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ant capping are linked by a narrow but elevated saddle (over 3000 ft.), situated to the south of Fezzan. It may well be that future geological inquiry will establish that the Central Saharan highlands represent the greatly reduced, but hard-compressed, core of an ancient mountain-system whose trend is still to be perceived in the diagonal line of the Ahaggar-Tibesti country.

North-west of Ahaggar the land gradually descends across the oasis country of Tuat and Gurara towards the depression, formerly occupied by a river-system draining from Ahaggar, which extends along the base of the Saharan Atlas like a dry moat. This feature may be followed along the Wadi Draa from the Atlantic coast between Cape Juby and Cape Nun; its widest and lowest levels are reached in Southern Algeria and Tunisia where occur the

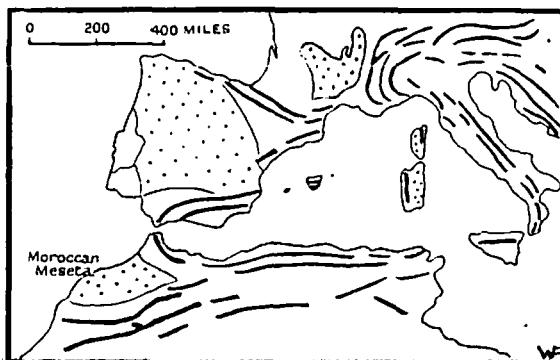


FIG. 6.—The mountain systems of the Western Mediterranean lands
(Showing the relationship of the Atlas folds to the Apennine and Iberian systems)
N.B.—Old residual plateaus shown by stippling.

salt-lakes, known locally as 'shotts', of which the Shott Jerid in Southern Tunisia is the most extensive. Farther to the east the depression is submerged by the Gulf of Gabes, an arm of the Mediterranean. To the south-east of Biskra the basin of the Shotts is lower than sea-level and provides a system of internal drainage situated remarkably close to the Mediterranean seaboard.

The Atlas ranges do not form a complete and isolated mountain group but rather an African extension of an 'Alpine' system which is most extensively developed in Europe and encloses the western basin of the Mediterranean. From the 'Alpine' Sierra Nevada of south-eastern Spain a range—the Riff Atlas (6000 ft.)—enters Africa, if we ignore the recently-formed hiatus occupied by the Straits of Gibraltar, and curves to the east across northern Barbary as the Mediterranean branch of the

Atlas system. The folds are cut off abruptly on the eastern coast of Tunisia, but were in a former age continuous across the straits to Sicily and the Apennines of Italy. In addition to this close physical connexion with Mediterranean Europe the lands of the Atlas form a biological province of Europe as is shown by their characteristic flora and fauna. The large mammals which are representative of the fauna of tropical Africa, such as the elephant, rhinoceros and giraffe, are completely absent.

The Great Atlas of Morocco not only raises the loftiest peaks of the system, with one summit of 14,500 feet, but also is the only range providing a complete barrier between north and south. With the neighbouring and lower fold of the Anti-Atlas (5000–10,000 ft.) to the south, the Moroccan ranges extend into Algeria and are transformed into a broad high plateau—about 100 miles across—which is well defined by northern and southern ramparts known respectively as the Tell Atlas and the Saharan Atlas. This is the Plateau of the Shotts (3000–3500 ft.), a region of internal drainage with numerous salt-lakes ('shotts'). The fertile terraces on the coastward side of the Tell Atlas which mark the irregular descent to the sea-board from the Tell, renowned as one of the richest agricultural lands of the Mediterranean Basin.

Involved in the mountain-building which produced the Atlas ranges were rocks of the primitive base of Africa: they form the Archaean core of the Great Atlas of Morocco, where overlying Mesozoic sediments, mainly limestones, are gently folded and widely appear at the surface, though erosion is steadily reducing their thickness so as ultimately to expose the core of ancient rocks. Offshore from the western end of the Moroccan Atlas the Canary Islands though superficially volcanic may represent in their foundations a former continuation of the mountain-system with which they are in line.

The western district of the Sahara which includes Mauritania¹ is of monotonous relief and nowhere does the level exceed 1500 feet. Within it and the neighbouring Senegal Colony is the largest area—about 250,000 square miles—with an average altitude of less than 600 feet, though in the Eastern Sahara—or Libyan Desert—there is a region comparable in area and surface form which extends up to the lower Nile.

Throughout the Sudan the most prominent features of relief are provided by isolated masses of the primitive tableland of the continent which surmount the general level of the Sudan, itself

¹ As a regional, not as a modern political, term 'Mauritania' is applied to the western district of the Sahara between the Senegal River and the Anti-Atlas range.

replaced by low pressure there is convectional rainfall which is reinforced, especially in the eastern half of the sub-continent, by orographical rains borne by the south-east winds from the Indian Ocean. From equatorial latitudes towards the southern tropic and from the eastern flanks of the Plateau towards the Atlantic coast there tends to be a steady diminution of rainfall up to the borders of the Kalahari and neighbouring desert.

