PART I

INTRODUCTION

CHAPTER 1

PHYSICAL GEOGRAPHY

PHYSIOGRAPHICAL FEATURES

The territory of the Somalis forms part of what is known as the Somali Plateau, one of two vast structurally and morphologically similar areas into which the Horn of Africa may be geologically divided. These two areas, the Abyssinian High Plateau and the Somali Plateau, have been separated the one from the other by faulting and earth movement on an immense scale. The structure of the Somali Plateau is to a great extent determined by faulting along three main trends—the East African trend (N.E.–S.W.), the Red Sea trend (N.W.–S.E.), and the Gulf of Aden trend (E.–W.). The first has caused the development of the Abyssinian and Danakil Rifts, which form part of the major Rift Valley system stretching from the Palestinian lakes in the north to Lake Nyasa and the lower Zambesi in the south. Work undertaken by Nilsson[1] in the Abyssinian section of the Rift Valley in the basin of Lakes Zwai and Shala (5900 to 4900 ft.) has shown that the last major period of faulting in this section of the Rift is to be assigned to a time later than the deposition of Kamasia-type sediments, which in Kenya and northern Tanganyika have been dated to the Middle Pleistocene, and have yielded an evolutionary series of the Chelles-Acheul Culture.[2] These beds have been faulted and occur on the escarpment in steps rising up to the mountain ranges which flank both sides of the Rift. The highest beach of the Zwai-Shala basin has been worked out in these Kamasian beds.[3] The Kamasian sediments are exposed again in the valley of the Awash (Hawash) river in open position to the Danakil desert and the Red Sea, no doubt deposited in an arm of the latter.[4] If therefore we can accept the contemporaneity of these Kamasia-type sediments with dated Kamasian deposits in East Africa, then an appreciable part of the present rifting in the Abyssinian section of the Rift Valley is of end-Middle Pleistocene age.

The Danakil Rift (3300 ft. to −400 ft.) is a roughly funnel-shaped area bordered on the west by the massive escarpment of the Ethiopian plateau and on the south-east by the scarp of the Somali Plateau. The southern part of the Danakil Rift, the Aussa desert, lies between the Ethiopian plateau and the

[1] Nilsson, E. (1940). [See Bibliography, p. 369.]
[2] (i) Leakey, L. S. B. (1936). (ii) Solomon, J. D. (1931).
[3] (i) Negri, G. (1913). (ii) Nilsson, E. (1940, p. 39).
[4] Nilsson, E. (1940, p. 38).

Danakil Horst, a triangular mountain ridge (average 3300 ft.) bordered on the north and east by the Red Sea. The Aussa desert is made up of stony delta deposits, clays and silts, some of which have yielded human artifacts.[1]

The Somali Plateau lies to the south-east of its Abyssinian counterpart and, as can be seen from the inset map (Pl. 29), its western edge is determined by the fault-scarp, the plateau here falling steeply almost precipitously to the floor of the Rift. This feature of the scarp is maintained in the north-west where, at the junction of the East African and Gulf of Aden fault trends,[2] the high mountain walls bend round to the east, past the Danakil or Aussa trough, and along the shores of the Gulf of Aden, the plateau in places approaching, particularly to the east of Berbera, almost to the coast itself.[3]

The highest parts of the plateau, apart from the strip of highland marking the edge of the Gulf of Aden fault-scarp, lie close to its western edge, where the Harar and Arussi-Bale mountains reach average heights of 7000 ft., with occasional peaks rising above this to as much as 10,000 ft. or more.[4] From this mountainous region, now within Abyssinian territory and inhabited for the most part by the agricultural Galla, the plateau slopes very gradually to the east-south-east to the Indian Ocean, indicating uplift of the plateau along its western side and gentle tilting about an axis at right angles to this slope.[5] The initiation of the last earth movement along this axis has been deduced by Nilsson to have taken place during the Last Interpluvial, and to have been completed before the end of the first part of the Last Pluvial.[6] These western highlands form the major watershed of the plateau.

Within the Somalilands the plateau falls naturally into three parts divided by the three great drainage basins of the Nogal, the Webi Shebeli, and the Juba

[1] Garesleh Tug, see p. 116.

[2] Gregory, J. W. (1921, p. 31).

[3] The following Admiralty Charts were examined with a view to ascertaining whether any submarine faults could be recognized on either the north or east coasts. East Coast Charts, nos. 597, 100*a*, 671, 848, 670. North Coast Charts, nos. 6B, 919, 100*b*. It was apparent that at a distance varying from 1 to 4 miles from the coast the sea-bed sloped fairly steeply down from 60 to 120 fathoms on an average along the north coast. Whether this is the result of submarine faulting or represents merely the normal continental-slope zone could not be determined. A definite and deep fault is, however, clearly discernible in the Gulf of Tajura.

