THE SNAKES OF SOMALILAND AND THE SOKOTRA ISLANDS

by

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ABSTRACT

The systematic status of the snakes recorded from the area has been reinvestigated, often in the light of new material. Allometric growth is shown to occur in several species and taxonomic errors arising from its previous non-recognition are rectified. The same feature is also used to determine the respective ontogenetic levels of closely allied forms. The fauna of the Sokotra group is shown to have greater relationships with the Palaearctic and Oriental regions than with the Ethiopian and to consist of mainly primitive types; they are assumed to have been isolated in the islands since the mid-Miocene. The mainland fauna, though predominantly Ethiopian, contains a strong northern admixture and this element predominates in the northern coastal plain which is apparently part of the route by which the northern forms have reached the peninsula. The northern component of the fauna shows a higher degree of endemism in the peninsula than the Ethiopian component and this is ascribed to the fact that they are completely or partly isolated from their northern relatives. Where the isolation is incomplete the connexion is tenuous and the distributional evidence suggests that the isolating factor is desiccation; any intensification of the present aridity would result in complete isolation. From this it is concluded that the elements retaining a connexion with the north have not been subjected to an epoch more arid than that of the present time and must, therefore, have entered the area since the last inter-pluvial, late in the Middle, or early in the Upper, Pleistocene; on the other hand those that are completely isolated probably lost their connexion with the north during this inter-pluvial. If Zeuner's dating of the Mount Carmel cave deposits is accepted, this implies that, in the absence of complete isolation these forms have undergone at most infraspecific change in a period of up to 120,000 years whereas other, often congeneric, forms that have been isolated for a minimum of 125-175,000 years have become differentiated to specific level.

The extreme richness of the Somali fauna is due to its geographical and ecological circumstances. In addition to Palaearctic elements associated with the desert fringes and Ethiopian elements from the Savannah regions, the uplands of the west and north contain an element associated with the damp uplands of the Abyssinian mountains. Amongst the endemics with Savannah affinities are some with analogues in the arid regions of South-west Africa. The taxonomic status of these suggests that the present arid phase in the latter area is of longer standing than that in Somaliland. This is explicable on the basis of alternations of climatic change north and south of the tropical region, which accords with the theory that the changes are associated with oscillating movements of the caloric equator; this cannot, however, be the sole cause since the number of these oscillations far exceeds the number of climatic changes for which there is any evidence.

In a previous study of the lizards of British Somaliland (Parker, 1942) the author drew attention to the extreme richness of the fauna and to the extraordinarily high degree of endemism in part of a continental land mass which is not remarkable for any excessively great diversity of environmental conditions. The high degree of endemism was ascribed to the sub-insular geographical character of the north-easterly tip of Africa, and the diversity of the fauna to the climatic fluctuations during the Pleistocene epoch; it was also suggested that the rate of evolution in the area might have been very much faster than is usually deemed probable. The object of the present studies is to check these tentative conclusions in another, but closely related, group of vertebrates, taking account of advances in knowledge since the previous work was done.

Since any comparative faunal studies must be valueless unless based on sound taxonomy, the bulk of the present paper is concerned with a taxonomic review of the snakes of the peninsula and the outlying islands of the Sokotra group. The material which has formed the basis of this review is that in the British Museum, an institution singularly well endowed with material from the area. In addition to selections from the collections made by the Italian explorers and reported upon by Boulenger (Robecchi, 1891; Bottego, 1895 b, 1896 c, 1898 a; Ragazzi, 1896 a; Ruspoli, 1896 b; Tancredi, 1909 a; Ferrari, 1909 b; Ferrandi, 1909 c; Citerni, 1912) there are also the collections of Lort Phillips and Donaldson Smith (Boulenger, 1895 a, 1895 c, 1896 d, 1898 b, 1901) from the north and west of the area, and new material obtained by Dr. W. A. Macfadyen, recently resident in British Somaliland, and by Col. R. H. R. Taylor who, in 1932 and 1933, made collections along the whole of the boundaries of this Protectorate. These boundaries run through some of the principal topographical zones within the area and the specimens, not having been previously studied or reported upon are listed herewith; they form what is probably the finest comparative series that has ever been collected in the region.

In the pages that follow an endeavour will be made to trace the distribution of the various species and races within the area in relation to existing topographical and climatic conditions, and to study the faunal relationships of the area in relation to what is known, or surmised, concerning the past history of the region.

The author owes much to the many who have been of assistance to him in preparing and writing this paper. Especial thanks are due to Col. R. H. R. Taylor and Dr. W. A. Macfadyen whose collections have been fundamental; to Dr. Desmond Clark whose manuscript report of his archaeological researches in Somaliland has been freely consulted; to Messrs. A. Loveridge and Benjamin Shreve for the loan of comparative material from

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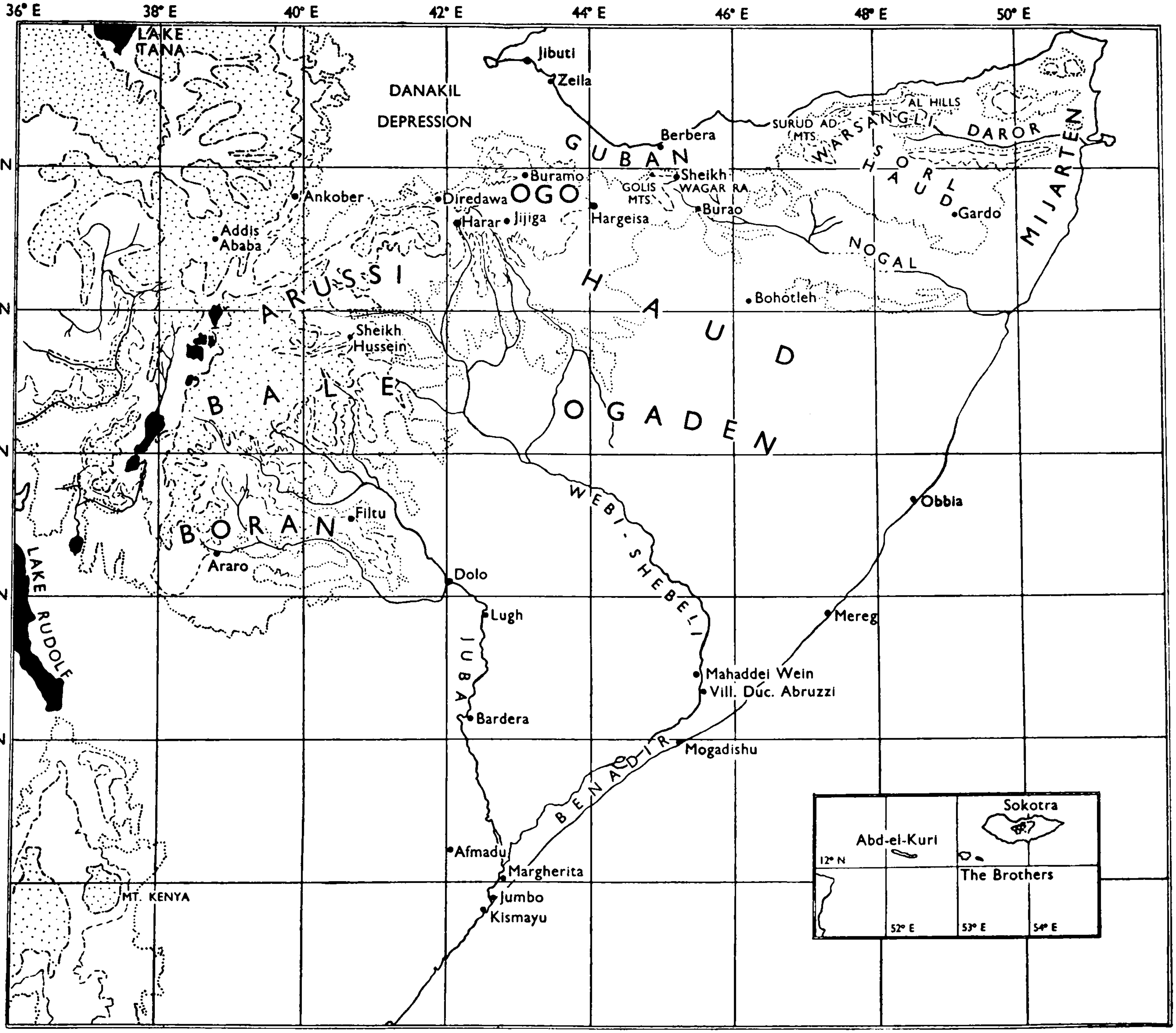
TOPOGRAPHY AND CLIMATE

In any faunal studies there are almost always obvious difficulties in defining the area to be considered, since it seldom happens that an area is entirely surrounded by "natural" boundaries. In the present instance the Gulf of Aden and the Indian Ocean form "natural" boundaries on two sides, whilst the Ethiopian mountain mass also forms a natural barrier to the west. But the latter provides no clear-cut line to form a boundary and there is a wide gap between the mountains and the Indian Ocean. Accordingly the line of the Rift Valley from the Danakil depression southwards through Lakes Zwai, Hora Abyata, Shala, Abaya and Chamo to Lake Stephanie has been taken as the western boundary, whilst a line eastwards from the latter lake to the Juba River and this river itself have been arbitrarily selected as the southern boundary; it is emphasised that the exact line in the south east corner (Boran country) has not been slavishly followed. The bulk of the area within these boundaries consists of a tilted plateau, highest along its western and northern edges and sloping downwards to the south-east. The western edge rises abruptly from the floor of the Rift Valley, forming a series of mountain masses, the Harar and Arussi-Bale mountains which reach an average height of about 6000 feet, with peaks rising to over 10,000 feet. The northern edge of the plateau is also precipitous on its northern face and forms a series of mountain masses across British Somaliland to the extreme tip of the peninsula in the Sultanate of Mijarten. The mountains of the Ogo, inland from Zeila, reach an average height of about 5000 feet and are continuous with the Wagar and Golis mountains, inland from Berbera, which reach an average height of 6-7000 feet; after a break—the Huguf Plain—the mountains continue as the Warsangli mountains (the Surud Ad range and the Al and Karin Hills in the British Protectorate) and various discontinuous mountain masses in the Sultanate of Mijarten. From these elevated northern and western edges the plateau slopes south-eastwards towards the Indian Ocean from which it is separated by a coastal plain which, in the south, extends inland for a considerable distance (nearly to Bardera in the valley of the Juba river) but which becomes progressively narrower towards the north; from Obbia to Cape Gardafui it becomes discontinuous, being interrupted by stretches of the plateau which reach the coast. Similarly the northern edge of the plateau is separated from the Gulf of Aden by a narrow coastal plain, broader at its western end



Somaliland and adjacent areas, showing the principal regions and physical features.

........, 1000 m contour; - - - - - -, 1500 m contour; –.–.–. 2000 m contour; areas exceeding 2000 m in altitude are stippled.

(the Guban which is continuous with the Danakil depression) and becoming progressively narrower and almost or quite non-existent in the extreme east. The Sokotra Islands are, topographically and geologically, detached outliers of the northern edge of the plateau.

The drainage of the plateau is, naturally, to the Indian Ocean and four principal drainage systems intersect it; there are, in addition, several minor, deeply entrenched, tugs in the north of Mijarten. The most northerly of the main drainage channels is the Daror which drains eastwards from the Warsangli mountains. To the south lies the Nogal, draining from the Wagar range in an east-south easterly direction; in its upper course this valley is wide and shallow, but becomes restricted and deeper where it cuts through the eastern edge of the plateau. The area between the Daror and Nogal Valleys is the Sorl Haud, a level table-land with an average height of about 3000 feet. The next, and very much more extensive drainage system is the Webi Shebeli which, with its affluents, cuts diagonally across the plateau from its north-westerly corner of the Harar and northern Arussi mountains almost to its southwesterly corner. The zone between the Nogal and Webi Shebeli valleys is known as the Haud in its northern and higher part and the Ogaden in its southern part. The Juba river system marks the southern boundary of the area, and flows from the southern part of the Bale mountains converging towards the Webi Shebeli.

The Somali peninsula lies on the fringe of the great Saharo-Sindian desert belt and north of the meteorological tropical region. The climate is influenced by the Ethiopian mountain mass which, although outside the tropical belt, also has two seasonal maxima and an annual average of 40-60 inches of rain. Eastwards from this region the rainfall diminishes steadily though not regularly, the higher regions having a higher amount of precipitation than the lowlands. The northern coastal plain, the northern part of the eastern coastal plain and the extreme north-eastern tip of the plateau have an annual average of less than 10 inches of rain. The Sokotra Islands have a more oceanic climate with two rainy seasons, at the change of the monsoons, during which there is often a considerable amount of precipitation.

The vegetation of the area is directly correlated with the rainfall as modified by the existence of permanent rivers and the nature of the substratum. Thus, in the Harar and Arussi-Bale mountains there is, with the relatively plentiful rainfall, a considerable vegetation containing "an infinite variety of trees, bushes and vines" (Donaldson Smith, 1895). Eastwards along the northern edge of the plateau there is a less luxuriant vegetation and although cedar, box, acacia and euphorbia are abundant on the crest and northern slopes, these give place in the Haud and Sorl Haud to diminishing amounts of grass and thorn scrub; the Daror Valley, eastern Nogal Valley and Mijarten are almost completely waterless except for scattered oases and support little more than a sparse thorn scrub. The valleys of the principal rivers, the Juba and Webi Shebeli, support a thick forest growth along their lower courses and in the coastal plain where they approach the sea. The northern coastal plain (Guban), though supporting some evergreen bushes in the drainage channels, otherwise possesses a very stunted, scanty, bush vegetation with some seasonal grass-lands. The Sokotra islands in spite of their more abundant rainfall support only a scanty vegetation except on the banks of steams and in nooks and crevices; this is due to the porous nature of the limestone which caps most of the surface of the islands.

