39′	53° 51′	−33	10
Erivan*	40° 10′	44° 30′	3,260	6–20
Henjam	26° 38′	55° 52′	60	4
Husainabad	30° 52′	61° 23′	1,700	6
Isfahan	32° 38′	51° 38′	5,817	7–22
Jask	25° 45′	57° 45′	13	3–38
Kashan	34° 00′	51° 27′	3,190	?
Kermanshah	34° 19′	47° 04′	4,860	7
Khurramshahr	30° 28′	48° 18′	10	5–9
Kirman	30° 21′	57° 05′	6,100	7
Lenkoran*	38° 46′	48° 51′	−62	8–36
Lingeh	26° 36′	54° 59′	20	2–3
Maidan-i-Naftun	31° 55′	49° 20′	500	7
Meshed	36° 15′	59° 33′	3,104	12–28
Ordubat*	38° 58′	46° 00′	..	12
Pahlevi	37° 29′	49° 28′	−67	3
Resht	37° 17′	49° 35′	−50	2
Sarakhs	36° 32′	61° 10′	984	4–5
Seistan	31° 02′	61° 30′	2,000	7–9
Tabriz	38° 05′	46° 18′	4,423	?
Tehran	35° 41′	51° 25′	4,002	4–27
Zahidan	29° 30′	60° 53′	4,718	5

* In the U.S.S.R. or on the frontier of Persia.

† The altitudes given are from official meteorological records, and may not be co-ordinated with other heights given in this volume. Many stations are, however, some distance from the towns from which they take their names. Places near the Caspian with negative heights are below mean sea-level. The Caspian is approximately 85 feet below the level of the Black Sea.

TABLE II. *Percentage Frequency of Wind Directions**

TEHRAN. 6 years' observations (mean of 0730 and 1730 hrs.)

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*	
N.	7	7	5	5	2	0	1	1	2	7	8	5	4	N.
NE.	12	12	11	6	4	2	2	5	6	9	12	9	8	NE.
E.	3	3	3	2	1	1	1	0	0	0	1	2	1	E.
SE.	3	2	3	1	3	1	6	4	2	1	1	1	2	SE.
S.	3	2	3	3	4	3	6	5	3	3	1	1	3	S.
SW.	11	13	11	14	18	17	9	10	10	7	3	7	11	SW.
W.	3	19	7	9	6	3	1	1	1	2	4	5	4	W.
NW.	1	2	3	3	3	3	1	0	1	3	3	1	2	NW.
Calm	**57**	**52**	**54**	**57**	**59**	**70**	**73**	**74**	**75**	**68**	**67**	**69**	**65**	Calm

MESHED. 14 years' observations (0800 hrs.)

N.	3	5	7	7	8	9	8	7	6	2	2	3	6	N.
NE.	0	1	3	1	2	2	2	3	1	4	3	1	2	NE.
E.	1	1	2	3	2	3	1	1	1	1	2	0	1	E.
SE.	2	3	3	5	2	3	1	3	2	3	4	1	3	SE.
S.	2	4	3	5	4	3	1	2	2	4	3	2	3	S.
SW.	2	1	1	1	0	1	0	1	0	1	1	0	1	SW.
W.	1	1	1	1	1	1	0	0	0	1	1	1	1	W.
NW.	5	4	4	5	3	2	2	2	1	0	2	1	3	NW.
Calm	**84**	**80**	**76**	**72**	**78**	**76**	**85**	**81**	**87**	**84**	**82**	**91**	**80**	Calm
Velocity†	1·1	1·5	**1·7**	**1·7**	1·3	1·5	1·6	1·3	1·1	1·0	0·9	0·9	1·3	Velocity†

ISFAHAN. 5–9 years' observations (mean of 0730 and 1530 hrs.)

N.	4	4	4	5	5	6	7	7	5	5	3	3	5	N.
NE.	5	5	7	6	7	10	10	9	8	7	7	6	7	NE.
E.	5	5	6	4	3	6	9	7	6	6	8	5	6	E.
SE.	2	4	5	3	2	1	5	5	4	3	3	4	3	SE.
S.	3	6	3	7	3	1	1	2	2	1	1	1	3	S.
SW.	12	19	16	20	20	14	7	6	7	6	6	7	12	SW.
W.	8	8	10	10	13	9	6	7	6	5	4	7	8	W.
NW.	8	7	10	10	10	12	10	5	7	6	5	9	8	NW.
Calm	**53**	**42**	**39**	**35**	**37**	**41**	**45**	**52**	**55**	**61**	**63**	**58**	**48**	Calm

SEISTAN. 8 years' observations (0700 hrs.)

N.	20	24	17	21	23	17	17	15	10	12	17	7	17	N.
NE.	3	3	3	4	1	0	0	0	0	1	2	1	1	NE.
E.	4	2	3	2	2	0	0	0	0	2	2	2	2	E.
SE.	0	1	0	0	0	0	0	0	0	2	2	1	<1	SE.
S.	2	2	2	1	0	0	0	0	0	2	2	1	1	S.
SW.	1	0	2	0	0	0	0	0	0	0	0	0	<1	SW.
W.	7	3	0	3	1	0	0	0	0	4	3	3	2	W.
NW.	17	27	28	**43**	**62**	**80**	**79**	**82**	**81**	**47**	24	18	**49**	NW.
Calm	**46**	**38**	**45**	26	11	3	4	3	9	31	**50**	**68**	28	Calm
Velocity†	4	4	6	7	10	13	**15**	**15**	13	7	6	4	9	Velocity†

ABADAN. 10 years' observations (0900 hrs.)

N.	8	10	10	11	15	14	11	7	9	11	11	7	10	N.
NE.	11	8	5	7	8	2	1	2	4	5	11	12	6	NE.
E.	10	7	8	9	4	1	1	2	1	3	5	8	5	E.
SE.	5	11	14	11	4	2	1	4	4	2	8	9	6	SE.
S.	6	7	9	9	3	1	2	5	9	6	5	2	5	S.
SW.	3	4	6	10	8	4	5	10	6	11	5	4	6	SW.
W.	**29**	**24**	**22**	12	15	24	29	23	30	24	20	**29**	24	W.
NW.	24	22	20	**24**	**35**	**49**	**46**	**39**	**32**	**31**	**31**	25	**32**	NW.
Calm	4	7	6	7	8	3	5	8	5	7	4	4	6	Calm

* Throughout these tables, figures in heavy type are maxima, those in italics minima.

† Mean velocity in m.p.h. of 24 hrs.; number of observations unspecified. Meshed, 12 years' and Seistan 7–8 years' observations.

TABLE II. *Percentage Frequency*

BUSHIRE. 5 years' observations (1933–7)*

	Jan.		*Feb.*		*March*		*April*		*May*		*June*	
Time	0730	1530	0730	1530	0730	1530	0730	1530	0730	1530	0730	1530
N.	**40**	11	**29**	10	25	3	**26**	5	22	1	21	3
NE.	31	5	25	2	**29**	1	21	1	12	1	5	0
E.	16	3	15	3	18	<1	14	1	13	<1	5	0
SE.	5	8	12	13	9	8	10	3	4	1	7	0
S.	0	7	1	6	3	8	5	8	5	2	5	3
SW.	1	3	2	3	<1	8	1	11	0	9	6	13
W.	0	5	4	11	3	23	1	25	6	29	3	**46**
NW.	7	**58**	11	**52**	11	**48**	21	**46**	**34**	**56**	**45**	35
Calm	0	0	1	0	1	0	<1	0	4	0	3	0
Velocity†	5·8		5·8		5·8		6·9		6·9		**8·1**	

HENJAM. 6 years' observations (1930–5)*

Time	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600
N.	35	2	**32**	1	14	1	6	2	2	<1	3	<1
NE.	**37**	22	28	12	**28**	5	13	2	6	0	11	<1
E.	4	12	2	6	6	6	9	4	8	1	9	1
SE.	0	3	1	4	2	10	4	4	3	2	3	2
S.	1	4	0	2	2	3	3	3	2	3	1	2
SW.	3	**35**	8	**53**	17	**54**	**33**	**65**	**44**	**77**	**38**	**72**
W.	5	11	4	13	7	14	7	16	12	15	12	15
NW.	11	4	17	1	7	2	11	<1	5	0	5	<1
Calm	4	7	8	8	17	5	14	3	18	2	18	6
Velocity†	6·9		6·9		5·8		6·9		**8·1**		6·9	