[4] Mount Kaka 13,232 ft.; Chillalo Mountains 11,961 ft.

[5] (i) Nilsson, E. (1940). (ii) Dainelli, Prof. G. (1936, p. 97).

[6] Nilsson, E. (1940, p. 42). That some degree of early tilting along this axis must have existed prior to the formation of the major river systems is evidenced by the general south-east trend of the latter. Stefanini, Dainelli and others attribute this initial tilting to the fact that the plateau, composed of successive deposits of sedimentary rocks laid down for the most part in direct stratigraphical succession following three major periods of marine submergence and subsequent uplift, emerged evenly but very gently inclined towards the south-east, the strata becoming progressively later in age from south-west to north-east.

rivers, the directions of flow being towards the south-east. In the north the plateau of British Somaliland slopes gently from its northern edge, a strip of high country known generally as the Ogo, to the south, and east to the Nogal depression and the great plains of the Haud.[1] This mountain escarpment which may be considered as an extension of the Harar high plateau, attains average heights of 6000 ft., with a maximum of 7900 ft. at Shimbir Beris in Erigavo District and forms the main watershed for the streams and rivers flowing north into the Gulf of Aden, and south-east into the Indian Ocean; it has been affected by tilting on the south-east axis of a similar nature to that in the west. Over the northern edge of the Gulf of Aden fault-scarp the terrain falls often precipitously and abruptly to the coastal plain or to the sea itself. Approximately two-thirds of the way going eastwards along this coast, however, the scarp is broken by a broad gap of less elevated country (600–1600 ft.) known as the Karin Gap, formed by northward-throwing faults, and through which at one time the Darror (or Daror) depression appears to have been drained into the Gulf of Aden.[2] A somewhat similar break occurs in the scarp further to the west near Las Dureh, known as the Asseh Gap. The eastern corner of the plateau lying between the Gulf of Aden and the Nogal is known as the Mijertein and is one of sharp relief characterized by steep, flat-topped, often isolated hills and plateaux, of which the desolate and waterless Sol Haud (or Sawl Haud) is an example, and numerous deeply entrenched streams or 'tugs' to give them their Somali name, which today are almost invariably dry for the greater part of the year and contain water for a few hours only after rain: they wind through steep gorges and gullies to the sea.[3] These drainage channels have been carved out of anhydrite beds limited to the north and south by hills of overlying limestones. The central plateau, lying between the Nogal and the Webi Shebeli, consists of a vast undulating plain known as the Haud, waterless for the most part but storing water for three or four weeks during the rains in a number of natural reservoirs known as 'ballehs'.[4] The soil of this plain is of a bright red sandy nature. Much of it is probably derived from the disintegration of the underlying limestones and sandstone,[5] but some is undoubtedly of aeolian origin

[1] Average altitude for the Ogo is between 5000–6000 ft. Average altitude for the southern Haud is 1000 ft.

[2] (i) Hunt, J. A. (1944). (ii) Barrington Brown, C. (1931*a*, p. 259).

[3] Such seasonally dry river courses will be referred to by their Somali (Isaak-Darod) name of 'tug'. In the south various terms are used: 'bohol' (Rahanwein), 'bug' (southern Darod: Hawiyia), etc.

'Webi' means a seasonally flowing river, e.g. the Webi Shebeli, Webi Gestro.

[4] The 'ballehs' or shallow pans, sometimes artificially enlarged, are of paramount importance to the Somali tribes who rigidly guard their rights over these water-holes. In the south the term 'balleh' is replaced by 'saha'.

[5] Stefanini, G. (1936, p. 83).

and covers cultural material in the neighbourhood of some of the 'ballehs'.[1] In the eastern part of the central region the red Haud sand gives way to monotonous exposures of the underlying Eocene limestone and gypsum beds, relieved in places by solution valleys and sinks. This vast plain slopes very gently from the Abyssinian boundary towards the coastal plain and the Indian Ocean. In the west, however, near the territorial boundary with Abyssinia are found the parallel depressions containing the valleys of the Tugs Gerer (or Jerer) and Fafan, running south-east towards the Webi Shebeli. They probably run directly down the dip slope though it is possible that they may have been developed along old fault lines connected with the south-east Red Sea trend as may be also in part the upper reaches of the Dakata. It is unfortunate that with the exception of the lower courses of the Fafan no opportunity was found of examining these valleys. In the south-west in the bend of the Webi Shebeli, the plateau is dissected by deep gorges incised by 'tugs' that drain into the parent river. These 'tugs' have deepened their beds in geologically recent times and the time at which this rejuvenation took place can be ascribed to the latter half of the Last Inter-Pluvial and initiation of the Last or Gamblian Pluvial when earth movement was causing uplift and tilting of the Somali plateau.[2]