TOPOGRAPHICAL AND ZOOGEOGRAPHICAL DISTRIBUTION

It is a common gibe that the zoo-geographer, after laboriously analysing the fauna of any area, inevitably comes to the conclusion that it is a mixture and that, as no two species have exactly the same geographical range, if the analysis is carried far enough, the mixture is found to contain exactly as many elements as it has component parts. Nevertheless, if extremes of subdivision are avoided, a faunal analysis in relation to geographical and topographical distribution can throw considerable light on the probable past changes that have led up to the present situation. In considering the snake fauna of the area the first step must be to eliminate from consideration all those forms whose taxonomic status is unsatisfactory. For reasons given in detail below no account is taken of the genus *Leptotyphlops,* and certain other forms, known only from one or two specimens, are considered unreliable.

The only absolutely demarcated zone in the area under discussion is the Sokotra group of islands. These have a fauna that is almost wholly endemic but whose affinities are quite clearly not Ethiopian. Discounting the genus *Leptotyphlops,* the four recorded snakes are *Typhlops socotranus* Boulenger, *Coluber socotrae* (Günther), *Ditypophis vivax* Günther and *Echis coloratus* Günther; all except the last-mentioned are endemic in the islands. The first species belongs to a cosmopolitan genus, but would appear to be most closely related to the palaearctic *T. vermicularis* Merrem; the next is a primitive species of a Palaearctic-Nearctic genus. The third species belongs to an endemic genus that appears to have oriental as well as African affinities and the last species, though there are legitimate doubts about its being a reputable member of the Sokotran fauna, is a palaearctic species of the Saharo-

Sindian region. The facies of the Sokotran snake-fauna is, therefore, definitely northern.

On the mainland the only eco-topographical area that is at all sharply marked is the Guban where there is an abrupt transition from extreme aridity to the relatively well watered crest of the scarp of the maritime mountains. In all other regions the transitions from wetter to dryer conditions, with the associated floral differences, are so gradual that it is profitless to attempt to define separate regions. In the tables that follow an effort has been made to summarise the known or apparent distributional facts and the Somali peninsula has been subdivided into

(a) The Guban
(b) The Maritime mountains, from the Harar Mts. to the Al Hills
(c) The Nogal-Mijarten, including the Sorl Haud
(d) The Haud-Ogaden
(e) The Western Mountains, including the Arussi, Bale and Boran regions, and
(f) the Webi Shebeli-Juba region comprising the lowlying zone in the south-east of the area.

The zoogeographical subdivisions of the Ethiopian region are those of Schmidt (1923, p. 7).

	a	b	c	d	e	f	Distribution elsewhere and remarks
(a) NORTHERN (PALAEARCTIC — NEARCTIC — ORIENTAL) GENERA							
Eryx colubrinus "rufescens"	+	.	.	.	.	.	Egypt
E. c. subsp.	.	.	.	.	+	+	Egypt to Kenya Colony
E. somalicus	+	.	.	+	.	+	
Coluber florulentus	+	.	.	.	.	.	A.E. Sudan and Eritrea to Egypt
C. rhodorhachis subnigra	+	+	.	+	.	.	Eritrea
C. r. subsp.	.	.	.	.	.	.	Egypt to N.W. India
C. brevis	.	.	+	+	.	+	
C. citernii	.	.	.	.	.	+	(Possibly = *C. smithi*)
C. smithi	.	.	.	.	+	+	Adjacent eastern Kenya Colony
C. somalicus	.	.	.	.	+	.	(Possibly = *C. brevis*)
C. taylori	.	+	.	.	.	.	
Echis carinatus	+	+	+	.	.	.	Circum-Sahara to Peninsular India.
(b) GENERA OCCURRING IN, BUT NOT CONFINED TO THE ETHIOPIAN REGION							
Typhlops cuneirostris	.	+	.	+	.	+	Allied to Palaearctic *T. vermicularis*
T. unitaeniatus unitaeniatus	.	.	.	.	.	+	Eastern Savannah
T. u. ataeniatus	.	.	.	+	.	+	

	a	b	c	d	e	f	Distribution elsewhere and remarks
T. somalicus	.	.	.	.	+	.	Abyssinian Mts. Forest affinities
T. schlegeli brevis	.	.	.	+	+	+	A.E. Sudan and Uganda
T. s. subspp.	.	.	.	.	.	.	Eastern and southern Savannahs
T. blanfordi blanfordi	.	+	.	.	+	.	Abyssinian Mts.
T. b. lestradei	.	.	.	.	.	.	Uganda-Ruanda
Python sebae	.	.	.	.	.	+	Circum Rain Forest Savannahs
Psammophis schokari	+	.	.	.	.	.	A.E. Sudan and Eritrea to N.W. India
P. punctulatus punctulatus	+	.	.	.	.	.	N.W. Kenya Colony, A.E. Sudan, Abyssinia and Eritrea. S. Arabia?
P. p. trivirgatus	.	+	+	+	.	+	Eastern Savannah
P. sibilans	.	+	+	+	.	+	Circum Rain Forest Savannahs
P. biseriatus tanganicus	+	+	+	+	.	.	Libya to Central Tanganyika Territory
P. b. biseriatus	.	.	.	.	.	+	Eastern Kenya Colony and N.E. Tanganyika Territory
P. pulcher	.	.	.	.	+	.	
P. subtaeniatus	.	.	.	.	+	+	Eastern and Southern Savannahs
Tarbophis dhara somalicus	+	+	+	+	.	+	Adjacent Kenya Colony
T. d. subspp.	.	.	.	.	.	.	A.E. Sudan and Eritrea to Muscat
T. pulcher	.	.	+	+	.	.	
T. barnum-browni	.	+	.	.	.	.	
Naja nigricollis nigricollis	.	.	.	.	.	.	Circum Rain Forest Savannahs
N. n. pallida	+	+	+	+	+	+	A.E. Sudan and Abyssinia
N. haje haje	.	+	.	.	.	.	Circum Rain Forest Savannahs
N. h. arabicus	.	.	.	.	.	.	S.E. Arabia
N. melanoleuca	.	.	.	.	.	+	Rain Forest and outlying forest islands

(c) ETHIOPIAN GENERA

	a	b	c	d	e	f	Distribution elsewhere and remarks
Neusterophis olivaceus olivaceus	.	.	.	.	.	+	A.E. Sudan to Central Tanganyika Territory
N. o. subspp.	.	.	.	.	.	.	Central Tanganyika Territory to Angola
Meizodon semiornatus	.	.	.	+	+	+	Eastern Savannah (S. Arabia?)
Aeluroglena cucullata	.	+	.	+	.	.	
Pseudoboodon lemniscatus	.	.	.	.	+	.	Montane Abyssinia and Eritrea

	a	b	c	d	e	f	Distribution elsewhere and remarks
Boaedon lineatus	.	+	.	+	+	+	Circum Rain Forest Savannahs
B. maculatus	.	.	+	.	.	.	(Doubtful validity)
B. erlangeri	.	.	.	.	.	.	(Uncertain range; doubtful validity)
Lycophidion capense.	.	+	.	+	+	+	Circum Rain Forest. S. Arabia
Mehelya capensis fiechteri.	.	.	.	+	.	+	
M. c. subspp.	.	.	.	.	.	+	Savannah subprovinces
Philothamnus semivariegatus.	.	+	.	+	+	+	Eastern and southern Savannahs (? S. Arabia)
Chlorophis irregularis hoplogaster	.	.	.	.	.	+	Ethiopia to Natal and Cape Province
C. i. irregularis.	.	.	.	.	.	.	Senegal to Uganda; Angola
Scaphiophis albopunctatus raffreyi.	.	?+	.	.	.	.	Mountains of Abyssinia and Eritrea. S. Arabia?
S. a. albopunctatus	.	.	.	.	.	.	Sudanese and Eastern Savannahs
Prosymna agrestis.	.	.	.	.	.	+	Allied to *P. ambigua* of Eastern Savannah
P. somalica	.	.	.	+	.	.	Primitive species allied to *P. sundevallii*
Asthenophis ruspolii.	.	.	.	.	.	+	Doubtful validity (? = *Prosymna agrestis*)
Dasypeltis scaber	.	+	.	+	+	+	Savannah subprovinces; S. Arabia
Thelotornis kirtlandii.	.	.	.	.	.	+	Savannah subprovinces
Dispholidus typus	.	+	.	.	+	+	Savannah subprovinces
Rhamphiophis rubropunctatus.	.	.	.	+	+	+	Eastern Savannahs
R. rostratus	?	+	.	+	+	+	Eastern Savannahs
Hemirhagerrhis kelleri	.	.	.	+	+	+	Eastern Savannahs
H. nototaenia	.	.	.	+	.	+	Eastern Savannahs
Cerastes tritaeniatus multisquamis	.	.	.	.	+	.	Montane districts of eastern Savannah
C. t. tritaeniatus	.	.	.	.	.	.	Eastern and southern Savannahs
Micrelaps vaillanti	.	.	.	.	.	+	
M. boettgeri.	.	+	.	+	+	+	
Brachyophis revoili corni	.	.	.	+	.	.	
B. r. revoili	.	.	.	.	.	+	Adjacent coastlands of Kenya Colony
Aparallactus lunulatus scorteccii	.	+	.	+	.	+	Abyssinia and Eritrea
A. l. subspp.	.	.	.	.	.	.	Sudanese and Eastern Savannahs
Elapsoidea sundevallii güntheri	.	.	.	.	+	.	Montane regions of eastern Savannah
E. s. subspp.	.	.	.	.	.	.	Savannah subprovinces

	a	b	c	d	e	f	Distribution elsewhere and remarks
Dendroaspis polylepis antinorii	.	+	.	+	+	.	Abyssinia, Eritrea and N. Uganda
D. p. polylepis	.	.	.	.	.	.	Eastern and southern Savannahs
Causus rhombeatus	.	+	.	.	+	.	Savannah subprovinces
C. resimus	.	.	.	.	.	+	Eastern and southern Savannahs
Bitis lachesis somalica	+	+	+	+	+	.	
B. l. subspp.	.	.	.	.	.	.	Savannah subprovinces; S. Arabia
Atractaspis engdahli	.	.	.	.	.	+	Allied to *A. aterrima* of the Sudanese and eastern Savannahs
A. microlepidota magrettii	.	.	+	+	+	.	
A. m. subspp.	.	.	.	.	.	+	Sudanese and eastern Savannahs
A. leucomelas	+	.	+	.	.	.	Uncertain affinities
A. scorteccii	.	.	+	+	.	.	Allied to preceding

From this summary and from conclusions reached in the systematic section of this paper it is clear that the fauna as a whole is, as generally recognised, predominantly Ethiopian with strong affinities with that of the Savannah Province. There is, however, a small but marked "northern" element which appears to possess special interest and the following points are emphasised.

(a) There is, in Somaliland, a group of Palaearctic species associated with the periphery of the Saharo-Sindian desert belt. They are *Eryx colubrinus, Coluber florulentus, Coluber rhodorhachis subnigra, Tarbophis dhara somalicus, Psammophis schokari* and *Echis carinatus*. The Somali populations are, at most, subspecifically differentiated (there being complete, or nearly complete continuity of geographical distribution) but even when subspecific status is not taxonomically justifiable they tend to be slightly different. Where it is possible to form an opinion on the matter (e.g., *Coluber florulentus* and *C. rhodorhachis*) the differences appear to be of a secondary nature. These forms constitute fifty per cent of the recorded fauna of the northern coastal plain (the Guban) and only one of them has a wide distribution elsewhere in the peninsula; most of the others are either confined to the plain or to it and the immediately adjacent areas.

(b) There is a second group of species belonging to some of the same genera, plus a *Typhlops*, whose affinities again appear to be northern rather than Ethiopian. This group consists of *Typhlops cuneirostris, Eryx somalicus, Coluber brevis, Coluber citernii, Coluber smithi, Coluber somalicus,* *Coluber taylori, Tarbophis pulcher* and *Tarbophis barnum-browni.* These are all endemic in the peninsula, but only one of them has been recorded from the Guban; their specific differentiation is complete and they cannot be obviously paired with vicarious species elsewhere.

(c) Although more than seventy three per cent of the northern elements of the Somali fauna are specifically or subspecifically endemic in the peninsula there are no endemic genera of undoubted northern affinities.

Turning to the Ethiopian elements of the fauna the position appears often to be very different. There is proportionally much less specific and subspecific endemism; the endemic species form less than twenty per cent of the whole and the peninsular subspecific endemics number only five (10 %); only two of these endemics have been recorded from the Guban. On the other hand differentiation has proceeded in two instances to generic level (*Aeluroglena* and *Micrelaps*). In several instances the endemics are apparently primitive types (e.g., *Micrelaps, Prosymna somalica* and *Bitis lachesis somalica*) and may well be relicts.

Another noticeable feature is the apparently close association of some forms with the montane regions. Of the twenty species and races recorded from the Western Mountains more than a third (*Typhlops somalicus, T. blanfordi blanfordi, Psammophis pulcher, Pseudoboodon lemniscatus, Scaphiophis albopunctatus raffreyi, Aparallactus lunulatus scorteccii* and *Dendroaspis polylepis antinorii*) appear to be strictly montane snakes which should really be considered as endemics of the Abyssinian plateau; with two exceptions their distribution in Somaliland is restricted to the Western and Maritime mountains.

GEOLOGICAL AND CLIMATIC HISTORY

The foregoing distributional facts [1]) ought to be susceptible of rational explanation in relation to past events in the area and in neighbouring areas. The following is a summary of some current beliefs on these matters. The Ethiopian plateau is regarded as dating from Jurassic times whilst the Somali plateau is of later date. The main elevation of the peninsula probably took place in the Cretaceous, but the existence of Miocene and Eocene limestones in the north and east of the area, and capping the Sokotra Islands, makes it clear that the elevation of this area was of later date. At this time there was continuity with Arabia and the separation of the two is dated by Macfadyen (1933) as the middle of the Pliocene. The same movements which

1) Further exploration will doubtless alter the details but the general picture ought to be reliable.

produced their separation are also believed to have resulted in the separation of the Sokotra islands from the peninsula (Arldt, 1919) though Mertens (1934, p. 50) without any statement of reasons dates it earlier — Upper Miocene. The Rift Valley also, forming the western boundary of the area, is generally believed to have been formed in association with the same mid-Pliocene earth-movements.