JASK. 5 years' observations (1933–7)*

Time	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600
N.	**46**	3	18	2	23	2	10	<1	5	0	1	0
NE.	18	1	16	2	15	2	10	2	8	0	10	0
E.	10	7	10	5	13	4	19	<1	25	0	**38**	<1
SE.	3	12	4	12	5	12	8	7	5	5	18	17
S.	0	3	0	7	<1	13	<1	12	2	15	0	15
SW.	0	13	<1	15	<1	18	2	19	3	22	1	19
W.	3	**29**	13	**38**	12	**29**	**21**	**31**	**27**	**38**	12	**25**
NW.	14	18	**33**	19	**24**	20	**21**	26	13	18	13	23
Calm	6	4	5	<1	7	0	8	2	12	2	7	0
Velocity†	8·1		8·1		8·1		8·1		8·1		8·1	

CHAHBAR. 6 years' observations (1932–7)*

Time	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600
N.	7	2	8	4	5	2	3	0	2	1	1	0
NE.	**31**	4	18	2	18	<1	8	1	1	<1	7	0
E.	**31**	9	20	3	18	3	12	<1	12	0	**29**	2
SE.	2	13	3	6	5	9	7	5	13	9	25	17
S.	<1	13	<1	16	<1	24	1	27	5	24	9	**37**
SW.	<1	20	0	20	1	**32**	2	27	7	**31**	5	28
W.	4	**21**	14	**31**	12	23	23	**30**	22	27	6	13
NW.	14	13	**27**	17	**25**	5	**27**	8	**25**	7	6	1
Calm	10	5	10	<1	16	1	17	<1	13	1	12	2
Velocity†	6·9		6·9		6·9		5·8		5·8		6·9	

* Second observation was 2 hours later previous to July 1934.

† Mean velocity in m.p.h.

of Wind Directions—continued

July		*Aug.*		*Sept.*		*Oct.*		*Nov.*		*Dec.*		*Year*		
0730	1530	0730	1530	0730	1530	0730	1530	0730	1530	0730	1530	0730	1530	*Time*
15	4	17	2	18	1	20	5	23	8	**35**	17	**24**	6	N.
6	0	13	0	**19**	0	**32**	0	**33**	3	31	1	22	1	NE.
5	0	18	<1	12	0	17	<1	25	5	23	4	15	2	E.
5	0	15	1	12	0	7	1	12	7	6	5	9	4	SE.
12	6	5	10	4	3	4	4	1	4	0	8	4	6	S.
2	19	2	24	4	15	1	10	0	5	0	3	2	10	SW.
8	**47**	2	**41**	8	**43**	3	35	1	17	0	6	3	27	W.
34	24	**19**	21	10	38	10	**44**	4	**51**	4	**55**	17	**44**	NW.
13	0	9	0	13	0	6	0	1	<1	<1	<1	4	<1	Calm
5·8		5·8		4·6		4·6		4·6		4·6		5·8		Velocity

0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	*Time*
3	1	5	1	9	<1	21	0	**44**	<1	**38**	3	18	1	N.
24	2	**38**	4	**27**	0	**46**	2	39	2	37	16	**28**	6	NE.
16	14	29	20	23	4	10	9	1	8	3	12	10	8	E.
5	12	3	16	6	14	1	11	1	10	<1	9	2	8	SE.
3	3	2	3	<1	2	1	<1	0	3	0	2	1	2	S.
21	**44**	7	**38**	9	**53**	6	**53**	1	**52**	2	**38**	16	**53**	SW.
7	17	4	11	4	22	2	17	<1	15	5	10	6	15	W.
3	2	2	<1	5	1	2	0	7	2	10	1	7	1	NW.
18	5	10	6	17	4	11	7	6	7	5	9	12	6	Calm
5·8		6·9		5·8		5·8		4·6		5·8		5·8		Velocity

0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	*Time*
<1	<1	<1	0	10	0	3	<1	**33**	0	**45**	3	16	<1	N.
7	0	5	0	10	0	9	<1	20	0	20	3	12	<1	NE.
62	<1	**58**	3	**40**	<1	**36**	<1	11	1	7	3	**28**	2	E.
15	**39**	26	**46**	18	19	11	19	5	10	0	9	10	17	SE.
2	35	2	31	1	19	0	16	<1	22	0	21	<1	18	S.
<1	7	1	10	<1	**26**	0	**29**	0	18	0	18	<1	18	SW.
5	10	4	6	0	23	9	23	5	**30**	9	**35**	10	**27**	W.
6	8	2	4	7	11	11	10	13	18	16	7	14	15	NW.
2	0	2	0	13	1	21	1	12	1	3	1	8	1	Calm
9·2		**9·2**		8·1		6·9		5·8		6·9		8·1		Velocity

0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	0800	1600	*Time*
0	0	0	0	0	0	2	0	5	0	7	4	3	1	N.
10	0	8	0	12	0	17	<1	26	1	27	4	15	1	NE.
42	8	**49**	11	**32**	2	**26**	1	**28**	<1	**30**	8	**28**	4	E.
25	34	29	**38**	23	18	9	8	3	6	3	8	12	14	SE.
10	**39**	6	33	5	**38**	5	29	1	23	0	17	4	**27**	S.
2	15	3	16	5	33	2	**39**	<1	**35**	0	**25**	2	**27**	SW.
1	4	<1	<1	7	9	6	19	3	28	3	24	8	19	W.
2	0	1	<1	**2**	<1	13	2	18	6	16	9	15	6	NW.
8	0	4	0	14	0	20	2	15	<1	14	1	13	1	Calm
8·1		**8·1**		5·8		4·6		5·8		5·8		6·9		Velocity

of 24 hrs. Bushire, 24 years', Henjam, 8 years', Jask, 21 years', and Chahbar, 6 years' observations.

TABLE III. *Number of occasions per 100 on which particular winds may be expected*

I = 3–13 knots (4–15 m.p.h.) II = 14–27 knots (16–31 m.p.h.) III = 28–40 knots (32–47 m.p.h.) IV = over 40 knots (over 47 m.p.h.) C = less than 3 knots (less than 4 m.p.h.)

JASK. 25° 45′ N., 57° 45′ E., <33 ft. Time of obs.: not known Period: June 1924–June 1925.

Height above M.S.L. (feet)	*N.*				*NE.*				*E.*				*SE.*				*S.*				*SW.*				*W.*				*NW.*				*C*	*No. of obs.*
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
January																																		
Surface	26	0	0	0	13	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	23	30
1,700	3	0	0	0	7	0	0	0	3	0	0	0	13	3	0	0	3	0	0	0	7	0	0	0	23	3	0	0	17	17	0	0	0	30
3,000	0	0	0	0	0	0	0	0	7	0	0	0	3	0	0	0	0	0	0	0	20	0	0	0	26	0	0	0	23	20	0	0	0	30
6,500	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	11	37	15	0	7	7	7	0	0	27
10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	20	28	24	8	4	0	8	0	25
February																																		
Surface	14	0	0	0	40	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	0	0	7	0	0	0	25	28
1,700	14	4	0	0	11	4	0	0	18	0	0	0	4	4	0	0	4	0	0	0	7	0	0	0	7	7	0	0	11	4	0	0	4	28
3,300	12	0	0	0	8	0	0	0	12	0	0	0	19	0	0	0	4	0	0	0	4	0	0	0	4	15	0	0	19	0	0	0	4	26
6,500	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	4	0	0	12	8	0	0	12	8	12	0	15	8	4	0	8	26
10,000	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	13	17	25	4	4	13	13	0	0	24
March																																		
Surface*	0	0	0	0	6	0	0	0	8*	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	12	0	0	0	18	0	0	0	41	17
1,700	18	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	0	18	0	0	0	35	18	0	0	0	17
3,300	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	0	0	0	18	0	0	0	18	23	0	0	6	17
6,500	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	12	6	0	0	29	0	0	18	18	0	0	0	17
10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	37	13	0	19	19	0	0	0	16
April																																		
Surface	5	0	0	0	5	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	18	0	0	0	27	22
1,700	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	14	0	0	0	50	0	0	0	0	22
3,300	5	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	9	0	0	45	18	0	0	0	22
6,500	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	18	0	0	5	27	0	5	0	22
10,000	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	0	0	20	25	10	0	10	0	0	0	10	20