The southern Somali plateau, between the Webi Shebeli and the Juba rivers again comprises a gently undulating limestone surface with occasional isolated low hills rising above it, of inselberg form.[3] Water is comparatively common over this part of the plateau and is found in shallow wells. Here also natural ponds form small lakes and contain water for as much as two or three months after the rains. Two of these 'sahas' as they are here called are often perennial and old tufa, and surface limestone deposits with artifacts have been noted in their basins as also in those of several others.[4] The junction of the plateau and the coastal plain where the crystalline rocks are exposed is often imperceptible especially to the north of the Webi Shebeli in the Mudugh (or Mudug), but sometimes, notably in the region of Isha Baidoa, the junction is effected by a short steep scarp, remnant of the old coast zone in the south.

With the exception of the narrow belt of high country bordering the Gulf of Aden fault and low hills of inselberg form there are no ranges of any size on the plateau within the boundaries of the Somalilands. The plateau here presents the character of a gently warped and folded peneplain surface and is probably of mid-Tertiary Age. Only in the country between the Webi Gestro and the Webi Shebeli, at El Carre, do the outliers of the high country within the

[1] See pp. 208, 217, 218.
[2] See pp. 78–79.
[3] Bur Eschunle, Bur Gheider Idda, Cal-ie-Corar, and the Ted Surface.
[4] Ted, Burdo; see also El Dubbo, Saha Gurral, Sijjia, Morogavi, etc.

Abyssinian boundary obtrude and form the foothills of the Arussi-Bale mountains.

Of the principal rivers, all of which flow into or towards the Indian Ocean, the most important is the Juba. Fed by three large tributaries, the Webi Gestro or Web, the Ganale Doria, and the Daua, all of which have their source in the Arussi-Bale range, the Juba has entrenched itself to a depth of 1000 ft. below the plateau. In its lower reaches the river meanders over the wide coastal plain (having here a width of some 200 miles), supporting a thick riverine forest fringe, and reaches the sea near Kismayu.

The Webi Shebeli, also perennial throughout the greater part of its course, rises in the western part of the Ghedeb basin close to the source of the Juba, near the western edge of the plateau,[1] and flows south-east and south for the first part of its course through a deeply incised gorge and then, near Imi, opens out into a wide valley of mature profile. The river flows through this valley, flanked by clearly defined scarps and pediments on both sides, as far as Afgoi where, only fifteen miles from the sea, its course is deflected by coastal sand dunes and it meanders south-west, running parallel to the coast until it finally disappears into the plain at Ballei yer (0°40′ N., 43°4′ E.).

The Nogal is a short deeply entrenched river, or more correctly 'tug', now flowing only during the rains. It may be divided, however, into two separate physiographic areas which comprise the short but deep gorge of the lower Nogal reaching the sea at Eil, and the upper Nogal, a wide flat depression draining a considerable area of broken country flanked on the north and south by steepish scarps which descend by a series of steps of predominantly structural origin to the plain itself; this wide and arid plain is dissected near the scarp by a number of 'tugs', which eventually lose themselves in the sands of the central plain.

The Darror (or Daror), between the Nogal and the north coast, is a smaller counterpart of the Nogal and reaches the sea near Ras Hafun. With the possible inclusion of the Issutugan and Raguda Tugs, which flow north-west into the Gulf of Aden, this is the only other large river of note.

Distinct from the plateau is the coastal plain which to the south, in Jubaland and southern Somalia, is low-lying, the average altitude is less than 1000 ft., and reaches for a considerable distance inland up the valley of the Juba nearly to Bardera, and thence across the lower Webi Shebeli to the 'Bur country'. These 'burs' are typical granite inselbergs which rise steeply from the surrounding plain.[2] The highest of these, Bur Eibe, reaches to a height of 1000 ft. and is an impressive sight from the Baidoa scarp. Proceeding northwards the coastal

[1] Abruzzi, Duc d' (1932).