The subsequent history of the area is much more controversial. The existence of raised beaches on both the north and east coasts and reef limestones of Pleistocene age covering the lower parts of the Sokotra islands up to 40 feet above sea level indicate further movements, which must have slightly affected the extent of the present Guban (northern coastal plain) and Danakil Desert. The chief interest from the present standpoint lies in the climatic changes during the Pleistocene and Holocene periods, and in their probable causes. There is now a mass of evidence placing it beyond reasonable doubt that Somaliland and the countries surrounding it have been subjected to an alternating succession of wetter and drier periods throughout the Pleistocene. The controversy lies in the number of these alternations, their intensity, their duration and their dating. The following evidences are taken from Zeuner (1945) and from an unpublished manuscript by Dr. J. Desmond Clark that I have been privileged to consult.

I. Mount Carmel (Palaeontological considerations).

The successive layers, from the lowest upwards, give the following indications; the tentative chronological dating is by Zeuner.

(a) Warm and damp climate with distinct and primitive species of tropical affinities.

(b) Warm and damp at first, becoming drier later when there is an increase of Asiatic elements. Second half of penultimate glaciation (??).

(c) and (d) Further Asiatic immigration. Climate drier, but with perennial water for hippopotamus. *Homo neanderthalensis* appears. Last Interglacial (?).

(e) Abrupt faunal change with evidence of considerably increased rainfall. "This faunal break is higly significant from the chronological point of view. A similar break is observed in temperate Europe at the beginning of the first phase of the Last Glaciation when a great many forms appear for the first time and the specific composition of the fauna assumes a modern aspect...."

(f) Drier conditions, as compared with the preceding layer, are indicated but not desert conditions.

(g) Similar to the preceding but perhaps slightly more dry.

(h) An increase of rainfall compared with the preceding. Second phase of the last glaciation (?).

(i) Fallow deer diminishing in numbers and gazelle increasing, indicating increasing aridity.

(j) Gazelle showing a further increase in number indicating even greater aridity. The fauna essentially that of the present day though containing a few forms not now extant in Palestine.

II. Kharga Oasis (Geological considerations).

(1) Some rain.

(2) Increased rainfall with great erosion.

(3) Filling of eroded valleys by breccia on a large scale for a long period. Little or no rain. Last Interglacial.

Zeuner suggests that this period "might well represent a prolonged period of dry conditions *resembling those of the present day*" (italics mine).

(4) Tufa, gravel and silt deposited on the breccia; some rain.

(5) Intense erosion and formation of a gravel sheet; maximum of moist conditions.

(6) Aggradation of silt and gravel, followed by tufa formation indicating less rain.

(7) Erosion of earlier deposits; second maximum on rainfall curve.

(8) Aggradation of silt and gravel followed by tufa formation indicating drier conditions.

(9) Erosion but on a smaller scale than before, followed by formation of a gravel terrace, indicating a humid oscillation followed by a drier phase.

(10) Erosion on a still smaller scale followed by gravel terrace building indicating another humid oscillation followed by a drier phase leading to present conditions.

III. Ethiopian Lakes (Lake Levels).

Evidence derived from this source is suspect, since tectonic movements, known to have occurred during the Pleistocene, could produce the same effects as climatic fluctuations and the two cannot be readily disentangled. Nevertheless in the Ethiopian Lakes (Zwai-Shala and Tsana) there is evidence of a high level towards the beginning of the Upper Pleistocene, followed by four lesser maxima.

IV. Uganda (Palaeontological evidence).

"Available evidence points to two main pluvials, the second of which (and perhaps the first) was a double one ...... and two subsequent epi-pluvials".

V. Kenya (Archaeological evidence).
"... Three pluvials, each with two maxima, followed by two after phases."

VI. Somaliland (Desmond Clark: Geology and Archaeology).
Three pluvials, the second with two maxima and the third with three, and two post-pluvial wet phases. The interpluvial between the second and third pluvials is dated as late in the Middle Pleistocene and was drier and possibly of longer duration than any subsequent dry phase. Human artifacts first appear (Acheuleo-Levalloisian culture) in the immediately following wet phase, i.e., the beginning of the Upper Pleistocene.

Other similar evidence could be quoted, but the foregoing suffices to show that over a wide area from Palestine to Kenya there has been a sequence of climatic changes, and although there may be differences of opinion regarding the exact number of oscillations there is very general agreement that there was, at the beginning of the Upper Pleistocene, a pluvial period of an intensity not subsequently reached. This (last) pluvial was immediately preceded by a spell of prolonged and intense desiccation at the end of the Middle, or beginning of the Upper, Pleistocene; it was succeeded by two to four wetter periods of lesser intensity separated from one another by dry spells. These, also, were of lesser intensity and shorter duration than the arid spell preceding the last pluvial. Human remains or cultures first appear during, or immediately after, this interpluvial.

Various attempts have been made to correlate these pluvial fluctuations with the successive glaciations of northern latitudes for which an absolute chronology has been worked out on the basis of calculable variations in the amount of solar energy received over the period. Zeuner has pointed out the difficulties of any such correlation between the tropics and more northern latitudes; if periodical increases and decreases of seasonal solar radiation are the causes of pluvial periods "... one can hardly escape the conclusion that there were about 28 pluvial phases during the last 600,000 years...." There is no evidence of any such large number. Nevertheless he is prepared to accept that the sequences in Palestine (Mount Carmel) can be integrated with the European glaciations and he relates the dry epoch (c. & d. above) to the last Interglacial, with an absolute chronological dating of 125,000-180,000 years B.P. It is difficult to believe that this dry spell in Palestine was *not* contemporaneous with the prolonged dry spell in Egypt (3 of Kharga Oasis) and almost equally difficult to believe that the similar long dry spell in Somaliland, dated by Desmond Clark as late middle Pleistocene, was *not* contemporaneous with both. The first appearance of *Homo* at Mount Carmel during the dry spell and of human artifacts in Somaliland in the next horizon above it, add strength to this belief.

If this is accepted there remains the question of the nature of the climate during the various oscillations. Strangely enough there is a good deal of agreement amongst various workers, at least as regards the "last interglacial" dry spell and the pluvial that followed it. Thus: —

(a) DRY SPELL.

Mt. Carmel. Grasslands extending to their maximum. Dry conditions generally but perennial water present. (Zeuner).

Kharga Oasis. Dry conditions resembling those of the present day (Zeuner).

Lake Rudolf. Lake level not greatly different from that of the present (Fuchs).

(b) LAST PLUVIAL.

Mt. Carmel. "... a long period of damper, i.e., forest, conditions ..." (Zeuner).

Kharga Oasis. Trees and ferns growing even during the earliest part of the period before the rainfall reached its maximum (Caton-Thompson and Gardner).

Lake Rudolf. Lake level more than 200 feet higher than at present (Fuchs).

Kenya Colony. An "epoch of continuous forest" (Moreau).

ORIGIN AND DEVELOPMENT OF THE SNAKE FAUNA

The fauna of Sokotra presumably consists of changed and unchanged survivors from the mid-Pliocene fauna of the north-east corner of Africa, there being nothing to suggest that the islands have been re-stocked since their separation from the mainland, except perhaps in the case of *Echis coloratus*. It is, therefore, to be inferred that the climatic vicissitudes of the Pleistocene were not only not lethal to a group of mainly Palaearctic forms, but that a *Coluber* survived them all without generic change. There is also a possibility, that cannot be entirely ignored, that *Echis coloratus* lived through them without even subspecific change. It is, however, probable that the climate of the islands, under the tempering influence of the ocean, has been less subject to extreme variations than the mainland.

On the mainland there appears to be a clear and close correlation between geography and the composition of the fauna. The Abyssinian mountains obviously present a physical obstacle to the unhindered movement of terrestrial animals. How effective an obstacle they are cannot be measured and their efficacy will no doubt vary from animal to animal according to habits and mobility; but in the case of most serpents their effect must be reckoned considerable. In addition to the physical hindrance they offer, the mountains are, to-day, the cause of an ecological barrier. That this is effective for a large number of species may be inferred from the degree of specialisation of the montane fauna and the apparent inability of many of its members to penetrate into the peninsula except for limited distances in the mountain regions where the same ecological conditions persist. The fact that the mountains present an ecological barrier under the present climatic conditions does not necessarily imply that they have done so under all the different climatic conditions of the Pleistocene, but there is every probability that they did and even that, under circumstances such, for instance, as those at the height of a pluvial period, they may have been even more effective. The unobstructed routes into the peninsula are two, a long, narrow, coastal defile from the north leading through the Danakil Depression into the Guban and a very much broader and shorter one from the south leading into the centre. There is no reason to suspect that either of these two corridors has been subject to appreciable geographical change during the Pleistocene though the movements which produced the raised beaches on the north coast may have produced some very slight variations in the width of the northern one. This defile is the most direct route for northern entrants into the peninsula and its present fauna consists largely of northern forms; some northern elements (e.g., *Eryx colubrinus* and *Psammophis punctulatus trivirgatus*) also extend round the Abyssinian mountains and enter the peninsula, perhaps for the second time, by the southern route. Clearly the northern corridor provides a much more difficult "line of communication" than the southern one and the composition of the fauna of the peninsula, 77 % (approx.) of southern (Ethiopian) forms to 23 % northern, reflects this. Another effect arising from the same cause is to be found in the different extent to which peninsular endemism occurs in the same two divisions of the fauna. Any restrictions on the movements of individual animals from one area to another must necessarily restrict the flow of genes from population to population. The partial isolation so produced may be expected to encourage local differentiation and this expectation seems to be fulfilled; of the northern elements 73 % are endemic in Somaliland and the Danakil-Eritrean corridor, whereas amongst the southern elements the percentage is less than half that amount, approximately 30 %.

It has been emphasised on a previous page that the Palaearctic forms fall into two groups, one whose members are scarcely, or at most subspecifically, differentiated and exist along the route by which they are presumed to have entered the peninsula, and a second whose members are completely specifically differentiated and do not, with a single exception, exist in the corridor. The taxonomic arrangement of these forms obviously reflects the distributional facts and may supply a clue to their causes. There are two categories of the taxonomists' hierarchical system involved, infraspecific and specific, and if time is a factor in the evolution of these categories then we may be dealing with two time-groups. Now time must enter also into the dispersal and distribution of an animal, and though the rate of evolution is certainly not a constant, it is not unreasonable to expect that forms closely genetically akin will have approximately the same evolutionary rate under the same conditions. Consider then *Coluber florulentus* and *Coluber rhodorhachis*; the former is confined, in the Somali region, to the Guban and the latter is considerably more widely distributed over the Maritime Mountains and in the Haud. Given that they have similar dispersal rates (and they are similar in habits and mobility), then *C. rhodorhachis* has probably been longer in the region than its relative. Is it chance that the one that has been subjected to the semi-isolation of the peninsula for the longest time ranks taxonomically as a recognisable sub-species whilst the other, though showing signs of infraspecific differentiation, does not? The areal considerations played no part in determining the taxonomic arrangement. Chance cannot be completely ruled out, but the facts, inadequate though they may be for "proof", certainly fit the hypothesis of time-groups. The explanation of the existence of these time-groups may well be that they are the result of successive migrations, a not improbable occurrence in an area that has clearly been subject to a succession of alternatively wet and arid climatic conditions.

The non-endemic Palaearctic species in Somaliland (i.e., those found in the Guban) are all associated with the arid conditions of the Saharo-Sindian fringe; none of them is anywhere associated with wet or forest conditions and none of them appears able to withstand the full severity of the true desert. Any spread of the desert areas would, therefore, restrict their range and if the restriction took place where it might be expected to (an extension of the Nubian Desert) the Somali populations would be cut off from their northern relatives. The present climatic trend which, with fluctuations, has been in operation since the last Pluvial is towards increased desiccation and *Coluber rhodorhachis* appears already to have been fragmented in the manner suggested; there appears to be a distributional gap of several hundred miles between populations in Lower Egypt and in Eritrea-Somaliland. Any past arid phases of greater intensity than that of the present day would therefore have had a similar but more marked fragmenting effect on species with similar climatic tolerances or intolerances [1]). The endemic northern species (b, p. 9) mostly belong to the same three genera (*Eryx, Coluber, Tarbophis*) as most of the non-endemics and this strongly suggests that their present restriction to Somaliland is the result of such a process. They are immigrants from the north that have been isolated by climatic changes.

Can these immigrations be correlated with particular periods of the Pleistocene? Consider the later wave. Desiccation has not yet proceeded during the present cycle to the point of separating all of them from their northern dispersal centres and they could, therefore, have spread to their present limits at various times *subsequent to the last occasion when aridity was appreciably greater than now.* The last occasion of this nature appears to have been at the height of the last interpluvial ("drier and possibly of longer duration than any subsequent dry phase", p. 13). It is unlikely that the immigration was of earlier date since, had it been, there would have been isolation of the Somali populations during the inter-pluvial and the present faunal position could then only have arisen as a result of a highly improbable contingency: — that exactly the same forms had dispersed once again along the same route to re-establish contact and continuity after their separation. All the six forms involved clearly did not arrive simultaneously (see p. 16), but the earliest occasion when suitable semi-arid climatic conditions are believed to have existed along the migration route would have been sometime between the maximum of the last inter-pluvial and the peak of the last pluvial, i.e., about the beginning of the Upper Pleistocene. If the correlations attempted above are correct this would correspond approximately with period (4) of the Kharga Oasis and period (e) of Mount Carmel. Is it entirely without significance that in the latter place this period immediately follows one in which Asiatic invasion is the salient feature and is itself a period of abrupt faunal change when the "... composition of the fauna assumes a modern aspect ..."? The dating of the earlier wave of immigration is necessarily more difficult, the more so since it may not be a single wave but the survivors from more than one. However that may be, the last to arrive presumably did so before the last inter-pluvial, whose aridity was responsible for their isolation from their northern dispersal centre, and probably not earlier than the penultimate inter-pluvial, another arid phase.

Thus we have the possible position of six Palaearctic forms arriving in

1) Tolerance or intolerance of the climate alone is not intended, but of any secondary effects of the climate in addition.