May																												
Surface	7	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	16	3	0	0	3	0	0	0	23	31
1,700	7	3	0	0	3	0	0	0	10	0	0	0	19	0	0	0	0	0	0	0	3	0	0	0	7	0	0	0	26	13	3	0	7	31
3,300	0	3	0	0	0	3	0	0	7	3	0	0	13	0	0	0	3	0	0	0	7	0	0	0	10	3	0	0	23	19	0	0	7	31
6,500	10	3	0	0	13	0	0	0	3	3	0	0	0	0	0	0	3	0	0	0	3	3	3	0	23	7	0	0	10	10	0	0	7	31
10,000	16	0	0	0	10	3	0	0	7	3	0	0	16	0	0	0	0	0	0	0	3	7	0	0	16	10	0	0	10	0	0	0	0	31
June																												
Surface	6	0	0	0	3	0	0	0	14	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	17	0	0	0	39	36
1,700	19	0	0	0	6	0	0	0	8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	14	8	0	0	14	22	0	0	3	36
3,300	14	3	0	0	6	0	0	0	11	0	3	0	3	0	0	0	3	0	0	0	3	0	0	0	14	19	0	0	14	8	0	0	0	36
6,500	6	0	0	0	6	0	0	0	8	3	0	0	11	0	0	0	3	0	0	0	6	0	0	0	20	6	0	0	17	14	0	0	0	35
10,000	0	0	0	0	8	0	0	0	8	0	0	0	3	0	3	0	18	0	0	0	8	0	0	0	28	3	0	0	15	0	0	0	8	35
July																												
Surface	3	0	0	0	0	0	0	0	35	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	16	0	0	0	35	31
1,700	10	0	0	0	10	3	0	0	13	10	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	32	10	0	0	6	31
3,300	3	0	0	0	13	3	0	0	6	10	0	0	3	0	0	0	0	0	0	0	6	0	0	0	10	6	0	0	29	6	0	0	3	31
6,500	13	0	0	0	7	3	0	0	13	3	0	0	0	0	0	0	3	0	0	0	13	0	0	0	17	7	0	0	13	0	0	0	7	30
10,000	0	0	0	0	10	3	0	0	13	0	0	0	10	0	0	0	3	0	0	0	17	0	0	0	27	0	0	0	10	0	0	0	7	30
August																												
Surface	0	0	0	0	0	0	0	0	65	7	0	0	3	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	10	0	0	0	10	31
1,700	10	0	0	0	10	0	0	0	23	13	3	0	7	3	0	0	0	0	0	0	7	0	0	0	10	0	0	0	7	7	0	0	0	30
3,300	21	0	0	0	4	0	0	0	7	0	0	0	0	4	0	0	4	0	0	0	11	0	0	0	21	4	0	0	14	11	0	0	0	28
6,500	16	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	12	0	0	0	20	12	0	0	4	4	0	0	12	25
10,000	0	0	0	0	17	13	0	0	4	9	0	0	22	0	0	0	0	0	0	0	4	0	0	0	13	4	0	0	9	0	0	0	4	23
September																												
Surface	13	0	0	0	13	0	0	0	27	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	30
1,700	10	0	0	0	27	3	0	0	13	7	0	0	10	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	13	0	0	0	10	30
3,300	4	0	0	0	24	24	4	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	20	0	0	0	4	25
6,500	8	0	0	0	12	20	0	0	0	4	0	0	8	0	0	0	4	0	0	0	0	0	0	0	32	0	0	0	4	0	0	0	8	25
10,000	13	4	0	0	13	4	0	0	4	0	0	0	25	0	0	0	13	0	0	0	4	0	0	0	4	0	0	0	8	4	0	0	4	24
October																												
Surface	3	0	0	0	19	0	0	0	42	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	19	31
1,700	20	0	0	0	13	7	0	0	17	0	0	0	10	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	17	10	0	0	3	30
3,300	27	0	0	0	20	7	0	0	3	0	0	0	7	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	27	3	0	0	3	30
6,500	13	0	0	0	23	3	0	0	7	0	0	0	13	0	0	0	7	0	0	0	13	0	0	0	3	0	0	0	3	0	0	0	13	30
10,000	7	3	0	0	30	3	0	0	13	0	0	0	23	0	0	0	3	7	0	0	7	0	0	0	0	0	0	0	3	0	0	0	0	30

Note. The number of observations is not sufficient to give a reliable normal. Observations of cloud motion are not available.

* The total of these figures is only 91; it is probable that the frequency of E. winds should be 18 per cent. and not 8.

TABLE III—*continued*

Height above M.S.L. (feet)	*N.*				*NE.*				*E.*				*SE.*				*S.*				*SW.*				*W.*				*NW.*				*C*	*No. of obs.*
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
November																																		
Surface	3	0	0	0	27	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	47	30
1,700	13	0	0	0	17	0	0	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	23	0	0	0	27	30
3,300	7	0	0	0	13	0	0	0	23	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	13	0	0	0	23	3	0	0	10	30
6,500	21	0	0	0	7	0	0	0	21	0	0	0	3	0	0	0	3	0	0	0	3	7	0	0	3	0	0	0	24	3	0	0	3	29
10,000	21	0	0	0	21	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	17	0	0	0	28	0	0	0	3	29
December																																		
Surface	23	0	0	0	27	0	0	0	17	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	23	30
1,700	0	3	0	0	10	0	0	0	7	0	0	0	20	13	3	0	3	0	0	0	3	0	0	0	10	0	0	0	20	3	0	0	3	30
3,300	0	0	0	0	7	0	0	0	7	0	0	0	11	11	0	0	4	4	0	0	7	0	0	0	29	0	0	0	14	0	0	0	7	28
6,500	9	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	4	0	0	13	4	0	0	13	9	0	0	35	0	0	0	4	23
10,000	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	27	31	5	0	5	18	0	0	0	22

TABLE IV. *Mean Monthly Temperatures* (° F.)

Station	Alt. (feet)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Astara*	−69	40	42	46	54	65	73	76	77	70	62	52	44	58
Lenkoran*	−66	38	41	46	54	65	74	78	78	71	62	51	43	58
Ashuradeh	−82	45	48	52	59	70	77	81	81	77	67	56	51	63
Chikishliar*	−33	41	44	49	58	68	77	81	81	75	63	50	45	61
Erivan*	3,260	21	26	40	54	64	72	77	77	69	57	43	32	53
Tabriz	4,423	17	25	39	54	63	74	79	81	73	62	48	34	54
Kermanshah	4,860	32	36	44	52	62	72	80	79	70	62	48	37	56
Tehran	4,002	35	41	49	60	70	80	85	84	77	64	53	42	62
Meshed	3,104	34	38	46	56	67	74	77	74	67	57	47	39	57
Sarakhs	984	35	44	51	63	77	86	88	84	75	62	50	43	63
Kashan	3,190	35	36	43	60	74	83	90	85	77	68	53	42	62
Isfahan	5,817	35	41	49	59	69	77	83	80	73	61	50	41	60
Kirman	6,100	45	46	51	61	72	81	81	78	71	63	55	45	62
Seistan	2,000	48	51	59	70	81	87	90	89	79	69	57	47	69
Husainabad	1,700	45	49	60	70	82	89	91	89	79	67	59	50	69
Zahidan	4,718	41	45	51	62	74	81	83	80	71	62	51	43	62
Abadeh	6,200	41	41	47	56	68	75	79	75	71	50	55	46	59
Deh Bid	8,000	27	30	38	45	57	65	69	65	61	52	43	36	49
Shiraz	5,000	48	47	55	63	73	80	85	81	76	67	55	49	65
Kazerun	2,800	51	50	52	67	84	93	95	94	87	79	70	56	73
Maidan-i-Naftun	500	50	53	60	71	84	94	100	97	90	79	67	55	75
Ahwaz	200	53	57	65	75	87	95	99	99	93	83	70	57	78
Khurramshahr	10	55	59	65	75	85	90	92	93	88	81	69	57	76
Abadan	7	53	59	65	76	87	93	97	97	90	81	69	58	77
Borazjan	100	55	57	66	80	94	97	100	99	92	83	72	64	80
Bushire	14	57	59	66	74	83	87	89	91	87	80	71	61	75
Henjam	100	65	67	72	78	84	88	91	91	89	85	77	69	80
Jask	13	67	69	74	80	85	90	91	89	87	83	76	71	80
Chahbar	26	66	69	74	79	85	87	87	84	83	81	75	70	78

* In the U.S.S.R. or on the frontier of Persia.

TABLE V. *Maxima and Minima Temperatures* (° F.)