[2] Aloisi, P. & de Angelis, A. M. (1938).

plain becomes gradually more constricted by the encroachment of the plateau until from just north of Obbia in central Somalia, to Alula, near Cape Guardafui it occurs only as narrow isolated plains separated by long stretches of the plateau, which reach to the coast itself. Restricted patches of this coastal plain occur also along the northern coast, where it is known as the Guban to the Somalis,[1] but it rarely attains to more than thirty miles in width and is often, as for example near Berbera and Benda Ziada, divided into two parts by a line of rocky hills, usually faulted, which run parallel to the coast and the Aden Rift scarp. Only at the western end of the Gulf does the coastal plain open out once more between Bulhar and Zeila before joining the Aussa plains of southern Danakil.

The chief feature of this plain on the east coast is a line of consolidated fossil dunes, on an average from 200 to 400 ft. high but rising at Gowein, inland from Obbia, to a thousand feet or more, and having a width of from one to eighteen miles.[2] These fossil dunes run parallel to the coast and form an effective barrier between it and the inland plain beyond. The latter is composed for the most part of sandy alluvial soil, often attaining considerable depth, but has no conspicuous features except in the south where the monotony is broken by numerous small isolated 'burs'.

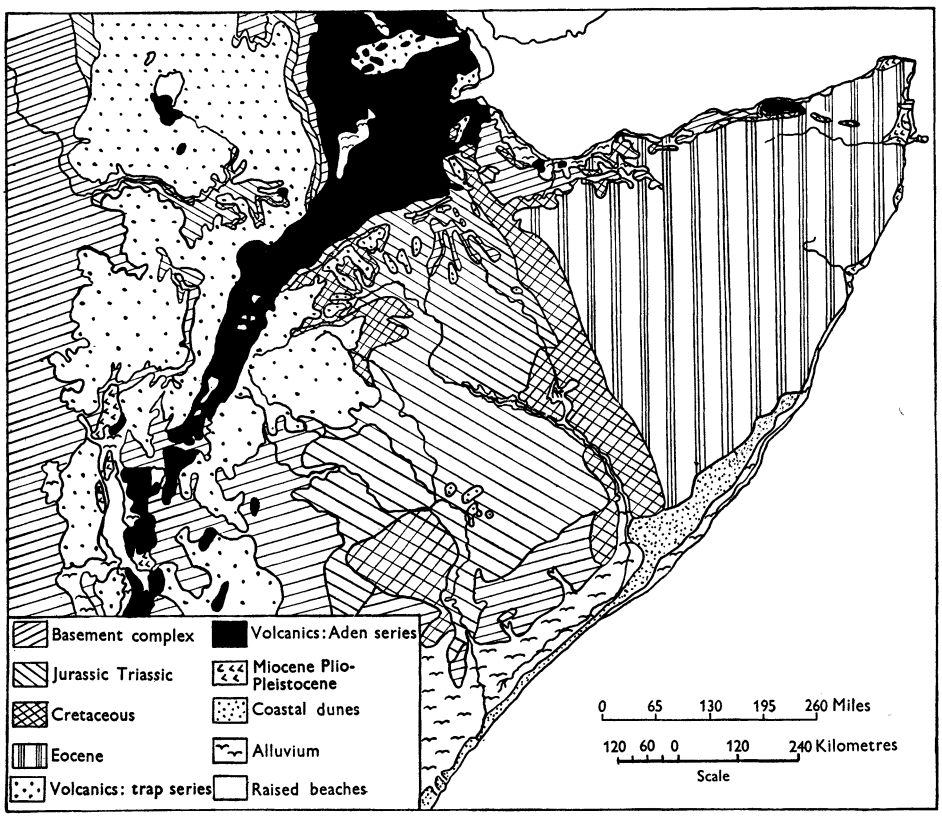
SOLID GEOLOGY

Brief mention may now be made of the underlying solid geology as this has controlled in varying degree the morphology of the area and the distribution and availability of man's raw materials.

The crystalline rocks, granites, gneisses and schists, which form the Archaean basement complex on which the geological superstructure is built up, are nearly everywhere overlain by more recent sedimentary deposits. They are, however, found exposed by the faulting and uplift of the plateau at points along the northern seaboard within the Aden Rift fault, near the base of the scarp, as for example between Hargeisa and Bulhar, at Mandera between Hargeisa and Berbera, at the foot of the Al hills, at Ras Hantara, and on the Harar plateau, and again in the south where the coastal peneplain has eroded the overlying sedimentaries exposing these basement complex rocks which are often covered by only a few feet of residual and wind-blown sand, while the harder and more resistant elements rise here and there to form the characteristic 'bur' between the Middle Webi Shebeli and Bardera on the Juba river.[3] In these areas, while chert is still the predominant raw material of prehistoric man, quartz (occurring