Somaliland at intervals subsequent to the last interpluvial. They retain their specific identity and in most instances full, though tenuous, geographical continuity with their northern relatives. They show varying degrees of differentiation from these relatives and in some instances at least it is the Somali population, at the extremity of the range of the species, rather than the parental stock that has changed. A further group of eight (perhaps 10) forms from the same region and for the most part belonging to the same genera, arrived before the last inter-pluvial, and probably between it and the penultimate. These forms have been isolated at least since the last interpluvial and are now not only specifically distinct from their parent stocks but so changed that their parent cannot be determined with certainty. If Zeuner's correlations of the climatic successions at Mount Carmel with the European glaciations and with absolute chronology are accepted, this means that:

(a) Forms that have been partially isolated for a maximum of 120,000 years, but probably very much less, show, at most, subspecific differentiation.

(b) Congeneric forms and some others that have been completely isolated for at least 125-175,000 years show complete specific differentiation.

This may imply a higher evolutionary rate than Zeuner himself found; he (1945, p. 277 and 1946, p. 375) concluded that the maximum evolutionary rate is between 500,000 and 1,000,000 years per species-step. It seems to the present writer, however, that there cannot be any such thing as a universally applicable maximum rate of evolution. If environmental conditions play any part in producing or fixing genetic changes, then the conditions that have existed in Somaliland during the Pleistocene, have been favourable for a very high rate, and the figure of 125-175,000 years for a species-step is not impossibly low, especially for poecilothermic animals.

TAXONOMIC SECTION

An endeavour has been made to revise the systematic status of all snakes recorded from the Somali Peninsula and Sokotra Islands. It is hoped that all the important records are included in the list of references given for each species and subspecies; a full list of references has been dispensed with in a few instances where a recent systematic revision exists. The specimens listed are from collections not previously reported upon together with others whose examination has furnished evidence of importance in connexion with the conclusions reached.

The taxonomic methods employed were those in everyday use, but, where the material was adequate, special attention was paid to the question of allometric growth and to simple statistical analysis. Insufficient attention has hitherto been paid to either of these matters in ophidian systematics and the results now obtained are regarded as encouraging. Failure to realise the existence of allometric growth, or failure to ascertain its nature and to measure its amount accurately, has undoubtedly led to the description of many invalid "species" and "subspecies" (e.g., *Meizodon semiornatus*). Its recognition and proper measurement places a new "character" in the hands of the systematist, one that is of importance in that the ontogenetic level of development of closely related forms can be compared directly (e.g., *Coluber rhodorhachis*). The statistical methods employed are of the simplest. Their value lies in the fact that they furnish an indication of the probability or otherwise of observed differences being the result of chance in samples of inadequate size. In the same connexion attention is drawn to the fact that Museum collections, especially the older ones, are liable to be unfair samples, the extremes being weighted by selection (cf., *Coluber rhodorhachis*). In dealing with the status of intergrading sympatric forms the principle adopted was to attempt to assess the probabilities of various possible theoretical explanations and to base the taxonomic treatment on the least improbable (cf., *Psammophis sibilans* and *P. schokari*).

Except where otherwise indicated Bogert's (1940) generic concepts have been followed. The International Rules have been followed in nomenclatorial matters; in this connexion the appearance of a comma between the name of an animal and the name of an author is indication that the author is *not* the originator of the animal's name.

Leptotyphlops Stejneger

The small burrowing snakes of this genus are in a very unsatisfactory taxonomic state and the numbers available are so small that it is not profitable to attempt any serious survey of them; virtually nothing is known of the range of individual and sexual variation. Five "species" have been recorded from Somaliland, and two from the Sokotra group.

(a) *Leptotyphlops reticulata* (Boulenger).

Based on a single individual, the type, collected in the Golis Mts. at Wagar (3-4000 ft.) by G. W. Bury. It is a stout-bodied, long-tailed form, the length/diameter ratio being about 40 and the length of the tail contained about 9½ times in the total length.

(b) *Leptotyphlops cairii* (Dum. & Bibr.).

This species has been recorded from the same locality as the foregoing

(Boulenger, 1906) and from the Buran District (2300 ft.) (Parker, 1932, p. 362). Two further examples referable to this, or some kindred species, were obtained by Col. Taylor in the mountains of the Ogo and in the Ogaden. One example, measuring 159 mm from 42° 05′ E. × 10° 10′ N. (4000 ft.) resembles the Buran District specimens, but the other, from Daggah Bur (43° 30′ E. × 8° 13′ N., 3500 ft.) is larger, 158 mm, with a broader head, less hooked snout, narrower frontal and sixteen scales round the middle of the body. This latter condition is unique in the genus and may well indicate specific differentiation, but with only a single damaged specimen available it seems inadvisable to do more than record the fact.

(c) *Leptotyphlops emini* Boulenger.

This has been recorded from Ethiopia and Italian Somaliland. Loveridge has recently distinguished an insular race on Pemba Island and it seems possible that the northern population may also be subspecifically distinct. Examples in the British Museum from Harar have a white tip to the tail and Scortecci (1940, p. 8) records the same condition in examples from Neghelli and Arero.

(d) *Leptotyphlops longicauda* (Peters).

Scortecci (1939 b, p. 265) has recorded this, with a query, from Italian Somaliland, but Loveridge (1936 a, p. 231) had previously expressed the opinion that the next-mentioned nominal species is not distinct from *longicauda.*

(e) *Leptotyphlops fiechteri* Scortecci.

This species was originally described from Italian Somaliland and has since been recorded from various localities in that area, and also from northern Kenya. Loveridge, as already remarked, inclines to the belief that it is not distinct from *longicauda* and has shown that the range of variation of the latter is great enough to cover the recorded variations of *fiechteri.*

(f) *Leptotyphlops filiformis* (Boulenger).

Glauconia filiformis Boulenger, 1899, Bull. Lpool. Mus., vol. 2, p. 7 (Type localities: Dahamis, 350 ft.; Jenna-agahan, 1200-2500 ft. and Homhil, 1500-2500 ft.); Idem, 1903, p. 88, Pl. 11 fig. 2; Steindachner, 1903, p. 13 (Hakari).

This endemic species, characterised by its extreme slenderness (the length/diameter ratio varies betwen 100 and 140) was believed by its describer to be most closely allied to *L. macrorhynchus* (Jan), recorded from the A. E. Sudan to Iraq.

(g) *Leptotyphlops macrura* (Boulenger).

Glauconia longicauda (non Peters) Boulenger, 1899, Bull. Lpool. Mus., vol. 2, p. 7

(Type localities: Dahamies, 350 ft.; Jena-agahan, 1200-2500 ft. and Homhil, 1500-2500 ft.).
Glauconia macrura Boulenger, 1903, p. 89, Pl. 11 fig. 3.

This alleged Sokotran endemic is known only from the original types.

A number of "species" have also been recorded from neighbouring territories and some of the following may well extend into the area dealt with in the present paper.

(h) *Leptotyphlops erythraea* (Scortecci).
Known only from Eritrea.

(i) *Leptotyphlops braccianii* (Scortecci).
Known only from Eritrea.

(j) *Leptotyphlops variabilis* (Scortecci).
Recorded only from Eritrea; may not be specifically distinct from *cairii*.

Typhlops Schneider

SYNOPSIS OF THE SPECIES

I. Snout with a more or less well marked horizontal edge. Rostral width a little more or a little less than half the width of the head.
  A. A subocular separating the ocular from the labials; eye showing through the posterior part of the nasal. Scales in 24 rows at mid-body.
    (1) A yellow vertebral stripe. *T. unitaeniatus* Peters
    (2) No yellow stripe. *T. unitaeniatus ataeniatus* Boul.
  B. Ocular in contact with the labials, no subocular. Eye, if visible, in the ocular or preocular.
    (1) Scales 24. Length/diameter ratio 43. Eyes visible. Brown above, white beneath. Rostral width slightly less than half that of the head; horizontal edge feeble. *T. leucocephalus* Parker
    (2) Scales 24-26. Length/diameter ratio 55-90. Eyes not visible. Greenish yellow above and below. Rostral width more than half that of the head; horizontal edge distinct. *T. somalicus* Boul.
    (3) Scales 30-38. Length/diameter ratio 26-47. Eyes visible. Rostral width more than half that of the head; horizontal edge acute and cutting, extending on to the nasal shield. *T. schlegeli brevis* Scortecci (adults)

II. Snout rounded, without angular horizontal edge.
  A. Rostral width half that of the head, or more.
    (1) Scales 30-38. Olive above, yellow beneath. Rostral distinctly longer than broad when viewed from above (average length/breadth ratio 1.33). Nasal suture usually arising from the second labial. *T. schlegeli brevis* Scortecci (juveniles)
    (2) Scales 28-30. Gray above and beneath. Rostral about as broad as long in dorsal view. Nasal suture arising from the first labial. *T. blanfordi* Boul.
  B. Rostral width one third that of the head.
    (1) Scales 22. Snout strongly dorso-ventrally depressed. Posterior border of the nasal not excavated, so that the nostril is much nearer the rostral than the preocular. *T. cuneirostris* Peters
    (2) Scales 26-28. Snout only slightly depressed. Posterior border of the nasal deeply excavated so that the nostril is equidistant from the rostral and preocular. *T. socotranus* Boul.

Typhlops unitaeniatus ataeniatus Boulenger

Typhlops unitaeniatus, Lepri, 1911, p. 318 (Mogadiscio neighbourhood).
Typhlops unitaeniatus var. *ataeniatus* Boulenger, 1912, Ann. Mus. Stor. nat. Genova (3), vol. 5, p. 331 (Type locality: Dolo); Calabresi, 1927, pp. 31 & 51 (between To-bungab and Obbia); Scortecci, 1930 b, p. 15 (Afgoi).
Typhlops unitaeniatus ataeniatus, Scortecci, 1939 b, p. 264 (Afgoi, Balad, Vill. Duc. Abruzzi, Belet Amin).
Typhlops somalicus (non Boulenger), Calabresi, 1918, p. 123 (between Jelib & Margherita).

B.M. 1949.2.1.1. ♂. Haud, 46° E. × 8° 20′ N., 2100 ft. 30.4.32. Taylor.
B.M. 1949.2.1.2. ♂. Haud, 45° 43′ E. × 8° 26′ N., 2350 ft. 15.5.42. Taylor.
B.M. 1949.2.1.3. ♀. Haud, 45° 34′ E. × 8° 29′ N., 2600 ft. 29.5.32. Taylor.
B.M. 1949.2.1.4. ♀ Haud, 46° 30′ E. × 8° 10′ N., 3000 ft. Taylor.

These four examples constitute the most northerly record of the species. They are all referable to the "variety" *ataeniatus* which Scortecci (1939 b) considers, probably correctly, to be a northern, geographical subspecies. Specimens with the *ataeniatus* colouring have been recorded as indicated above, and the typical form has been reported from Lugh, Jumbo, Mogadiscio, and Merca in Somalia as well as from localities farther south in Kenya, Uganda and Tanganyika Territory. The two subspecies appear to meet in the region of the provinces of Upper Juba and Lower Shebeli, both having been recorded from the latter. The extent to which the two intergrade has not been determined, but Scortecci (1930 b) mentions one example from Mogadiscio which has the *unitaeniatus* colour on the anterior half of the body and the *ataeniatus* colour posteriorly. There are probably some morphological differences also since it was noted that in the four most northerly specimens from the Haud and in a paratype from Dolo the number of scales from occiput to tip of tail ranges from 443 to 473, whereas in examples of *unitaeniatus* it is very much higher, thus: Lugh 507; Mombasa 521; Taru, Uganda, 516.

Typhlops leucocephalus Parker

Typhlops leucocephalus Parker, 1930, Ann. Mag. nat. Hist. (10), vol. 6, p. 605 (Type locality: Las Anod, 2400 ft.); Idem, 1932, p. 362.

This species is still known only from the unique type collected in the Nogal Valley and its relationships are uncertain.

Typhlops somalicus Boulenger

Typhlops somalicus Boulenger, 1895 c, Proc. zool. Soc. London, p. 536, Pl. 30 fig. 1 (Type locality: Beearso, W. Somaliland); Idem, 1896 e, p. 589; Idem, 1896 d, p. 216 (Sheikh Hussein).
Typhlops acutirostris Mocquard, 1905, Bull. Mus. Hist. nat. Paris, No. 2, p. 77 (Type locality: Shoa, Ethiopia).

Although the name of this species and the type locality are indicative of Somaliland as its home, it appears to be a species of the Ethiopian Highlands. Beearso, the type locality, is in the Arussi Galla country not far from Sheikh Hussein, the only other locality east of the Rift Valley from which the species has been recorded 1).

In the British Museum there is a *Typhlops* collected by Col. Taylor at Ambo (38° E. × 9° N.) at an altitude of 7000 feet. This specimen differs from the type of *T. somalicus* only in a slightly more pointed rostral and in having 26 scales, instead of 24, around the middle of the body. It differs from the description of *T. acutirostris* Mocquard (described from "Shoa", a highland district which, like Ambo, lies to the west of the Rift Valley) only in having 26 instead of 28 scales and a more slender body; the length/diameter ratio in *somalicus* is 90, in *acutirostris* 55 and in the Ambo specimen 75. This latter appears, therefore, to link *somalicus* with *acutirostris* completely and it seems probable that there is but one species distributed through the Ethiopian highlands from the Arussi country to Lake Tana; there are examples from the last-mentioned region in the British Museum. The affinities of this mountain species appear to lie with other members of the genus from the Congo area. Mocquard considered his *acutirostris* to be closely allied to *T. praeocularis* Stejneger, from Leopoldville or Stanley Pool, whilst Werner (1921, p. 325) regards *T. somalicus* as closely akin to *T. acutirostratus* Andersson from Irebu in the Belgian Congo.

Typhlops schlegeli brevis Scortecci

Typhlops mucroso, Sternfeld, 1908 b, p. 239 (Abd-el-Kadr, Harar).
Typhlops brevis Scortecci, 1929, Atti Soc. ital. Sci. nat., vol. 68, p. 267, fig. (Type locality: Kismayu).
Typhlops schlegeli mucroso (part), Loveridge, 1933, Bull. Mus. comp. Zoöl. Harv., vol. 74, pt. 7, p. 216 (Uganda and Lado Enclave).