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
TEHRAN (alt. 4,002 ft.) 10–21 years' obsns.													
M.D. Max.	44	51	59	71	83	94	99	97	91	77	63	51	73
M.D. Min.	26	32	39	48	57	66	71	71	63	52	43	33	50
M. Monthly Max.	53	61	76	84	91	99	103	100	96	85	73	60	103•
M. Monthly Min.	17	19	26	38	47	57	65	63	57	43	32	23	15•
Absolute Max.	65	67	83	91	96	107	109	109	101	90	84	68	109
Absolute Min.	−5	4	16	28	39	51	59	57	47	38	19	13	−5
KERMANSHAH (alt. 4,860 ft.). 7 years' obsns.													
M.D. Max.	41	46	55	64	76	89	96	97	88	77	60	46	70
M.D. Min.	23	26	34	41	48	55	63	61	51	47	37	29	43
Absolute Max.	58	69	74	80	91	99	106	106	100	100	75	63	106•
Absolute Min.	−8	−6	15	28	32	43	46	50	41	31	22	14	−8•
MESHED (alt. 3,104 ft.). 16–26 years' obsns.													
M.D. Max.	46	48	57	68	80	89	92	90	83	72	61	50	70
M.D. Min.	22	28	35	45	55	60	63	59	51	42	34	29	44
M. Monthly Max.	63	63	75	83	92	98	99	98	92	92	79	63	—
M. Monthly Min.	4	12	22	34	46	52	55	50	42	32	23	18	—
Absolute Max.	72	72	84	91	101	104	105	104	98	94	90	75	105
Absolute Min.	−11	−2	0	18	35	42	47	41	29	22	7	−3	−11
ISFAHAN (alt. 5,817 ft.). 5–25 years' obsns.													
M.D. Max.	47	53	61	72	83	93	98	96	90	77	63	52	74
M.D. Min.	24	29	37	46	54	62	67	64	56	46	37	29	46
M. Monthly Max.	57	65	71	83	91	100	103	103	94	88	75	65	104•
M. Monthly Min.	13	20	25	35	46	54	60	57	47	39	27	20	10•
Absolute Max.	66	74	79	89	95	103	107	105	100	99	79	73	107
Absolute Min.	−1	11	6	31	39	48	54	52	45	28	16	12	−4
SEISTAN (alt. 2,000 ft.). 7–9 years' obsns.													
M.D. Max.	61	63	72	83	95	101	103	101	93	84	72	60	82
M.D. Min.	35	38	46	57	68	74	77	76	66	53	41	34	55
M. Monthly Max.	69	80	88	96	104	109	110	108	102	95	85	70	111•
M. Monthly Min.	26	27	35	46	55	62	70	67	54	39	29	23	20•
Absolute Max.	87	89	100	100	111	116	114	113	105	103	92	75	116
Absolute Min.	19	22	31	30	42	39	63	60	49	31	22	12	12
KIRMAN (alt. 6,100 ft.). 7 years' obsns.													
M.D. Max.	61	62	65	77	91	101	101	98	92	84	76	60	81
M.D. Min.	29	31	36	46	54	62	62	57	49	42	33	30	44
Absolute Max.	75	82	84	90	104	109	112	108	103	94	89	78	112
Absolute Min.	7	14	22	28	32	50	48	44	36	29	20	11	7
KHURRAMSHAHR (alt. 10 ft.). 5–6 years' obsns.													
M.D. Max.	64	68	75	86	95	101	103	104	101	93	80	65	86
M.D. Min.	46	49	55	64	74	79	82	81	76	69	58	48	65
Absolute Max.	76	81	87	93	104	108	120	111	107	100	93	80	120
Absolute Min.	30	37	43	55	65	70	73	74	67	59	49	37	30
ABADAN (alt. 7 ft.). 10–13 years' obsns.													
M.D. Max.	63	68	76	88	101	108	112	113	107	97	81	68	90
M.D. Min.	44	49	55	64	74	78	82	81	73	65	57	48	64
M. Monthly Max.	72	77	88	102	111	116	117	118	114	105	92	78	119•
M. Monthly Min.	33	37	43	53	66	72	76	74	66	57	43	36	32•
Absolute Max.	77	83	93	109	116	118	122	123	118	110	97	84	123
Absolute Min.	26	27	36	45	60	67	73	71	60	53	33	24	24

• Means of highest and lowest each year.

TABLE V—*continued*

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
BUSHIRE (alt. 14 ft.). 34–53 years' obsns.													
M.D. Max.	64	65	73	81	89	92	95	**97**	94	88	78	68	82
M.D. Min.	51	53	59	67	76	81	**84**	**84**	79	72	63	55	69
M. Monthly Max.	74	76	87	95	100	101	102	**104**	100	94	87	78	106*
M. Monthly Min.	43	45	51	59	67	74	**78**	**78**	73	65	54	46	42*
Absolute Max.	80	85	105	103	107	112	112	**115**	107	101	93	87	115
Absolute Min.	32	37	42	47	58	67	**74**	69	63	55	42	37	32
JASK (alt. 13 ft.). 38 years' obsns.													
M.D. Max.	74	75	81	87	93	**97**	**97**	95	93	91	84	78	87
M.D. Min.	60	62	67	73	78	83	**85**	84	81	75	68	63	73
M. Monthly Max.	79	81	88	94	101	**105**	104	103	101	98	90	83	106*
M. Monthly Min.	52	55	59	66	72	78	**81**	80	76	69	62	57	51*
Absolute Max.	85	88	93	102	110	**113**	112	110	107	103	94	88	113
Absolute Min.	42	47	47	60	65	73	**76**	74	70	64	52	46	42
CHAHBAR (alt. 26 ft.). 10 years' obsns.													
M.D. Max.	74	76	81	87	91	**93**	91	88	88	88	84	78	85
M.D. Min.	58	61	66	72	78	82	**83**	80	77	73	66	62	71
M. Monthly Max.	80	82	89	94	**99**	98	98	94	96	97	92	84	102*
M. Monthly Min.	48	52	57	65	72	78	**79**	76	72	65	59	53	48*
Absolute Max.	85	86	94	97	103	101	**112**	102	104	99	96	87	112
Absolute Min.	41	45	51	61	70	75	77	73	69	59	57	46	41

* Means of highest and lowest each year.

TABLE VI. *Relative Humidity*
(Percentages)

	Local time	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
ASTARA. 1–3 years' obsns.														
	..	82	**85**	77	80	72	77	81	80	77	81	80	81	79
LENKORAN. 8–36 years' obsns.														
	..	86	87	87	84	81	75	73	76	82	88	**89**	**89**	83
TEHRAN. 4–6 years' obsns.														
	0730	78	72	52	52	55	52	54	53	54	55	66	**80**	60
	1730	**75**	59	39	40	47	49	41	46	49	54	66	**75**	53
MESHED. 23 years' obsns.														
	0800	**83**	**83**	77	68	59	48	45	46	49	62	76	79	65
ISFAHAN. 5–9 years' obsns.														
	0730	**76**	69	56	50	47	36	33	35	38	45	64	70	52
	1530	**53**	40	33	25	27	18	15	15	19	24	35	45	29
SEISTAN. 5 years' obsns.														
	0700	**81**	73	68	57	49	37	36	35	42	53	62	75	56
ABADAN. 10 years' obsns.														
	0900	**77**	75	59	45	33	25	25	29	33	39	60	75	48
BUSHIRE. 4 years' obsns.														
	0730	**87**	81	75	67	67	69	73	68	67	69	73	80	73
	1530	77	73	68	65	68	68	70	67	64	65	67	75	69
JASK. 4 years' obsns.														
	0800	67	**76**	69	68	66	71	71	74	66	67	64	67	69
	1600	58	66	61	63	62	63	66	**68**	63	62	59	57	62
CHAHBAR. 4 years' obsns.														
	0800 } 1600 }	71	**82**	75	75	78	78	77	75	75	74	69	68	75

TABLE VII. *Dust-storms, Fog, and Low Visibility*
Number of Days with these Phenomena

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Yearly total*
TEHRAN. 3–5 years' obsns.													
Fog	1·0	0·8	0·0	0·3	0·0	0·0	0·0	0·0	0·0	0·3	0·4	0·7	3
ABADAN. 5–6 years' obsns.													
Fog	0·4	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·2	0·8	1
BUSHIRE													
Fog	1	1	1	0	0	2	1	1	1	1	0	4	13
Dust-storms	1	0	0	2	1	3	2	0	2	1	1	0	13
Poor visibility*	1	3	0·4	2	0·6	3	4	1	0	1	0	0·4	16
HENJAM. 5 years' obsns.													
Fog	1	1	1	0	2	4	2	1	1	0	1	1	15
Dust-storms	1	2	1	2	2	2	1	1	0	1	1	0	14
Poor visibility*	0·9	2	0·6	1	2	7	7	3	0·3	0·3	0·3	0·6	25
JASK. 5 years' obsns.													
Fog	2	0	0	4	3	1	0	0	1	1	0	1	13
Dust-storms	1	1	1	1	1	3	1	1	0	1	1	1	13
Poor visibility*	0·6	1	0·6	3	0·6	2	2	0	0·2	1	0·2	0	11
CHAHBAR. 3 years' obsns.													
Fog	1	0	2	0	1	0	1	1	1	2	0	0	9
Dust-storms	1	0	1	1	1	0	1	0	0	0	1	1	7

* Number of days with visibility less than 2 nautical miles; these statistics include fog and dust-storms. It is probable that many reports of fog are more strictly speaking dust haze. There is obviously a certain amount of uncertainty in the visibility data.