On the western coast, in Angola, a low rainfall of 10-20 inches is partly explained by the occurrence of cold surface water offshore. This is a condition for which the cool Benguela current, flowing northwards close to the coast, is in part responsible. South-west winds pass from the South Atlantic 'High' over cool surface water to the heated continent, and condensation tends to be deficient as a result. Beyond the coastal plain, going inland, where the altitude of the Plateau is 3000-5000 feet, precipitation is considerably higher, though the meteorological records for this very inadequately known land of Portuguese West Africa are too meagre to permit certainty of statement with regard to rainfall occurrence over tens of thousands of square miles.

Rather more is known of the rainfall régime of Northern Rhodesia and Nyasaland over which extends the modified 'Sudan' climate that is characteristic of interior Angola. Their latitudes, almost entirely on the poleward side of the parallel of 10° South, are beyond the reach of the equatorial low-pressure rain-belt, but the south-east winds of summer bring abundant rain, especially in Nyasaland, where altitude is higher and relief more accentuated and where 50 inches may be taken as the average. The southern highlands of Nyasaland, to the south of the Lake, experience a cooler climate than the normal for the region: this has encouraged European settlement, and Southern Nyasaland is to be associated from the standpoint of climate and habitability with the higher parts of the Plateau in Kenya and Tanganyika.

Farther east and south-east on the littoral belt of Portuguese East Africa and in the lower valley of the Zambezi temperatures are generally higher. The climate is unhealthy—particularly for the European—and diseases, such as malaria, which are associated with low altitudes in the wet Tropics are a very unfavourable feature of the environment. Rainfall seems to be similar in seasonal occurrence to that of the Plateau but less in total amount and the average does not appear to reach 40 inches. Meteorological records are, however, very rare and any statement concerning the climate of Portuguese East Africa must be considered with reserve. A factor in the coastal climate is the warm

Mozambique Current, which flows southwards, close to the coast, from equatorial latitudes and is responsible for raising the temperature and humidity of the prevalent onshore winds.

Temperature and rainfall records are included below and refer to stations distributed as follows:

- (a) at comparatively low altitude on the shore of Lake Nyasa;
- (b) at moderately high altitude in Southern Nyasaland;
- (c) on the coast of Mozambique.

Station	Alt. (feet)	(1) Temp. (°F.)	(2) Rainfall (inches)													(1) Range (°F.)	(2) Total
				Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
(a) Nkata Bay	1400	(1) (2)	77.2 8.1	75.6 12.4	76.6 13.2	75.0 11.6	72.0 3.3	67.7 2.4	66.9 2.2	68.6 1.1	73.6 0.3	77.1 0.4	80.0 0.9	78.0 8.6	(1) 13.1 (2) 64.5		
(b) Zomba	3100	(1) (2)	71.8 11.3	70.7 11.0	69.8 8.5	68.5 3.8	64.8 0.7	61.9 0.4	60.6 0.3	64.0 0.1	68.2 0.3	74.5 1.7	74.5 5.4	71.8 10.7	(1) 13.9 (2) 54.2		
(c) Mozambique	Near sea-level	(1) (2)	81.9 7.9	81.5 8.7	82.8 7.4	81.0 4.4	77.7 2.3	73.9 1.0	73.8 0.5	74.5 1.1	77.5 0.5	80.1 0.1	82.8 0.3	83.3 4.9	(1) 9.5 (2) 39.1		

The Vegetation associated with the 'Sudan' Climate

Luxuriant growth of tall grasses, attaining a height of 5-12 feet by the close of summer, is characteristic not only of the Sudan and the plateau of South-Central Africa, but also, as we have seen, of certain parts of the East African Plateau in equatorial latitudes. Passing from the savanna there is gradual transition on the poleward side to semi-desert and scrub-land, and, on the equator-ward border, to park savanna followed by transition to forest.

On the savanna the long period—3-5 months—of very low rainfall or actual drought is opposed to the growth of forest trees, though tall thorn-bushes including varieties of acacia and mimosa are common. Trees must be capable of storing water, as in the case of the massive baobab—the 'sentinel of the savanna'—or of reducing transpiration to a minimum during the period of drought. The life of the grasses is short and limited to the period of the rains, after which they die, withered and scorched, exposing the hard-baked soil.

Not very satisfactory pasture is provided for domesticated animals by the tall, rank grasses, though wild game such as the elephant, rhinoceros and many types of buck, find on the savanna very favourable conditions. Stock-rearing is, however, more important than cultivation throughout the tropical grass-lands of Africa as a whole, and cattle are especially important within the zone which is transitional to the true savanna and the semi-