B.M. 1931.6.11.1. ♀. British Somaliland. Withycombe.
B.M. 1949.2.1.5. ♂. Hargeisa. Taylor.
B.M. 1949.2.1.6-8. ♂ ♂, ♀. Haud, 2300 ft., 45° 48′ E. × 8° 24′ N. Taylor.
B.M. 1949.2.1.9-10. ♂ ♀. Ditto. Taylor.
B.M. 1949.2.1.11. ♂. Haud, 2350 ft., 45° 43′ E. × 8° 26′ N. Taylor.

These eight specimens differ in some characters from *T. schlegeli mucroso*; the snout is slightly more hooked, more acutely angular, with a sharper cutting edge which extends on to the nasal shields and so produces a slightly trilobate appearance of the head when seen from above (Scortecci figure); the rostral when viewed from above is a little longer in proportion to its width and the nasal suture constantly arises from the second, instead

1) Calabresi's record (1918, p. 123) was based on a specimen of *unitaeniatus* (vide Calabresi, 1927, p. 51).

of the first, upper labial. None of these characters provides a clear-cut differentiation from any of the various races of *T. schlegeli* in which the range of variation is sufficiently great to include the conditions found in Somaliland. In combination, however, they appear to indicate that there is a northern geographical race of *T. schlegeli* to which the name *brevis* is tentatively applied. Loveridge (1936 a, p. 227) has pointed out that the principal feature distinguishing *brevis* from *schlegeli* is the origin of the nasal suture from the second labial and this condition is found in all the Somali specimens examined as well as in examples from the Lado Enclave and Uganda which Loveridge considered indistinguishable from *schlegeli mucroso*; it also occurs sporadically as an uncommon condition throughout the whole range of the species, and has been noticed in specimens from Zanzibar, Nyasaland, Tanganyika Territory, N. Rhodesia, S. Rhodesia and Angola. The other feature said to distinguish *brevis* is the ratio of body length to diameter which is given as 18.2. The lowest ratio recorded in *schlegeli* is 22 from which it ranges upwards to 47; but this character is notoriously variable, difficult to measure accurately, and affected by preservation, so that a figure as low as 18.2 is not improbable.

The range of variation observed by the author in *brevis* (12 specimens from Somaliland, "Uganda" and Lado Enclave) compared with other races of *schlegeli* (77 specimens from Kenya Colony, Zanzibar, Tanganyika Territory, Nyasaland, N. Rhodesia, Mozambique, S. Rhodesia, Angola and S.W. Africa) is as follows:

	T. schlegeli brevis	*T. schlegeli* subspp.
Mid-body Scales	♂♂ 34-36 ♀♀ 36-38	♂♂ 30-34 ♀♀ 30-42
Ratio $\frac{\text{length}}{\text{diameter}}$	26-47	25-46
Ratio of Rostral $\frac{\text{length}}{\text{width}}$	1.29-1.41 (Mean 1.33)	1.09-1.42 (Mean 1.24)
Nasal suture arising from	2nd labial (92 %)	1st labial (92 %)

Examined statistically the ratio of the rostral dimensions appears significant. In the 12 specimens here referred to *brevis* (from Somaliland, Lado and Uganda) the mean value is 1.33 with $\sigma = 0.035$; in 76 specimens from other areas (Kenya, Tanganyika Territory, Nyasaland, Portuguese E. Africa, N. Rhodesia, S. Rhodesia, Mashaaland, Angola and S.W. Africa) the mean value is 1.24 with $\sigma = 0.055$. The difference of the means is thus 7.7 times as great as the standard error of the difference would be for two samples from a single normally variable population and the recognition of a northern race, *brevis*, appears to be justified.

Typhlops blanfordi Boulenger

Typhlops blanfordi Boulenger, 1895 b, p. 13 (Upper Ganale); Idem, 1898 a, p. 720 (between Badditu and Dimé); Scortecci, 1940, p. 7 (Moyale); Loveridge, 1942, p. 254 (Harar).
Typhlops punctatus Sternfeld, 1908 b, p. 239 (Lake Abaya and Harar).

Loveridge has recently (1945 and 1942) stated that most Eritrean records of *T. punctatus* are probably based on specimens of *T. blanfordi* which has a southern race, *T. blanfordi lestradei* de Witte, in western Uganda and Ruanda. The two races are said to be distinguished by the number of scales at mid-body, from 32-36, rarely 30, in *lestradei* and constantly 30 in the northern, typical, subspecies which ranges from Eritrea through Ethiopia into Kenya. The Ethiopian specimens available to the author, from Lake Abaya and Harar have 28 (2 specimens) or 30 (2 specimens) scale rows. Loveridge considers *blanfordi* to be "an upland form with sylvicoline associations" in contrast with *punctatus* which is essentially a forest form.

Typhlops cuneirostris Peters

Typhlops cuneirostris Peters, 1879, Monats. Akad. Berl., p. 775, Pl. fig. 4 (Type locality: Brava); Boulenger, 1896 b, p. 10 (Dolo); Idem, 1896 c, p. 20 (Web); Idem, 1898a, p. 720 (Lugh); Idem, 1898 b, p. 132 (Golis Mts.); Idem, 1909 b, p. 309 (Jumbo); Lepri, 1911, p. 319 (Mogadiscio neighbourhood); Scortecci, 1939 b, p. 264 (Afgoi; Sidi Choiama; Belet Amin).

B.M. 1949.2.1.12. 1 specimen. Burao, 3500 ft.

B.M. 1949.2.1.13-45. 33 specimens. Haud, along the border between British and ex-Italian Somaliland from 45° E. to 46° 30′ E. at altitudes of from 2100 to 3000 feet.

This species, as indicated in the references given above, was previously known from the Golis Mts. and the Juba and Shebeli provinces of Somalia. The new series is intermediate geographically. It is very constant in all characters; there are always 22 scales around the middle of the body and the length/diameter ratio varies between 22 and 36.5. There are normally 10 dark lines down the centre of the back, the outermost being the least well marked, but, rarely, there are indications of two additional lines making 12 in all. The largest individual is 187 mm in total length and the smallest 75 mm.

The series was collected in all months between January and August and all were found under dead logs and branches lying on the ground. The apparent absence of the species from the western parts of the Haud, which was traversed during September to December might, conceivably, be due to the time of year during which collections were made; this is, however, unlikely as the period does not coincide with any of the recognised climatic seasons (see Taylor in Parker, 1942, p. 94). It may, however, be significant that Col. Taylor (loc. cit.) observed a floral difference between the eastern and western parts of the Haud, the dividing line being at about 45° E. on the political boundary; *Typhlops cuneirostris* was found abundantly to the east of this line but not at all to the west.

Typhlops socotranus Boulenger

Typhlops sp. Günther, 1881, p. 462 (Sokotra).
Typhlops socotranus Boulenger, 1889, Ann. Mag. nat. Hist. (6), vol. 4, p. 362; Idem, 1893, p. 21, Pl. 2 fig. 2; Idem, 1903, p. 88.
Typhlops sokotranus Steindachner, 1903, p. 13.

The original description of this species is faulty; there are 26 (not 24) scales at mid-body in both the cotypes. Another specimen from Dahamis has 28 scales.

So far as is known at present the species does not occur on Abd-el-Kuri or the Brothers. Of the species on the mainland, the Somali *T. cuneirostris* appears to be very closely allied, differing in a more prominent, more wedge-shaped snout (with some differences in the relative sizes of the head shields associated therewith) and in a lower number of mid-body scales. In those species of the genus *Typhlops* where there are ontogenetic changes in the shape of the snout it is found that the more prominent snout is the adult, and presumably secondary condition, whilst it is reasonable to assume that a lower number of scales at mid-body is also a secondary rather than a primitive condition.

Eryx Daudin

Synopsis of the Species

I. Scales across the forehead from eye to eye 9-12; scales around the eye 12-15. Scales at mid-body 44-59. *E. colubrinus* Linn.
II. Scales across the forehead from eye to eye 5-6; scales around the eye 9-11. Scales at mid-body 34-40. *E. somalicus* Scortecci.

Eryx colubrinus Linn.

Eryx thebaicus, Mocquard, 1888, p. 122 (Somaliland); Boulenger, 1896 c, p. 20 (Brava); Idem, 1896d, p. 216 (between Shebeli and Juba River; Lake Abaia; Lake Stephanie); Idem, 1898a, p. 720 (between Badditu and Dimé); Sternfeld, 1908b, p. 239 (Dadab [1]);

[1]) Loveridge (1936b) and Scortecci (1939b) suggest this locality to be erroneously intended for Dudub and give two different positions in Somalia, 43° E. × 7° N. or 46° 42′ E. × 6° 50′ N. The type locality is, however, clearly shown as Dadab in the map made by Erlanger and Neumann, who collected the snake, and published in the Geographical Journal, 1902, vol. 20; it lies about 27 miles inland from Zeila in the Guban, its modern co-ordinates being about 43° 15′ E. × 11° N.

Boulenger, 1909 b, p. 309 (Jumbo); Idem, 1909 c, p. 311 (Bardera); Lepri, 1911 (Mogadiscio neighbourhood); Boulenger, 1912, p. 331 (Dolo); Loveridge, 1916, p. 82; Scortecci, 1929, p. 269 (Vill. Duc. Abruzzi); Idem, 1931, p. 203 (Vill. Duc. Abruzzi; Mogadiscio).

Eryx rufescens Ahl, 1933, S.B. Ges. naturf. Fr. Berl. p. 324, figs. (Type locality: Dadab, 43° 15′ E. × 11° N.).

Eryx colubrinus rufescens Loveridge, 1936b, p. 235 (Bulbar in err. pro Bulhar).

Eryx colubrinus loveridgei, Loveridge, 1936 a, p. 233 (Kismayu); Scortecci, 1939b, p. 267 (Afgoi; Balad; Vill. Duc. Abruzzi; Belet Amin).

Eryx colubrinus, Scortecci, 1943, p. 284 (Gondaraba).

As indicated in the above references examples of this small boa from Somaliland have been referred to two distinct subspecies. Specimens from the Shebeli and Juba provinces have been referred to *E. c. loveridgei* and those from the coastal zone of British Somaliland (the Guban) to *E. c. rufescens*. The species has not been recorded from the central area of the peninsula. Loveridge (1936 b) has cast doubts on the validity of the first of these two alleged races and Scortecci (1939 b), though recognising the southern form considers *rufescens* to be of doubtful validity. The material available to the present author is insufficient to throw fresh light on the status of *loveridgei* and the single available specimen from the Guban (*rufescens*) can be matched exactly amongst specimens from Egypt. It is possible that *Eryx colubrinus* is a recent entrant into Somaliland from both the north and the south and that further collecting may show that a uniform reddish colouring which appears sporadically in Egypt, is present in a sufficient majority of the population along the northern invasion route to justify the recognition of a local race under the name *rufescens*.

Eryx somalicus Scortecci

Eryx thebaicus, Boulenger, 1901, p. 49 (Biji); ? Calabresi, 1927, p. 31 (between Obbia and Magangib).

Eryx somalicus Scortecci, 1939 b, Ann. Mus. Stor. nat. Genova, vol. 58, p. 269 (Type localities: Mogadiscio neighbourhood and Mahaddei Wen).

B.M. 1900.11.28.4. ♀; Sc. 39; V. 193; C. 26. Biji. Donaldson Smith.

B.M. 1949.2.1.46. ♀; Sc. 34; V. 159; C. 23. Haud, 44° 44′ E. × 8° 45′ N., 3500 ft. Taylor.

These two specimens from British Somaliland agree with the form described by Scortecci from the Lower Shebeli Province, in the south of the peninsula, in the possession of appreciably larger scales on the head and fewer mid-body scale rows than are known to occur in *E. colubrinus*. If they are correctly determined it would appear that *E. somalicus* occupies a geographical area over the centre of the peninsula in most of which *E. colubrinus* has not yet been found. Should further collecting confirm that this apparent distribution is a reality the status of *somalicus* relative to *colubrinus* would be of considerable interest; at present the two are known to occur together only in the Lower Shebeli region and the Guban and, since no intermediates have been recorded, it is reasonable to regard them as specifically distinct.

The specimen from the Haud was collected in August in sandy country with patches of grass and scattered large thorn trees; it was found during daylight half in and half out of a hole in the ground.

Python Daudin
Python sebae Linn.

Python sebae, Boulenger, 1896 c, p. 20 (Pozzi Meddo-Erelle); Idem, 1909 c, p. 311 Bardera); Scortecci, 1939 b, p. 270 (Belet Amin; Ola Wager).

The common Python is known from Abyssinia and, as indicated above, from the better watered districts in the south of Somalia, but the extent to which it penetrates along the river valleys into the drier country is not known.

Neusterophis Günther
Neusterophis olivaceus olivaceus (Peters)

Natrix olivacea olivacea, Scortecci, 1939 b, p. 270 (Mogadiscio).

Although this semi-aquatic snake has only once been recorded (loc. cit. supra) from Somalia, it is widely distributed in the neighbouring countries to the south and west, the A.E. Sudan, Uganda and Kenya; it may well prove to be not uncommon in the southern, wetter, parts of Somalia.

Coluber Linn.

SYNOPSIS OF THE SPECIES

I. Scales at mid-body in 15 rows. *C. somalicus* (Boul.)
II. Scales at mid-body in 17-19 rows.
(a) Ventral scales 159-182. *C. brevis* (Boul.)
(b) Ventral scales 208-228. *C. rhodorhachis subnigra* (Boettger)
III. Scales at mid-body in 21-23 rows [1]).
(a) Normally two preoculars (with a subocular beneath the lower), three postoculars and only a single labial bordering the eye. Sokotra islands. *C. socotrae* (Günther)
(b) Normally a single preocular (with a subocular beneath it), two postoculars and two labials entering the eye. Mainland.

1) See also comparative tables on pages 42-43.

(1) Rostral nearly twice as broad as deep; frontal nearly twice as long as broad, as long as the parietals. Southern Somalia. *C. citernii* (Boul.)

(2) Rostral not more than 1.75 times as broad as deep. Frontal seldom more than 1.5 times as long as broad, always appreciably shorter than the parietals.

(i) Head with transverse bands having wavy edges (figs. 5 and 7) or broken up into irregular markings.