TABLE VIII. *Cloudiness*

	Time	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
Astara	..	7·8	8·7	7·4	8·4	7·2	7·3	7·4	7·2	7·3	7·4	7·2	9·1	7·7
Lenkoran	..	6·8	7·3	7·8	7·1	6·6	4·7	4·7	4·4	5·6	6·0	7·7	7·5	6·4
Chikishliar	..	5·1	4·8	5·8	5·3	4·8	3·2	3·7	3·2	2·7	2·9	5·0	5·0	4·3
Erivan	..	6·3	5·7	5·0	5·1	4·5	3·0	2·3	2·0	2·0	3·0	5·3	5·7	4·2
Tehran	0730	4·1	4·3	3·5	3·4	2·1	0·8	1·5	0·9	0·5	1·7	3·8	4·4	2·6
	1530	4·1	4·7	4·1	5·0	3·8	0·8	1·2	1·3	0·8	1·9	3·6	4·2	3·0
Meshed	0800	4·5	4·7	5·2	4·5	2·6	1·1	0·5	0·3	0·5	2·2	3·8	4·5	2·9
Ashkhabad	..	5·9	5·6	6·2	5·1	4·1	2·4	2·0	1·1	1·5	2·7	5·2	5·9	4·0
Isfahan	0730	3·6	3·6	3·5	2·7	2·6	0·3	1·1	1·4	0·5	1·5	3·5	3·8	2·3
	1530	3·5	3·8	4·5	4·3	4·4	1·4	1·9	1·9	1·3	2·7	3·8	3·9	3·1
Seistan	0700	2·8	2·5	2·2	1·3	0·9	0·2	0·1	0·2	0·1	0·3	0·3	2·3	1·1
Zahidan	..	2·3	3·0	1·6	1·1	0·7	1·2	0·5	0·3	0·6	0·8	1·3	2·6	1·3
Abadan	0900	4·0	3·7	3·2	3·5	2·5	0·5	1·4	1·3	0·6	1·5	3·4	3·7	2·4
Bushire	0730*	4·5	4·0	4·1	3·3	2·2	0·2	0·8	1·0	0·6	1·0	2·6	4·7	2·4
Henjam	0800	3·7	3·1	2·8	3·0	1·3	1·2	1·9	1·8	1·3	1·2	2·0	3·4	2·2
Jask	0800	2·8	2·8	2·4	1·6	0·5	1·1	2·0	2·8	1·5	0·9	1·9	2·6	1·9
Chahbar	0800	2·9	2·2	1·5	1·1	0·8	1·5	3·5	4·3	2·5	0·8	1·0	1·6	2·0
Gwadar†	0800	4·1	3·8	3·0	3·0	2·8	4·3	7·3	8·4	6·2	3·3	2·6	3·6	4·3

* Observations at 0800 from April to October, and at 0700 from November to March.

† Gwadar on the seaboard of western British Baluchistan, emphasizes the great increase in the cloud-cover of summer in the extreme east of the coast of the gulf of Oman.

TABLE IX. *Precipitation*

In Inches of Rainfall and Number of Rain-days

	No. of years' obsns.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
ASTARA	3													
Inches		2·6	3·7	3·7	3·0	2·0	1·4	1·1	3·3	7·0	**12·9**	6·9	3·7	51·3
Days*		10	14	14	9	8	6	4	7	**16**	**16**	11	13	128
LENKORAN														
Inches	36	3·1	3·2	3·7	1·9	1·2	1·1	0·6	2·4	6·6	**9·3**	6·5	4·6	44·2
Days*	8–36	11	11	12	10	9	5	3	5	11	**13**	**13**	12	115
PAHLEVI	3	2·3	1·9	3·2	1·2	1·6	2·0	0·7	1·7	7·5	**11·0**	8·0	3·0	44·1
RESHT	1	4·0	0·3	7·6	6·8	0·6	0·7	1·5	7·1	4·9	**12·0**	7·8	2·6	56·0
ASHURADEH	4	1·5	1·6	1·4	0·9	1·5	0·6	1·1	0·6	4·7	1·1	1·1	**2·2**	18·3
CHIKISHLIAR	10	0·6	0·7	**1·3**	0·4	0·4	0·2	0·6	0·3	0·5	0·6	0·9	0·9	7·4
ERIVAN	6–20													
Inches		0·7	1·2	1·0	**2·1**	1·8	1·2	0·8	0·4	0·6	0·5	1·2	1·1	12·6
Days*		8	10	6	**13**	12	8	6	3	3	4	7	11	91
KERMANSHAH	7	3·1	2·4	**3·4**	3·2	0·9	0·1	0·0	0·0	0·0	0·3	2·4	2·7	18·5
TEHRAN														
Inches	15	1·7	1·0	**1·9**	1·1	0·4	0·1	0·2	0·0	0·1	0·3	1·1	1·3	9·2
Days	15	4	3	**6**	3	2	0·3	0·6	0·2	0·3	1	3	4	27
Max. in 24 hrs.	12	**2·4**	1·5	1·0	0·9	0·4	0·4	0·1	0·2	0·2	0·7	1·1	0·9	2·4†
MESHED														
Inches	26	0·8	1·0	**2·2**	1·8	1·2	0·3	0·1	0·0	0·0	0·4	0·6	0·7	9·1
Days*	26	2	2	**5**	**5**	3	0·8	0·1	0·1	0·1	1	2	2	23
Max. in 24 hrs.	28	1·5	1·4	**2·4**	1·8	1·7	1·0	1·3	0·2	0·1	1·4	1·4	1·0	2·4†
ISFAHAN														
Inches	21–24	0·6	0·4	**1·0**	0·6	0·2	0	0	0	0	0·1	0·6	0·8	4·4
Max. in 24 hrs.	5–9	0·5	1·0	0·5	0·8	0·7	0·1	0·3	0·0	0·8	0·1	0·7	**1·1**	1·1†
KIRMAN	5	0·5	0·9	0·9	0·7	0·1	0·2	0·0	0·0	0·1	0·1	0·5	**1·4**	5·4
SARAKHS	4–5	1·3	0·7	**2·1**	1·0	0·7	0·0	0·0	0·0	0·0	0·1	0·3	0·7	6·9
SEISTAN														
Inches	9	0·4	0·4	**0·5**	0·1	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·3	1·7
Days	9	1	1	**2**	0·6	0·1	0·1	0·0	0·0	0·0	0·2	0·4	0·9	6
Max. in 24 hrs.	8	0·6	**0·8**	**0·8**	0·5	0·2	0·1	0·0	0·0	0·0	0·4	0·2	0·5	0·8†
ZAHIDAN														
Inches	5	0·8	**1·0**	0·3	0·3	0·0	0·0	0·0	0·0	0·0	0·2	0·3	0·2	3·1
Days	5	2	**3**	1	2	0·0	0·0	0·0	0·0	0·0	1	1	1	11
MAIDAN-I-NAFTUN	7	**5·2**	3·2	3·1	1·5	0·0	0·0	0·0	0·0	0·0	0·4	1·7	3·2	18·4
AHWAZ														
Inches	6	2·0	1·3	2·1	0·8	0·0	0·0	0·0	0·0	0·0	0·2	1·0	**2·4**	9·8
Days	6	**8**	7	6	4	1	0	0	0	0	1	3	6	36
KHURRAMSHAHR														
Inches	5–6	1·2	1·4	1·6	0·4	0·2	0·0	0·0	0·0	0·0	0·1	1·0	**2·5**	8·4
Days	5–6	4	3	4	2	0·8	0·0	0·0	0·0	0·0	0·3	2	**5**	21
Max. in 24 hrs.	5–6	0·9	0·9	1·1	0·9	0·2	0·0	0·0	0·0	0·0	0·4	**1·7**	1·6	1·7†

In the precipitation the figure 0·0 indicates a mean rainfall of 0·05 inch or less; in the rain-days the figures 0·0 indicates an average of 0·05 or less, i.e. of 1 or less than 1 rain-day in every 20 years. A rain-day, except where specified otherwise, denotes a day with 2·54 mm. (0·1 inch) or more of rain.