[1] Swayne, H. G. C. (1895).
[2] (i) Stefanini, G. (1936, p. 85). (ii) Artini, E. (1915).
[3] (i) Stefanini, G. (1936). (ii) Barrington Brown, C. (1931). (iii) Macfadyen, W. A. (1933).

in large concentrations within the granite and syenites) is often extensively used. The earliest sedimentary beds, ascribed to the Trias and Lias, are found only in the middle course of the Juba valley in the area of Lugh Ferrandi (where they are overlain by the Jurassic series). Grouped together under the term 'Lugh Series' they include sandstones, gypsiferous and salt-bearing marls.[1]



Text-fig. 1. Modified geological map of the Horn.

The main portion of the southern plateau is formed of Jurassic limestones. These comprise a variety of fine-grained fossiliferous limestones, red to grey in colour intercalated with marls and chert-bearing limestone. These beds are fairly rich in fossils and are consequently well-dated. The Jurassic overlie the basement complex rocks also at points along the Gulf of Aden Rift fault and here comprise sandstones, grits and limestones; they are dated by contained fossils mainly to the Upper Jurassic.[2] Rocks of this age also outcrop in the upper

[1] Stefanini, G. (1929). The name denotes its geographical position and lithological nature; the age is not well proven, the fossils (fish teeth) being rare and not typical, neither is the stratigraphy clearly established. In this connexion, see p. 84.

[2] (i) Stefanini, G. (1936). (ii) Barrington Brown, C. (1931). (iii) Macfadyen, W. A. (1933).

reaches of the Webi Shebeli and in the region of the Harar plateau both on its south side (northern Ogaden) and north side (at the foot of the rift near Dire Dawa).[1]

These Jurassic rocks are followed by various Cretaceous deposits along the middle Webi Shebeli (predominantly the right bank) from Missarole to the Shaveli country, into the Ogaden and west again to Arussi where there outcrops a white or ochreous limestone with a rich fauna (Upper Cretaceous: Giglei limestone). On the left bank of the middle Webi the Cretaceous is represented by grey and purple sandstones passing into grey, yellow and red quartzites which contain ferruginous nodules (Jesomma sandstones). These Jesomma sandstones are correlated with the Nubian sandstones and with rocks of similar age in Abyssinia, Eritrea and the Hadhramaut. The Marehan sandstones south of the Juba and in the Northern Frontier District of Kenya are considered to be of the same age.[2] Fossiliferous Cretaceous beds outcrop again along the fault-scarps in the Northern Frontier District, where limestones, some argillaceous, and sandstones, sometimes ferruginous, overlie, often conformably, the Jurassic sediments.[3] The Cretaceous series is seen again on the northern plateau in the area of Hargeisa and in the Marodijeh (or Marodijehh) Tug where the quartzite from these beds is almost invariably the material used for the larger stone implements. Chert and chalcedony nodules (highly coloured) and quartz pebbles from the Cretaceous beds are characteristic and were extensively used, as was also the silicified sandstone found in the middle Webi Shebeli.

The central and northern parts of the plateau are built up of Tertiary sediments, predominantly of Eocene age, which comprise creamy limestones and intercalated anhydrite beds, the former yielding a characteristic honey and grey coloured chert, and the latter light brown and black cherts, which form a very satisfactory medium for the production of implements and throughout the north were universally used from Levalloisian times onwards.[4] On the southern side of the upper Nogal valley where the black-banded cherts outcrop within the

[1] Dreyfuss, M. (1931).

[2] Stefanini, G. (1936, pp. 33, 41 and 46).

[3] (i) Barrington Brown, C. (1931, p. 263). (ii) Reck, H. & Dietrich, W. O. (1923). (iii) Stefanini, G. (1925).

[4] Burkitt, M. C. & Barrington Brown, C. (1931, p. 164). Barrington Brown describes the raw material used on the north-eastern boundary of the Protectorate as follows: 'The material used is mostly a chert, of a yellowish, honey colour, which patinates to either a white or black tint. This chert occurs abundantly as large concretions in the Eocene limestones which form the greater part of the elevated plateau (at 2000 to 3500 ft.) constituting a great part of the interior of British Somaliland. A thick bed of gypsum and anhydrite outcrops over considerable areas on the plateau: no flakes were found on these areas. It is noticeable that white quartz from veins which outcrop in slates at the foot of the scarp is utilized to some extent on the coastal plain.'