(α) Rostral more than once and a quarter as broad as high. Rostral height less than once and a half the length of the internasal suture. Prefrontal suture less than once and a third as long as that between the internasals. Ventrals usually more than 200. Dark dorsal spots, or transverse bars not wider than the interspaces between them and usually rectangular. *C. florulentus* (Geoff. St. Hilaire)

(β) Rostral less than once and a quarter as broad as high. Rostral height more than once and three quarters the length of the internasal suture. Prefrontal suture more than once and a third as long as that between the internasals. Ventrals usually less than 200. Dorsal spots subcircular, or transversely oval, much wider than the interspaces between them. *C. taylori* sp. n.

(ii) Head without transverse dark markings in adults; in juveniles they are present, but straight-edged or nearly so (fig. 6). Rostral once and a quarter to once and a half as broad as high. Rostral height once to once and a half as long as the internasal suture. Prefrontal suture less than once and a third as long as the internasal suture. Ventrals less than 200. *C. smithi* (Boul.)

Coluber brevis (Boulenger)

Zamenis brevis Boulenger, 1895 b, Ann. Mus. Stor. nat. Genova (2), vol. 15, p. 13 (Type locality: Ogaden); Idem, 1896 c, p. 20 (between Matagoi and Lugh, Upper Juba Province); Calabresi, 1927, p. 31 (Afghedud; between Caaio and Andurgab).

Zamenis boschisi Scortecci, 1930a, Atti Soc. ital. Sci. nat., vol. 69, p. 321 (Type locality: Gardo, 49° 06′ E. × 9° 30′ N.); Idem, 1931, p. 204 (Gardo).

Coluber boschisi Parker, 1932, p. 362 (Sorl Haud and Nogal Valley).

B.M. 1949.2.1.47. ♀; Sc. 19; V. 178; C. 78 + 1. In the Haud, near Bohotleh, 46° 20′ E. × 8° 15′ N., 2400 ft.

B.M. 1949.2.1.48. ♂; Sc. 17; V. 167; C? Ditto.

Zamenis brevis, from the Ogaden, and *Zamenis boschisi*, from the Sultanate of Mijarten, were both compared by their describers with the Arabian *Z. variabilis* Boulenger. The differences between them appeared to lie in the number of mid-body scales (19 in *brevis*, 17 in *boschisi*), the proportions of the head scales in the region of the snout, the number of labials and colour. The snakes recorded by Parker from localities close to the type locality of *boschisi* bridged most of the differences between the two in the characters of the head scales and one of the specimens, a juvenile, though possessing the mid-body scales of *boschisi*, had a colour pattern very similar to that of *brevis*.

The new material listed above is from a locality mid-way between the two type-localities. The two specimens are almost certainly conspecific and have the colour of *brevis*, but although one agrees in its mid-body scales with this form the other agrees with *boschisi*. The probability therefore seems to be that *brevis* and *boschisi* are synonyms of a single species, though in the present state of our knowledge it would appear that in the populations of the north-east of its known range there are usually 17 mid-body scales and in the south, 19; if this condition is confirmed it would be justifiable to retain the two names in a subspecific sense.

Coluber somalicus (Boulenger)

Zamenis somalicus Boulenger, 1896b, Ann. Mus. Stor. nat. Genova (2), vol. 17, p. 11 (Type locality: "Audo Mts., between Webi Shebeli and Web").

This name was given to a population on the basis of only a single specimen and no others agreeing with this individual have since been found. The only feature in the description of the "type" which does not fall within the range of variation of *Coluber brevis* (as understood in the present paper) is the number of scales at mid-body, 15.

Coluber rhodorhachis subnigra (Boettger)

Zamenis ladacensis var. *subnigra* Boettger, 1893, Zool. Anz., vol. 16, p. 118 (Type locality: Ogaden).
Zamenis rhodorhachis, Boulenger, 1896e, vol. 3, p. 623; Idem, 1896a, p. 553 (Assab); Idem, 1901, p. 49 (Biji).
Zamenis rhodorhachus (sic), Meek, 1897, p. 179 (South of Toyo Plain).
Zamenis rhodorhachis ladacensis, Scortecci, 1928, p. 299 (Daalac Island and Islet near Massawa); Idem, 1930 c, p. 212 (Dahalac Island); Vinciguerra, 1931, p. 101 (Gaare).
Coluber rhodorhachis, Parker, 1932, p. 362 (near Dagah Shabell).
Coluber rhodorachis Loveridge, 1936 b, p. 27 (South of Toyo Plain).

B.M. 1949.2.2.61. ♂ ; V. 208; C. ?. 43° 15′ E. × 11° 25′ N., 150 ft.
B.M. 1949.2.1.49-51. ♀ ♀ ; V. 217, 219, 211 ; C. ?, 120, ?. 43° 15′ E. × 11° 25′ N., 150 ft.
B.M. 1949.2.1.52. ♂ ; V. 209; C. 112. 42° 40′ E. × 10° 35′ N., 2500 ft.
B.M. 1949.2.1.53. ♀ ; V. 213; C. 119. 42° 40′ E. × 10° 35′ N., 3000 ft.
B.M. 1949.2.1.54. ♀ ; V. 211 ; C. 120. 43° 15′ E. × 11° 25′ N., sea level.
B.M. 1949.2.1.55. ♂ ; V. 209; C. 119. 43° E. × 10° 45′ N., 3000 ft.
B.M. 1949.1.3.47. ♂ ; V. ?; C. ?. 45° 07′ E. × 9° 57′ N., 4800 ft.

Including the foregoing new material, 19 specimens of this snake from Somaliland have been examined. This series, from localities in the Ogo and Guban west of Berbera (approximately), has a range of ventral scales from 208-228 and a caudal range from 112-128; there are no sexual differences. The specimens recorded from Eritrea (references above) all fall within these ranges and the mean appears to fall below the mean of the range of *Coluber rhodorhachis* as recorded from Egypt and Arabia to N.W. India.

The species, as at present recorded, appears to have a discontinuous range. In the north it has been reported from N.W. India (Chitral, Kashmir, Punjab) through Baluchistan, Iran, and Transcaspia to Iraq (Diana, Schmidt, 1939, p. 73) and its range in this area would appear to be continuous. There is then an apparent distributional gap through most of Iraq, Syria, and N. Palestine. It has been recorded from Arabia (Muscat, Oman, Dhufar, Hadramaut, Aden, Yemen, Hejaz, Nejd, Midian), from southern Palestine (Negeb) and from lower Egypt, but there are no records to indicate that there is any continuity between this area and the colony in the Eritrea-Somaliland zone. In the expectation that there might be minor differences in scale counts correlated with the geographical distribution, the ventral and subcaudal counts have been plotted in histogram form (fig. 1). These diagrams fail to reveal any obvious differences between the two northern areas (though there are indications of the possible existence of distinguishable local races, e.g., in Egypt); but the peak of the Somaliland-Eritrea histograms are clearly at a lower figure. The subcaudal figure is less reliable than that for the ventralia [1]), since the tip of the tail is liable to be damaged and it is not always easy to be certain whether or not there has been actual loss of scutes. Accordingly, in testing the significance of the differences indicated by the histograms the subcaudals have been ignored and the frequency of occurrence of the different ventral counts has been plotted on "probability paper" (a logarithmic scale, Harding, 1949). The result is shown in fig. 2, where the continous line (× points) represents the frequency curve for 88 specimens from various localities between N.W. India and Egypt and the broken line (round dots) the frequency curve for a sample of 19 specimens from Somaliland and one from Eritrea (Boulenger, 1896 a, p. 553). The series of points derived from these samples lie along reasonably straight lines [2]), indicating normal variation frequency. The mean values and standard deviations derived from the curves are:

	Egypt to India (88 specimens)	Eritrea and Somaliland (19 specimens)
Ventral Range	208-258	208-228
Mean.	231	215
Standard Deviation . . .	8	5

1) In this connexion it is observed that the very high subcaudal count of 154 for a specimen from Egypt, first reported by Anderson (1898, p. 253) and repeated by others, is a typographical error for 145.

2) It may be objected that a sigmoid curve would be more appropriate for the Egypt-India series than a straight line; but it must be remembered that there is inevitably selection in the building up of Museum collections and in this process selection will

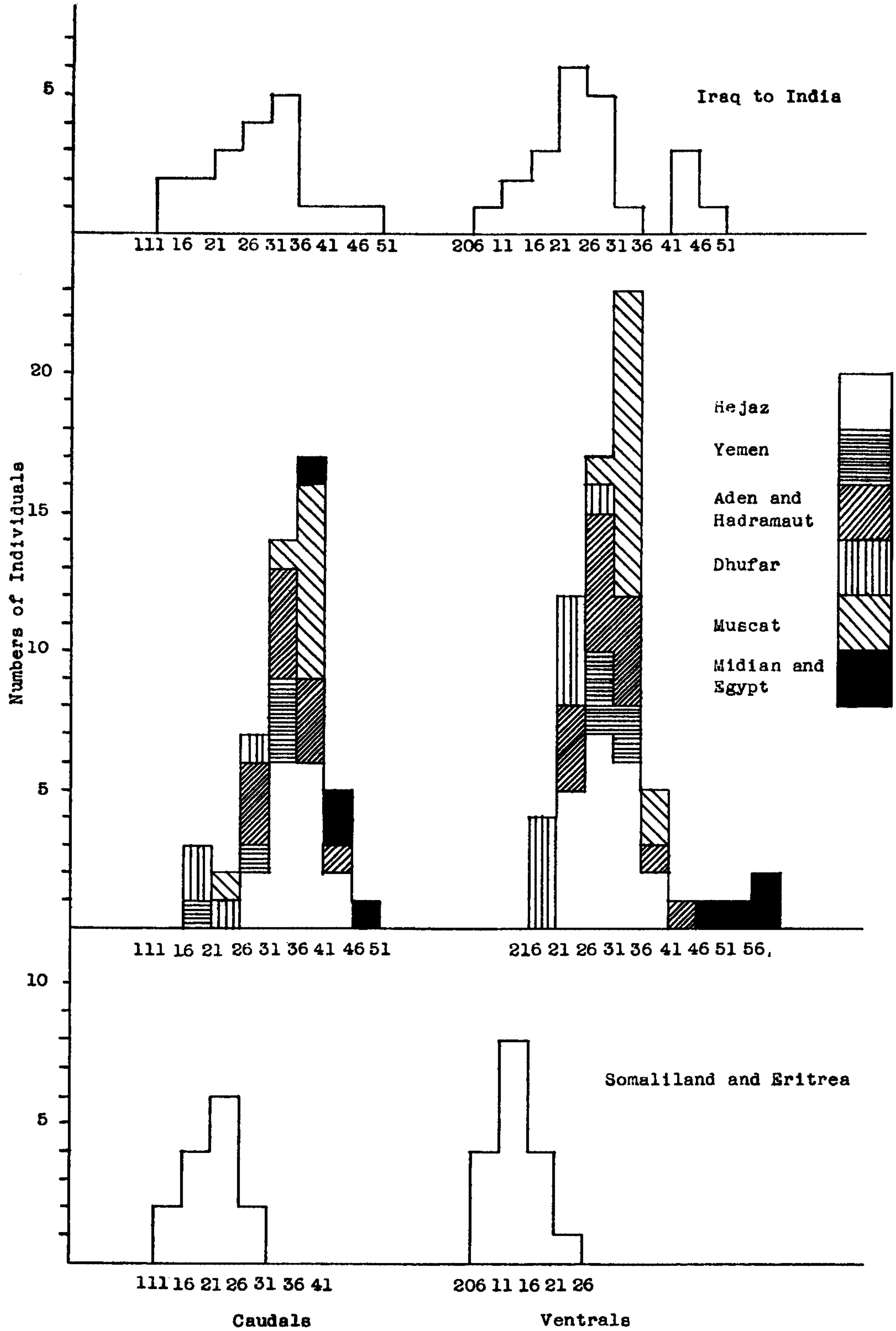


Fig. 1. *Coluber rhodorhachis* (Jan). Histograms of ventral and subcaudal counts.

From these figures it can be calculated that the difference between the means (16) is 10.8 times as great as the standard error of the difference of the means (1.48) would be were the two samples derived from a single population. The chances of getting two samples of a single population with means so widely divergent is extremely remote and, statistically, the differences are significant.

Since the number of ventral and subcaudal scales is associated with relative length (long slender species having higher counts than stouter bodied species) it seemed reasonable to look for some associated character in the head scales that are normally used in taxonomy. The proportions of some of the head scales one to another must clearly also be associated with the extent to which the head is elongate or otherwise. It is also not unreasonable to expect that these proportions will vary with age; embryos and newly hatched young snakes normally have relatively short and broad heads as compared with mature individuals. This elongation of the head with increasing age was, in fact, found to occur and a satisfactory, measurable, index exists in the ratio of the length of the frontal to the distance between the frontal and rostral shields. This ratio was measured in 81 specimens from the area Egypt-India and 16 examples from Somaliland (two of the series in the British Museum have damaged heads). The ratio varies from 1.03 to 1.93 in the former and from 1.10 to 1.60 in the latter; when the ratios are plotted against the total lengths of the individuals (fig. 3) two things emerge. Firstly, the ratio is inversely proportional to the length, juveniles having a much higher ratio than adults; secondly the specimens from Somaliland tend to have a lower ratio than those of comparable size from other parts of the recorded range. There is a high degree of scatter of the points, due to experimental errors arising from the difficulty of accurately measuring preserved specimens and to post-mortem distortions. It is, therefore, desirable to determine whether the apparent difference between the ratios of the two populations is mathematically significant. The numbers of individuals of comparable size are too small for statistical treatment but this difficulty can be overcome by calculating the ratio that each individual would have possessed had it been of some standard, arbitrarily selected length, assuming the curves to be fair. The standard length selected is 1000 mm and the point for each individual is then projected on to the 1000 mm vertical, and the theoretical ratio read off. The resulting figures

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favour the "abnormal" individuals. The result is that, as a sample, collections tend to be biassed, individuals with abnormally high and low counts being selected for retention rather than those with more normal characters. There has been no such selection in the Somali series, all the individuals collected having been included.