* Amount not specified.
† Heaviest fall recorded in 24 hours.

TABLE IX—*continued*

	No. of years' obsns.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
ABADAN														
Inches	10	1·5	1·7	0·6	0·8	0·1	0·0	0·0	0·0	0·0	0·1	1·0	1·8	7·6
Days*	10	1	1	0·6	0·5	0·1	0·0	0·0	0·0	0·0	0·2	0·6	1	5
Max. in 24 hrs.	10	1·1	1·4	0·8	1·2	0·7	0·0	0·0	0·0	0·0	0·5	2·2	2·3	2·3†
BUSHIRE														
Inches	53	2·9	1·8	0·8	0·4	0·1	0·0	0·0	0·0	0·0	0·1	1·6	3·1	10·9
Days	58	5	3	2	1	0·0	0·0	0·0	0·0	0·0	0·2	3	4	18
Max. in 24 hrs.	53	5·5	3·3	2·6	1·5	0·6	0·0	0·0	0·2	0·0	1·7	2·9	5·3	5·5†
HENJAM														
Inches	9	0·9	1·5	0·7	0·6	0·0	0·0	0·0	0·0	0·0	0·1	0·1	1·2	5·0
Days	9	1	2	1	0·9	0·0	0·0	0·0	0·0	0·0	0·1	0·3	2	7
Max. in 24 hrs.	9	1·6	2·2	1·5	2·3	0·0	0·0	0·1	0·0	0·0	0·1	0·3	1·7	2·3†
JASK														
Inches	38	1·2	0·9	0·6	0·2	0·0	0·1	0·1	0·0	0·0	0·2	0·3	1·2	4·7
Days	38	2	2	1	0·5	0·0	0·1	0·0	0·0	0·0	0·3	0·6	2	9
Max. in 24 hrs.	38	2·7	1·9	3·3	1·4	0·2	0·7	0·7	0·2	0·0	1·3	1·7	2·3	3·3†
CHAHBAR														
Inches	10	2·2	0·6	0·3	0·1	0·0	0·1	0·2	0·0	0·0	0·0	0·1	1·2	4·8
Days	10	2	1	0·5	0·4	0·0	0·2	0·4	0·0	0·0	0·0	0·5	2	7
Max. in 24 hrs.	10	3·0	1·2	1·9	0·4	0·0	0·3	0·5	0·0	0·0	0·0	0·4	2·7	3·0†

* With 0·4 inch (10 mm.) or more of rain. The number of days with 0·04 inch (1 mm.) of rain was five times as great.

† Heaviest fall recorded in 24 hours.

TABLE X. *Number of Days on which Thunder was heard*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly total
Lenkoran . .	0	0	0	1	6	5	2	2	1	2	0	0	19
Ashkhabad . .	0	0	1	2	5	4	1	0	0	0	0	0	13
Abadan . .	0·3	1	1	2	0·7	0	0	0	0	0·4	0·7	0·6	7
Bushire . .	0·6	0·2	0·6	0·6	0·4	0	0	0	0	0	1	0·4	4
Henjam . .	0	0·7	1	2	0·3	0	0	0	0	0·3	1	0·7	6
Jask . . .	0·8	1	1	0·4	0	0·2	0	0	0	0·2	0·6	1	5

3 years' or more observations.

TABLE XI. *Number of Days on which Snow fell**

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly total
Astara. . .	4	8	5	0	0	0	0	0	0	0	1	4	22
Lenkoran . .	5	3	2	0	0	0	0	0	0	0	0	1	11
Erivan. . .	8	8	2	0	0	0	0	0	0	0	0	8	26
Tehran . .	8	4	1	0	0	0	0	0	0	0	0	4	17

* Snow falls rarely in early April and in November at all the above stations. 5 years' or more observations.

APPENDIX B

CHRONOLOGICAL TABLE

Year	*Persian Empire*	*General History*	*Year*
B.C.			B.C.
	PRE-IRANIAN AND MEDIAN TIMES		
c. 4000–1600	Small bronze-age settlements	Sumerian civilization of Mesopotamia	*c.* 4000–2000
	..	Hammurabi king of Babylon	1792–1750
c. 1600	Iranians begin to arrive	Kassites enter Mesopotamia	*c.* 1600
c. 1200–1100	Zenith of Elamite kingdom	Assyrian Empire established by Ashur-Nasirpal III	*c.* 883–859
836	Parsua and Mada present in north-west	Assyrians besiege Jerusalem	701
675–653	Phraortes founds Median kingdom	..	
650	Floruit of Zoroaster?	..	
648	Assyrians destroy Elamite Susa	..	
612–606	Medes and Babylonians overthrow Assyrian Empire	..	
	ACHAEMENID, PARTHIAN AND SASSANID RULE		
553–529	Cyrus founds Achaemenid dynasty	Cyrus takes Babylon	538
529–522	Cambyses reigns	..	
522–486	Darius reigns	Battle of Marathon	490
486–466	Xerxes reigns	Greek victories over Persians at Salamis and Platea	480–479
	..	Philip of Macedon unites Greece	338
334–331	Alexander overthrows Achaemenid dynasty	Chandragupta founds Maurya empire in India	321
323	Death of Alexander	..	
311–302	Seleucus founds Greek dynasty	Rise of Roman power in Italy	*c.* 300
c. 247	Parni enter Parthia	..	
246–230	Diodotus founds Bactrian kingdom	Roman Empire reaches Taurus	189
160–124	Mithridates I establishes Parthian Empire	..	
128	Chinese envoy visits Parthia	Romans conquer Syria	64
53	Parthians defeat Romans at Carrhae	Principate of Augustus. Euphrates becomes boundary of Roman and Persian empires	27–A.D. 14
	..	Birth of Christ	4
A.D.			A.D.
14–200	Intermittent border warfare in Armenia and Mesopotamia	..	
224	Ardashir founds Sassanid Empire	Shapur I invades Roman Empire	252–261
242–273	Preaching of Mani	..	
c. 250–300	Conversion of Armenia to Christianity	..	
363	Shapur II defeats Julian	..	
387	Partition of Armenia with Byzantine Empire	..	
425	Ephthalites (White Huns) invade Khurasan	..	
488–531	Wars of Kavad with Byzantines	..	
c. 489	Nestorian Church founded	..	
531–579	Reign of Chosroes I. Baluchis enter north-west	Turks arrive in Jaxartes-Oxus area	531–579
	..	Chosroes I invades Syria	540–557
557	Ephthalites destroyed	Birth of Mohammed	569
	..	Chosroes II invades Syria and Anatolia	611–619
622–627	Byzantines invade Mesopotamia and Azerbaijan	Death of Mohammed	632
	..	Moslems conquer Syria	636
	THE ARAB CALIPHATES		
641	Moslems overthrow Sassanids at Nihavend	Omayyad Caliphate begins. Death of Ali	661
	..	Death of Husain	680