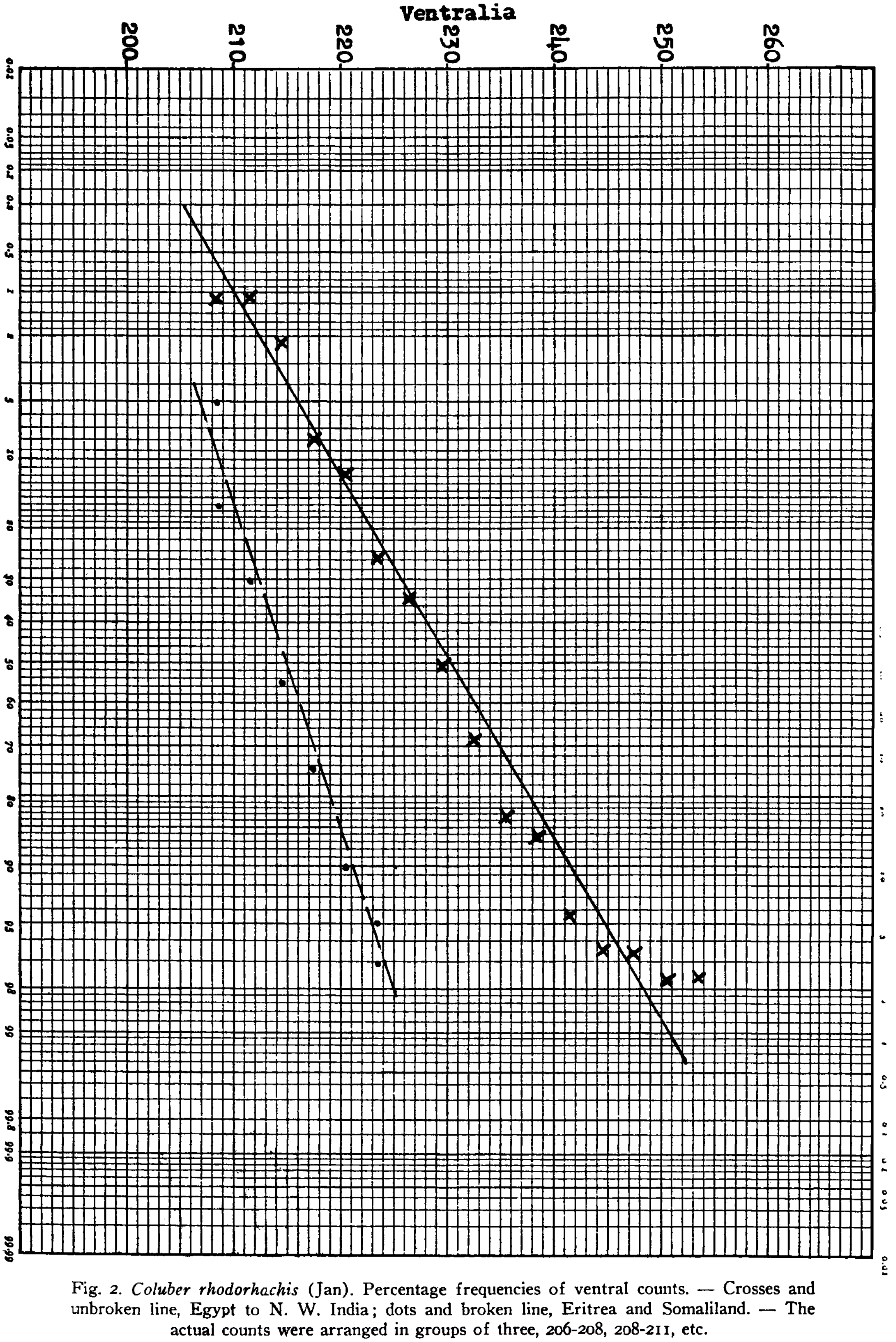

Fig. 2. *Coluber rhodorhachis* (Jan). Percentage frequencies of ventral counts. — Crosses and unbroken line, Egypt to N. W. India; dots and broken line, Eritrea and Somaliland. — The actual counts were arranged in groups of three, 206-208, 208-211, etc.

plotted for frequency on probability paper (fig. 4) approximate to straight lines, indicating normal frequency variation, and give the following:

	India to Egypt (81 specimens)	Somaliland (16 specimens)
Ratio at 1000 mm	0.98—1.5	0.98—1.3
Mean.	1.25	1.16
Standard Deviation . . .	0.11	0.10

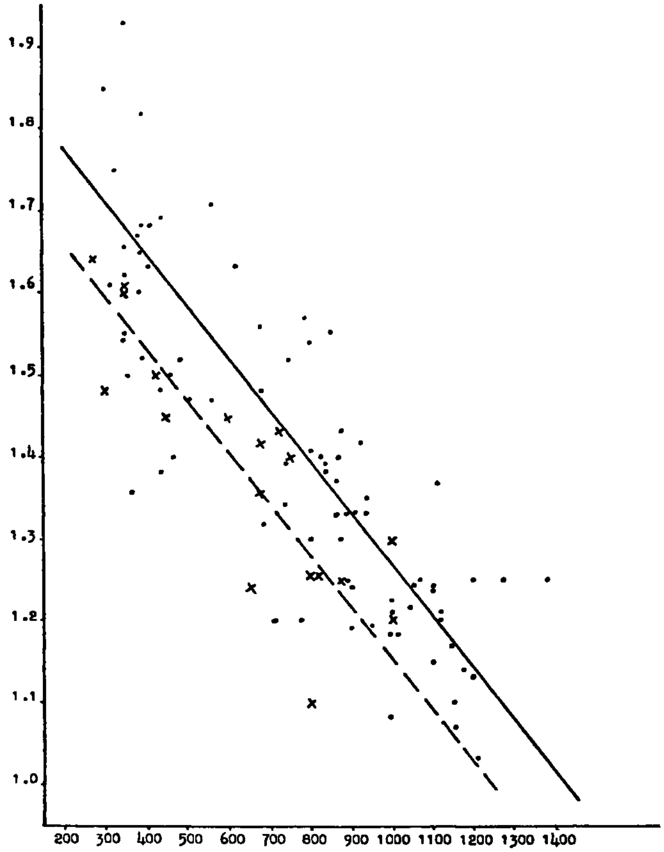

Fig. 3. *Coluber rhodorhachis* (Jan). Ratio of frontal shield to its distance from the rostral shield plotted against total length from snout to tip of tail.
Dots and unbroken line, Egypt to N. W. India; crosses and broken line, Somaliland.

The difference of the means (0.09) is 3.24 times as great as the standard error of the difference of the means (0.0278). This is just significant; two samples of a single population showing such a difference of the means would only occur in 0.12 % cases (one in 833 trials).

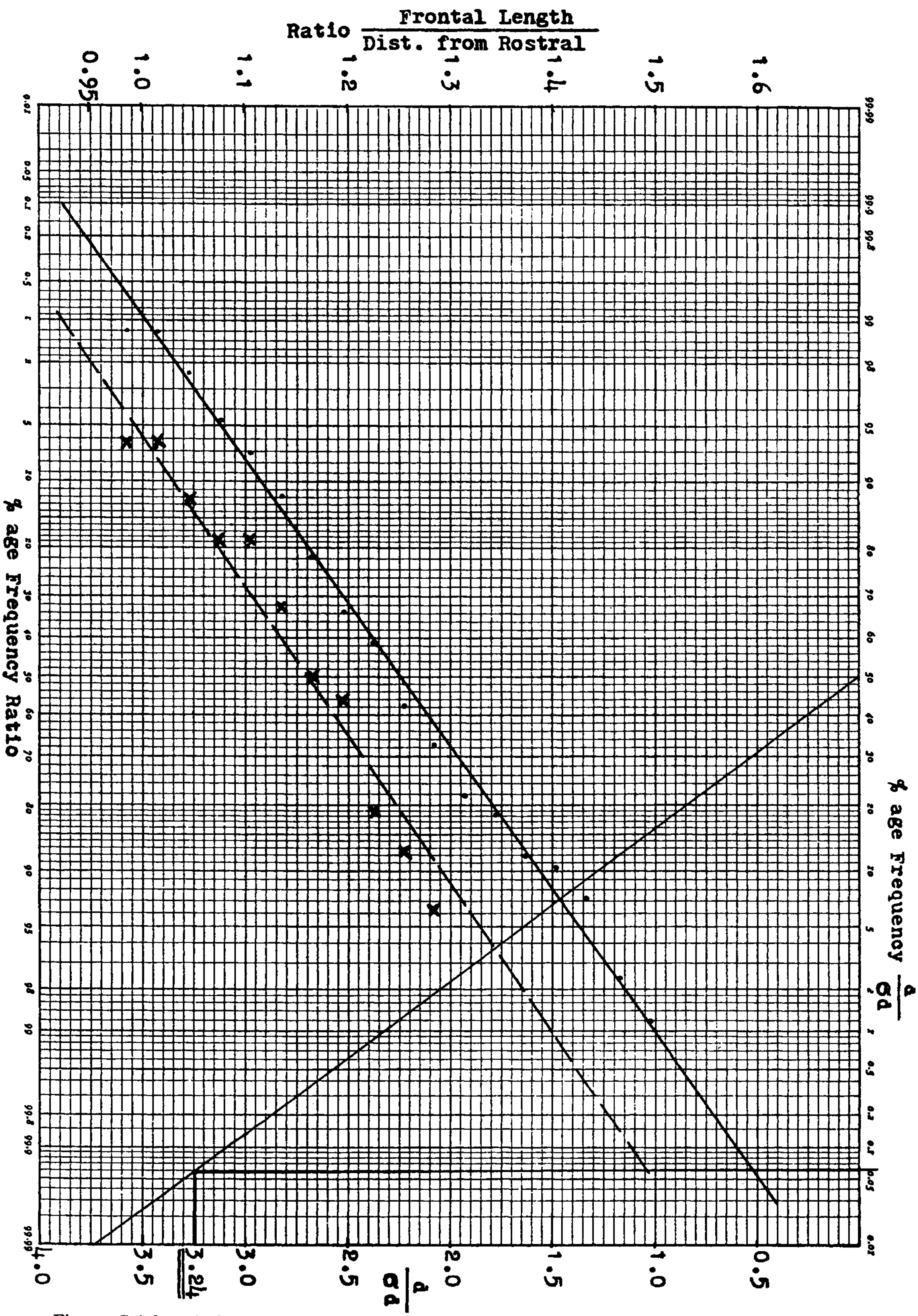

Fig. 4. *Coluber rhodorhachis* (Jan). Percentage frequencies of frontal distance from rostral ratios, calculated at standard length of 1000 mm. — Dots and unbroken line, Egypt to N. W. India; crosses and broken line, Somaliland. — Probability of occurrence of $\frac{d}{\sigma d}$ shown by curve on right.

It must be concluded therefore that the *Coluber rhodorhachis* of Somaliland and Eritrea is sufficiently well differentiated to be recognisable, at least subspecifically, and the name *subnigra* of Boettger is available. The race is characterised by a lower number of ventral and subcaudal scales and by a head in which the prefrontal region is relatively longer in relation to the frontal. Ontogenetically the prefrontal region increases in length with age and on this criterion, therefore, *C. r. subnigra* must be regarded as less primitive than *C. r. rhodorhachis*.

This snake was collected by Col. Taylor throughout the dry season (November to March) and during the early part of the "Ju" rains. It was found only in stony places in arid localities with little vegetation.

Coluber florulentus Geoff. St. Hilaire

Zamenis florulentus, Sternfeld, 1908b, p. 240 ("Jabalofluss" and "Harorissa", probably between Zeila and Jaldessa); Scortecci, 1930 b, p. 17 (Asmara).
Coluber florulentus florulentus Loveridge, 1945, p. 2 (Gurra, 6400-6800 ft.).
? *Zamenus smithi* (non Boulenger, 1895) Boulenger, 1896 a, p. 553 (Eritrea).

This species, though several times recorded from Eritrea (as indicated above) actually extends into the Guban in British Somaliland. The British Museum has 5 specimens from near Berbera and 5 from Wagar in the Golis Mountains (3-4,000 ft.). This sample gives a hint that the population at this extreme south easterly limit of the range of the species differs from the populations found in the Nile Basin, but the significance or otherwise of the observed differences cannot be determined on the basis of such a small sample.

The most noticeable difference is in maximum size. The largest examples from the Guban, a male and a female, each measure approximately 580 mm, whereas in the Nile Basin specimens of 1000 mm are not uncommon and a size of 1090 mm has been recorded. Another difference is to be found in the length of the anterior part of the head. Inspection shows the internasal shields apparently longer in the Guban series than elsewhere and this appearance is confirmed by measurement. There is apparently no difference in the relative height of the rostral throughout the whole sample, the ratio rostral width/rostral height being 1.25-1.68 in the Nile Valley and 1.27-1.76 in the Guban. Yet the ratio of the internasal suture to this shield is:

	Egypt and A. E. Sudan (31 specimens)	Guban (10 specimens)
$\frac{\text{Rostral Height}}{\text{Internasal Suture}}$	1.46-2.0; mean = 1.61; σ = 0.12	1.0—1.33

This ratio therefore shows discontinuous variation (and the observed difference is of a statistically significant magnitude) in the geographically discontinuous samples examined; but it is not unreasonable to expect that a series from the geographically intermediate area, Eritrea, might break the discontinuity and it is not proposed to use trinomials to designate the Nile Valley and Somali populations. If such a procedure is ultimately shown to be necessary a new name will be required for the latter. Loverdige (loc. cit. supra) has used trinomials in connection with specimens from Eritrea, but this was done in the belief that *Coluber smithi* from the south-west of

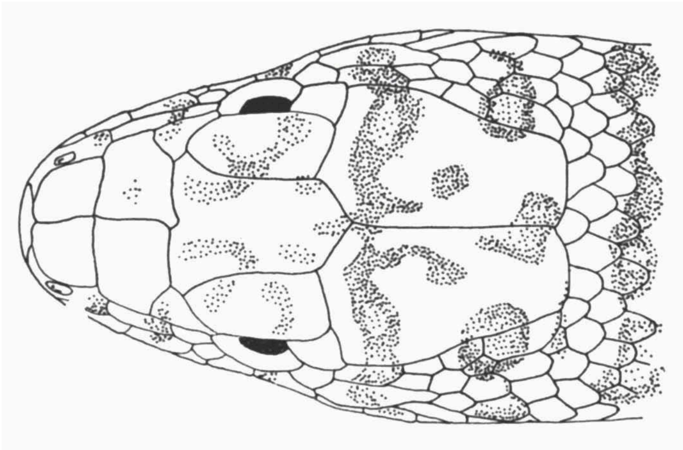

Fig. 5. *Culuber florulentus* Geoff. St. Hilaire ♂. B. M. 1905. 11.7.45. Wagar, Golis Mts., 3000-4000 ft. × 5.