Year	*Persian Empire*	*General History*	*Year*
A.D.			A.D.
717–720	Caliph Omar II encourages conversion of non-Moslems	Abbasid Caliphate begins	750
	..	Baghdad built	762–766
861	Saffarid dynasty in Khurasan begins	..	
874	Samanid dynasty in Khurasan begins	..	
932	Buwayhid dynasty in west	Turkish dynasty of Ghazni begins	977
996	Mahmud of Ghazni overthrows Samanids	..	
1037	Seljuk Turks invade Persia	Seljuks overthrow Byzantines at Manzikert	1071
1090	Society of Assassins founded	..	
1138–1194	Khwarizm Shahs overthrow Seljuk Sultanate	..	
1184	Birth of the poet Sadi	..	
1219–1227	Jenghiz Khan devastates Persia	Hulagu Khan sacks Baghdad. End of Abbasid Caliphate	1258
	MONGOL AND TURKOMAN KHANS		
1271–1295	Marco Polo travels in Persia	..	
1295–1304	Ghazan Khan converted to Islam	..	
c. 1300	Birth of the poet Hafiz	Ottoman expansion in Anatolia begins	1326
1380–1393	Tamerlane conquers Persia. Destruction of Nestorian Church	..	
1408–1446	Shahrukh restores Persian cities	Sultan Mohammed II organizes Ottoman Empire	1451
c. 1469	White Sheep Turkomans conquer west. Haydar founds Kizilbashi fraternity	Vasco da Gama circumnavigates Africa	1497
	..	Uzbeg dynasty in Oxus oases	*c.* 1500
	SAFAWID AND QAJAR DYNASTIES		
1500	Shah Ismail I overthrows White Sheep. Safawid dynasty begins. Conversion of Persia to Shia sect	Sultan Selim I occupies Arab lands	1512–1520
1514	Ismail defeated by Selim I at Chaldiran	Portuguese occupy Hormuz	1514
	..	Babar founds Moghul Empire in India	1526
1534	Sultan Suleiman I takes Iraq	Portuguese defeat Turkish fleet off Diu	1538
1558	Shah Tahmasp acquires Kandahar	..	
1587	Abbas I becomes Shah	..	
1598	Shirley brothers arrive	English and Dutch East India Cos. founded	1600–1602
1616	English merchants at Jask	..	
1622	Portugese expelled from Hormuz	..	
1644	First Russian embassy at Isfahan	Peter the Great Czar of Russia	1689–1725
1722	Afghans overthrow Safawid dynasty. Russians invade Gilan	..	
1729	Nadir Quli drives out Afghans	..	
1736	Nadir becomes Shah	Indian campaigns of Nadir Shah	1736–1740
1747	Death of Nadir Shah	Clive's governorships in Bengal	1758–1767
1783	Georgia falls under Russian protection	..	
1797	Agha Mohammed establishes Qajar dynasty	Napoleon plans invasion of India through Persia	1798–1807
1804–1813	First Russo-Persian War	..	
1823	Printing presses set up	..	
1825–1828	Second Russo-Persian War; present frontier fixed	First Anglo-Afghan War	1839
	..	Tanzimat reforms at Istanbul	1840
1844–1850	Preaching of the Bab	Russians control mouth of Oxus	1849
1852	Dar al Fonun College founded	..	
1856	Anglo-Persian War over Herat	..	
1864	First telegraph line laid	Russians occupy Samarkand	1865–1868
	..	Russians reach Atrek	1869
1872	Partition of Seistan with Afghanistan	Russians occupy Merv	1884

Year	*Persian Empire*	*General History*	*Year*
A.D.			A.D.
1888–1892	English and Russian banks opened. Popular outcry at foreign tobacco monopoly. Political reforms advocated by *Qanun*	..	
1894	French scientists explore west	..	
THE TWENTIETH CENTURY			
1901	D'Arcy oil concession granted	..	
1905	Great *bast* at Tehran	..	
1906	Shah Muzaffar grants Constitution	Anglo-Russian agreement over zones of influence in Persia	1907
	..	Revolution of Young Turks	1908
1909	Civil war. Abdication of Shah Ahmad. A.I.O.C. formed	..	
1911–1912	Russian forces at Meshed and Tabriz	..	
	..	Great War begins	1914
1914–1916	Russo-Turkish campaigns in north-west. British forces in south	Russian revolution	1917
1918	British forces in north-west	Great War ends	1918
1921	*Coup d'état* of Riza Khan. Russia renounces rights in Persia	..	
1925	Riza becomes Shah	..	
1927–1930	Trans-Iranian railway, dress reforms and industrialization begun	Rise of Hitler	1933
	..	Italian invasion of Abyssinia	1935–1936
1937	Saadabad treaty with Turkey, Iraq, and Afghanistan	World war begins	1939
1941	Great Britain and Russia occupy Persia. Riza Shah abdicates	Germany invades Russia	1941
1942–1945	Allies send supplies to Russia	Capitulation of Germany and Japan	1945

For chronological list of Shahs from A.D. 1500 to 1941 see p. 317.

APPENDIX C

WEIGHTS, MEASURES, AND CALENDAR

Weight. The small units are as follows:

1 Gandum = 0·74 grains
4 Gandum = 1 Nakhod = 2·96 grains
24 Nakhod = 1 Miskal = 71·6 grains
16 Miskal = 1 Sir = *c.* 2½ oz.

Larger weights are the Man or Batman and the Kharvar. The usual standard of the Man is the Man-i-Tabrizi (6·546 lb.), made up of 40 Sir, but several other standards are in use.

Man-i-Shah	= 1,280 Miskal	= 12·98 lb.	(two Tabrizi Mans)
Man-i-Rey	= 2,560 ,,	= 25·96 lb.	(four ,, ,,)
Man-i-Nau-Abbasi	= 720 ,,	= 7·3 lb.	
Man-i-Hashimi	= 11,520 ,,	= 116·8 lb.	(16 Man-i-Nau-
Man-i-Kohnah	= 1,000 ,,	= 10·14 lb.	[Abbasi)
Man-i-Bandar Abbasi	= 840 ,,	= 8·52 lb.	

The Kharvar contains 100 Tabrizi Mans and weighs 654·64 lb. Three Kharvars (1963·92 lb.) weigh nearly one short ton.

Length. 16 Gereh make 1 Zar or Gaz, which varies from 40·95 to 44·09 inches. Distances are reckoned by the Farsakh, the distance marched by a man in an hour, which varies according to the region, from 3½ miles in the south to 4 miles in the north. Sometimes it is calculated as equalling 6,000 Zar of 44·09 inches, or 4·17 miles.

Calendar. The months of the year are:

Sarvardin	21 Mar.–20 Apr.	31 days
Ordibehasht	21 Apr.–21 May	,,
Khordad	22 May–21 June	,,
Tir	22 June–22 July	,,
Mordad	23 July–22 Aug.	,,
Shahrivar	23 Aug.–22 Sept.	,,
Mehr	23 Sept.–22 Oct.	30 days
Aban	23 Oct.–21 Nov.	,,
Azar	22 Nov.–21 Dec.	,,
Dey	22 Dec.–20 Jan.	,,
Bahman	21 Jan.–19 Feb.	,,
Esfand	20 Feb.–20 Mar.	29 days (in leap-years 30 days)

The solar calendar years dating from the Hejira (A.D. 622) are in official use. Nau Ruz, New Year's Day (21 March), is the greatest festival and public holiday of the Persian year.

Time. Standard Persian time is 3½ hours ahead of Greenwich M.T.

APPENDIX D

AUTHORSHIP, AUTHORITIES, AND MAPS

AUTHORSHIP

THIS volume has been written by Dr. J. V. Harrison (Department of Geology, University of Oxford, formerly Geologist of the A.I.O.C.), A. N. Sherwin-White (Fellow of St. John's College, Oxford), and Lieut.-Colonel K. Mason (Professor of Geography, University of Oxford).

Contributions have been made by Dr. Norman White (late Indian Medical Service), Dr. W. B. Turrill (Royal Botanic Gardens, Kew), Mr. R. P. Beckinsale (School of Geography, Oxford), Mr. N. B. Kinnear and others of the British Museum (Natural History), Mr. Albert M. Hyamson, Mr. R. M. Cocks, Mr. N. R. Murphy (Principal of Hertford College, Oxford), and Miss H. F. Pickard-Cambridge.

Technical information has been supplied by the Foreign Office, Admiralty, War Office, Meteorological Office, Middle East Supply Centre, and Royal Geographical Society; photographs have been supplied by Dr. J. V. Harrison, Mr. L. Lockhart, Mr. C. P. Skrine, and other individuals, and by the Admiralty.

Maps, plans, and other figures have been prepared in the drawing office of the Oxford sub-section under the direction of Mr. K. W. Hartland.

AUTHORITIES

Although travellers' accounts of Persia are numerous, and specialist studies of particular topics fairly common, no detailed account of Persian geography and topography has been written since the works of Curzon and de Morgan, while Curzon's book written in 1892 still remains the only long description of Persia and its people as a whole, written in any language. Likewise there is no good general history of Persia. Consequently this book has been compiled, apart from first-hand knowledge, from a variety of short articles and incidental references in travellers' accounts, of which only the most useful have been quoted below, while the chapters on economics and communications have been derived from official sources which are not generally available. The attention of the serious enquirer is, however, drawn to three bibliographies which contain the titles of almost every book or article on Persia published up to 1938: Sir A. T. Wilson, *A Bibliography of Persia* (Oxford, 1930), the second volume of H. Field, *Contributions to the Anthropology of Iran* (Chicago, 1939), and *Bolletino della Regia Geografica Italiana*, vol. 65, p. 450 ff. (Rome, 1938).

Abbreviations: *G.J. The Geographical Journal.*
R.M.M. Révue du Monde Musulman.

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SURVEY AND MAPS

Survey

Persia is an ill-surveyed country. There is no general framework of triangulation to which the numerous scattered surveys and sketch-maps can be rigorously tied and no national survey department. Until 1914 all maps were rough compilations, mostly of hurried work done on small military expeditions or private journeys, and the latitudes and longitudes of even the larger towns were only roughly known from star and chronometer observations. The geodetic triangulation of India ends at Kuh-i-Malik Siah, the Russian work at Ararat; the political situation has never been favourable to a first-class connexion between the two countries across Persia.

At the outbreak of war in 1914 the survey of the Turko-Persian boundary was being completed at Ararat and was based on minor triangulation brought up from the Shatt al Arab. During the first two years of the war Russian topographers surveyed a considerable block of north-west Persia on a small scale. After the revolution British officers from the Survey of India worked outwards from a measured base at Kermanshah, mostly along the main routes, surveying a total of some 15,000 square miles; these surveys were generally in strips about 20 miles wide, but they were connected to the triangulation of Iraq and to that of the Turko-Persian boundary work, and extended to Tabriz, to the Caspian near Resht, and to Tehran. Rapid surveys were also carried out in the Pusht-i-Kuh, and route surveys from Bushire through Shiraz to Isfahan, and from Bandar Abbas to Kirman. At the end of the war and afterwards an area of about 42,000 square miles was surveyed in eastern Persia between Seistan and Meshed.

Very little official survey work was carried out between the two wars. But there were a number of journeys by experienced travellers such as Sir Aurel Stein and Dr. Alfons Gabriel, who were competent topographical surveyors. A large area was also explored by the Anglo-Iranian Oil Company, particularly in the south-west and south; and after the settlement granting them a new though curtailed concession, accurate minor triangulation was executed by their surveyors. Unfortunately the detail is primarily geological and much of the topography was not incorporated on the official maps, though some has appeared in scattered form to illustrate scientific papers.

It is believed that during the present war much detailed survey work has been done. No information is yet available for publication regarding the areas surveyed or the accuracy of the framework, and only a few photographed sheets were available for inspection during the writing of this book.

Maps

After the war of 1914–1918 the Survey of India undertook the recompilation of the quarter-inch map of Persia, incorporating all the work done during the war, including that of the Russian surveys obtained at Tiflis. This compilation of nearly 200 degree-sheets, which was a great improvement on the earlier maps, was numbered on the Indian system used for the series of 'India and Adjacent Countries'. Thus, the 16 Sheets 1 A–P cover the area between latitudes 36° and 40° N. and between longitudes 44° and 48° E. in the extreme north-west of Persia; the 16 Sheets 31 A–P cover a similar area in the south-east.

At some date between the wars the War Office took over from India the responsibility for quarter-inch maps of Western Asia as far east as longitude 48° E. Moreover a new numbering was introduced, based on the International numbering of the 1 : million series, and this numbering has been extended eastwards to cover the whole of Persia and Afghanistan. During the present war the War Office has reproduced copies of the Indian series by photo-lithography (W.O. number 3919). Those sheets which had appeared by May 1943 are underlined on fig. 61, which explains the present numbering of sheets.

Many of the old Survey of India sheets were coloured; the new War Office sheets are all in black and lose much of the clarity of the older sheets, especially in country which had been surveyed in detail in south-western Persia. It is to be hoped that this all-black edition is only provisional. In the absence of any rigorous framework it would be unwise to accept geographical positions as correct within half a mile, or heights above sea-level within 200 feet.

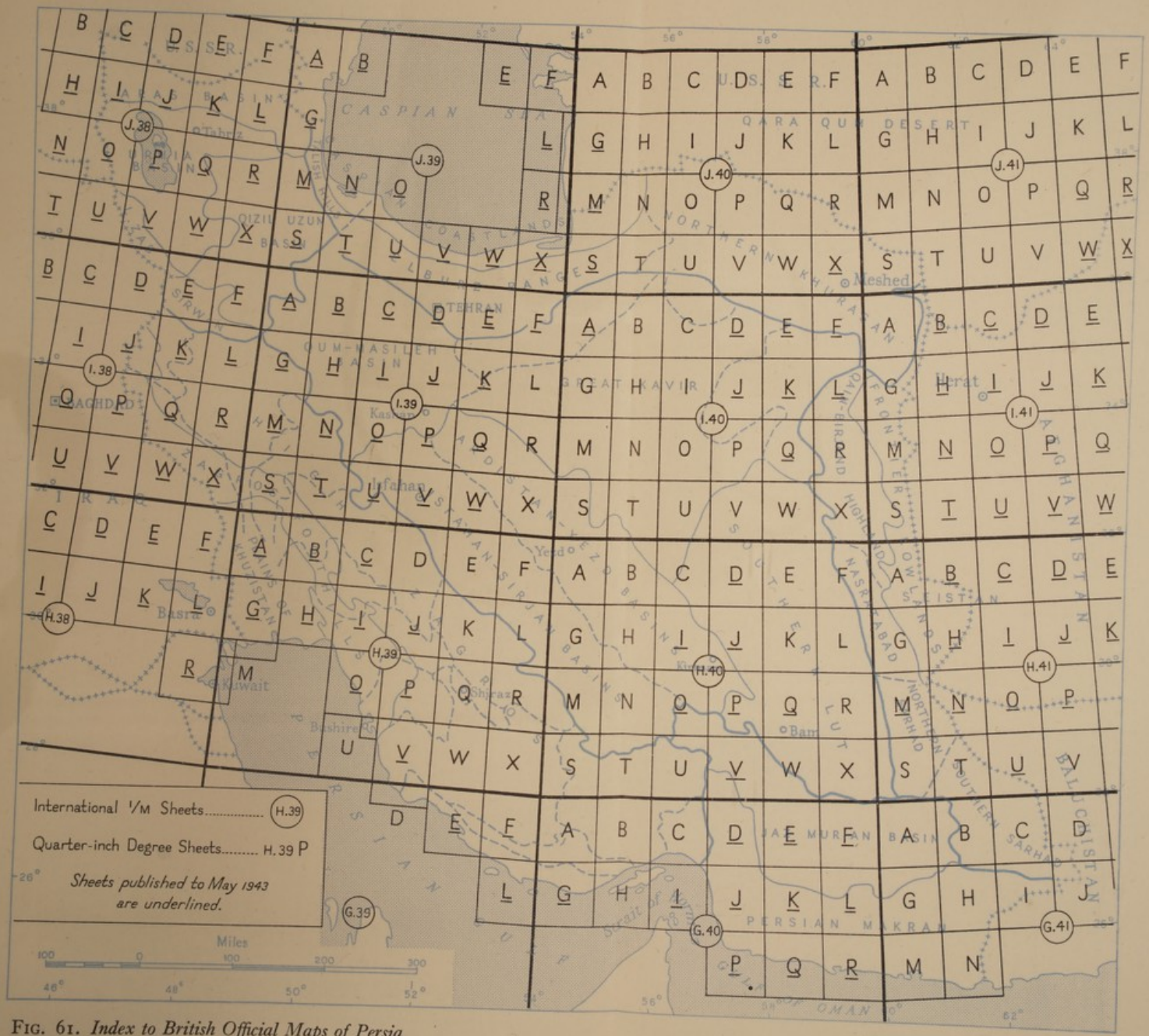

FIG. 61. *Index to British Official Maps of Persia*

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Additional references may also be given under the alternative names which are sometimes shown in brackets. To save space the first word, and sometimes the first two words have not been repeated; thus Ab-i-Diz is found under Ab-i-Aala, and Abu Muslim under Abu al Abbas. The only abbreviations used are r.s. (railway station), and R. (river). Mountains and hills will mostly be found under Kuh. The index should be used in conjunction with the Table of Contents at the beginning of the volume, which is fully paged.

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