Somalia was only racially distinct from *florulentus*; this belief is open to doubt as will be shown below.

Coluber smithi (Boulenger)

Zamenis smithi Boulenger, 1895c, Proc. zool. Soc. Lond., p. 536, Pl. xxx fig. 2 (Type locality: Shebeli [1]); Idem, 1896 b, p. 11 (Jabicio, west of Ganale Doria); Idem, 1896 d, p. 216 (West of Juba River); Idem, 1909 c, p. 311 (Bardera); Idem, 1912, p. 331 (Dolo and Rahanuin country); Calabresi, 1918, p. 124 (between Jelib and Margherita); Idem, 1927, p. 32 (Mahaddei region).
Coluber smithi Parker, 1936, p. 606 (Lake Rudolf); Scortecci, 1940, p. 10 (Malca Guba); Idem, 1943, p. 284 (Asile).

As the above records indicate, this is a form of the southwest of Somalia and adjacent territories; Loveridge (1945) refers to it as a form of "the Somali-Kenya coastlands." It has, however, also been recorded from Eritrea

1) A map and accounts of Donaldson Smith's journey are to be found in the Geographical Journal, 1895, vol. 5, p. 124. There is no mention of Shebeli on the map but, to judge from the dates of the traveller's stay there, it is presumed to be the Webi Shebeli in the neighbourhood of 41° E. × 8° N.

(Boulenger, 1896 a) but this record is thought to have been based on a misidentified *C. florulentus (*q.v.) It was also suggested by the present writer (1936) that *C. smithi* was only racially distinct from *C. florulentus*, and this expression of opinion led Loveridge (1945) to use the name *smithi* subspecifically. A more detailed comparison with a larger series of *florulentus*, however, gives no confirmation of this view. There is no evidence that the ranges of *C. florulentus* and *C. smithi* are continuous, nor of any area of intergradation. The two may be distinguished by the characters mentioned in the key (p. 29) and the comparative tables on pages 42-43.

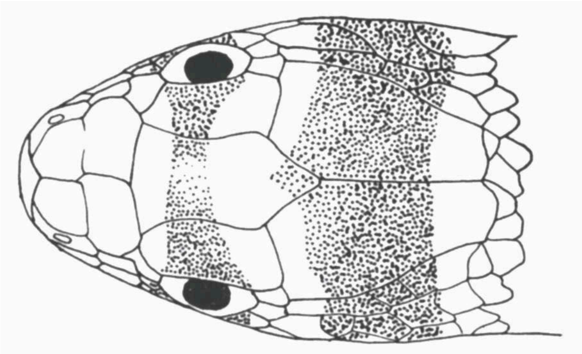

Fig. 6. *Coluber smithi* (Boulenger) ♀ juv. B. M. 1932.5.2.96.
Lokitaung, Turkana Plains, Lake Rudolf.
× 6.

Coluber citernii (Boulenger)

Zamenis citernii Boulenger, 1912, Ann. Mus. Stor. nat. Genova (3), vol. 5, p. 331 (Type locality: Dolo).

The type of this name, and the only recorded specimen, has not been examined. The type locality is within the range of *C. smithi* and the two are said in the original descriptions to differ as follows.

	C. citernii	*C. smithi*
(a) Rostral	Nearly twice as broad as deep, its upper part just visible from above	1.5 times as broad as deep, its upper part $^1/_4$ its distance from the frontal
(b) Frontal	Nearly twice as long as broad, as long as the parietals	Frontal $1^2/_5$ as long as broad, shorter than the parietals
(c) Preocular	Not reaching the frontal	In contact with the frontal
(d) Suboculars	One	One or two
(e) Upper labials	Eight, 4th and 5th entering the eye	Nine or ten, 5th and 6th, or 6th and 7th entering the eye
(f) Ventrals	195	180 (♂) 185 (♀)
(g) Subcaudals	87	100 (♂)

Of these differences c-g inclusive are not tenable. In the short series of *C. smithi* available (5 including the male cotype) and in the four specimens recorded by Scortecci (1940, 1943) and Loveridge (1935, as *Coronella semiornata fuscorosea*) the preocular is separated from the frontal in 8 specimens, one has only eight supralabials, the ventrals range from 175 to 213 and subcaudals from 82-100. There remain, therefore, only the characters of the rostral and frontal and the colour, to distinguish these two alleged species. The colour-differences described are far from convincing but none of the specimens of *smithi* examined shows a rostral or frontal condition approaching that ascribed to *citernii*; the ratio of Rostral Width/Rostral Height never exceeds 1.57 (range 1.22-1.57) and the frontal is never more than 1.75 times as long as broad and always appreciably shorter than the parietals.

Coluber taylori sp. n.

HOLOTYPE

B.M. 1949.2.1.56. ♀. From the Borama district, British Somaliland (42° 45′ E. × 10° 20′ N.), 4000 ft. 4.3.1933.

PARATYPES

B.M. 1949.2.1.57. ♂. Same data as holotype.
B.M. 1949.2.1.58-59. ♂ juv. ♀. 43° E. × 10° 35′ N., 3000 ft. 19.1.1933.
B.M. 1949.2.1.60-61. ♂, ♀. 42° 40′ E. × 10° 30′ N., 3500 ft. April, 1933.
B.M. 1949.2.1.62. ♀. 42° 45′ E. × 10° 45′ N., 2500 ft. 10.5.1934.

These 7 specimens, all captured in a relatively small area in the north western part of the mountainous Ogo appear to represent a form akin to *Coluber florulentus,* but distinguishable from the form of this species found in the maritime plain of the Guban and in the Ogo mountains further to the east. There is nothing to indicate that the two intergrade and they are accordingly regarded as specifically distinct, at least for the time being.

DESCRIPTION OF HOLOTYPE.

Distance from tip of snout to eye twice as long as the eye. Rostral shield relatively large and high, the ratio of width/height being 1.20, and the portion visible from above more than half its distance from the frontal; ratio rostral height/internasal suture 2.15; internasals short, the suture between the prefrontals being 2.15 times as long as that between the internasals; frontal 1.5 times as long as broad, longer than its distance from the end of the snout and only slightly shorter than the parietals; loreal once and a third as long as deep; preocular in contact with the frontal with a single subocular below it; two postoculars; temporals 2 + 3; nine upper labials, the fifth and sixth entering the eye; five lower labials in contact with the anterior chin-shields which are a little shorter than the posterior; the latter are separated by two rows of scales.

Scales smooth with paired apical pits in 21, 23, 15 longitudinal series. Ventrals 200; anal divided; subcaudals 90 + 1.

Brownish grey above. Head with darker markings as follows: traces of a dark bar across the snout, descending to the labials; a wavy edged bar across the interorbital region and on to the labials below the eye; a wavy edged transverse bar across the parietals, descending on to the temporal region, but not reaching the edge of the lip; three spots in a row across the nape, the median one elongate; all these markings are darker at their edges. Body with eight rows of quincuncially arranged darker dots and spots. The outermost rows are black spots on the outer ends of the ventrals; the next two series are larger, along the flanks and the two dorsal series are still larger, but less distinct and are partially or wholly confluent to form oblique, oval or figure-of-eight shaped blotches or a broad zig-zag band. Where the blotches are discrete they are separated by narrow cream-coloured transverse bars of which there are about 63 between nape and vent. All markings become indistinct on the tail. Lower surfaces white with scattered black dots laterally. Length from snout to vent 377 mm. Tail 123 mm.

The paratypes show the following important variations:

B.M. 1949.2.1.57. Scales 21, 21, 15. Ventrals 187. Caudals 86 + 1. Rostral width/height 1.25. Rostral height/internasal suture 2.50. Prefrontal suture/internasal suture 2.14. Colour pattern less defined than in the type. Total length 450 mm. Hemipenis reaching the 7/8 subcaudal.

This individual and the type were found in an area of thorn scrub, rocks and stones.

B.M. 1949.2.1.58. Scales 21, 21, 15. Ventrals 194. Caudals 81 + 1. Rostral width/height 1.08. Rostral height/internasal suture 2.0. Prefrontal suture/internasal suture 1.50. Two suboculars below the preocular. Total length 340 mm.

B.M. 1949.2.1.59. Scales 21, 21, 15. Ventrals 180. Caudals 88 + 1. Rostral width/height 1.15. Rostral height/internasal suture 2.08. Prefrontal suture/internasal suture 1.40. Two suboculars below the preocular. Temporals 2 + 2 on one side. Hemipenis reaching the 8th subcaudal. Total length 260 mm.

This and the preceding specimen were caught by day in an area of clay soil, bare except for a few patches of grass.

B.M. 1949.2.1.60. Scales 21, 21, 15. Ventrals 181. Caudals 81 + 1. Rostral width/height 1.23. Rostral height/internasal suture 2.17. Prefrontal

	C. florulentus (Nile) (31 specs.)	*C. florulentus* (Somali) (10 specs.)	*C. taylori* (7 specs.)	*C. smithi* (5 specs.)	*C. citernii*	*C. socotrae* (4 specs.)
(1) ROSTRAL SHIELD						
Ratio $\frac{\text{Width}}{\text{Height}}$	1.25—1.68	1.27—1.76	1.08—1.25	1.22—1.57	nearly 2	1.41—1.50
	Mean 1.41; σ 0.11		Mean 1.16; σ 0.08			
	Comparing *florulentus* with *taylori*, the difference of the means (0.25) is 7 times as great as the standard error of the difference of the means (0.035) and the difference is significant					
(2) ROSTRAL: INTERNASAL						
$\frac{\text{Rostral Height}}{\text{Internasal Suture}}$	1.46—1.85	1.0—1.33	1.87—2.50	1.16—1.60	?	1.60—2.15
	Mean 1.50; σ 0.32		Mean 2.16; σ 0.17			
	Comparing *florulentus* and *taylori* the difference of the means (0.66) is 8 times as great as the standard error of the difference of the means (0.082) and the difference is therefore significant					

(3) INTERNASAL: PREFRONTAL						
$\frac{\text{Prefrontal Suture}}{\text{Internasal Suture}}$	1.13—1.67	1.0—1.33	1.40—2.15	0.91—1.30	?	1.30—1.86
	Mean 1.31; σ 0.08		Mean 1.70; σ 0.13			
	Comparing *florulentus* and *taylori* the difference of the means (0.39) is 8 times as great as the standard error of the difference of the means (0.05) and the difference is therefore significant					
(4) FRONTAL						
$\frac{\text{Length}}{\text{Breadth}}$	< 1.5	< 1.5	1.5 approx.	1.5 approx.	2.0 approx.	1.46—1.73
(5) FRONTAL: PARIETAL						
$\frac{\text{Parietal Length}}{\text{Frontal Length}}$	> 1	> 1	> 1	> 1	1	1.18—1.29
(6) SCALES AT MID-BODY	21, rarely 23	21—23	21—23	21	21	23
(7) VENTRALS						
♂	192—214	197—205	180—187	175—181	195	219
♀	207—228	204—216	192—200	191—213		220—227
(8) CAUDALS						
♂	88—97	101—104	81—88	96—100	87	124
♀	86—101	93—103	81—90	82—94		113—121
(9) HEMIPENIS extends to	10-13th caudal	12th caudal	7-8th caudal	10-11th caudal	?	?

suture/internasal suture 2.0. Temporals 2 + 2. Hemipenis reaching the 8th subcaudal. There are 54 transverse light lines, complete or interrupted on the mid-line, on the body. Total length 420 mm.

This specimen has the remains of a gecko (*Hemidactylus* sp.) in its stomach. It and the next specimen were caught in an area of rocks and stones with little vegetation.

B.M. 1949.2.1.61. Scales 21, 23, 15. Ventrals 192. Caudals 85 + 1. Rostral width/height 1.13. Rostral height/internasal suture 1.87. Prefrontal

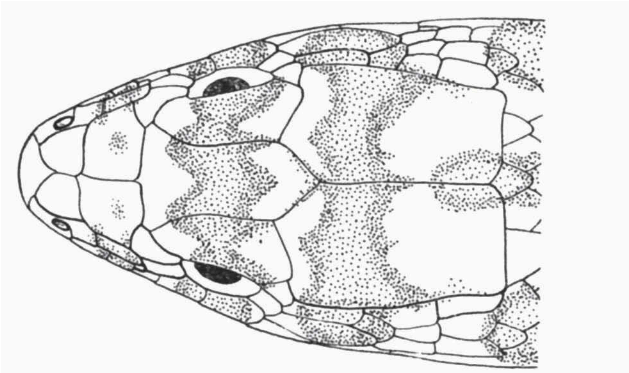

Fig. 7. *Coluber taylori* sp. n. Holotype ♀. × 5.

suture/internasal suture 1.50. Temporals 2 + 2. Total length 480 mm.

B.M. 1949. 2.1.62. Scales 21, 21, 15. Ventrals 196. Caudals 85 + 1. Rostral height/width 1.18. Rostral height/internasal suture 2.13. Prefrontal suture/internasal suture 1.75. Temporals 2 + 2. Total length 560 mm.

This specimen, taken in stony country, had a specimen of the lizard *Latastia boscai boscai* Bedriaga in its stomach.

The differences between this form and the other species of the genus in N.E. Africa which possess 21-23 scale-rows at mid-body are summarised in the table on pages 42 and 43.

Coluber socotrae (Günther)

Zamenis socotrae Günther, 1881, Proc. zool. Soc. Lond., p. 463, Pl. 41 (Type locality: Sokotra); Boulenger, 1893, p. 408; Idem, 1903, p. 89 (Hadibu Plain, Sokotra).

Zamenis sokotrae Steindachner, 1903, p. 14 (Coastal region of Haulaf close to Tamarida; Ras Shoab; Kallansiye; Hakari Islet; Island of Semhah, The Brothers group).

Günther (1881, p. 461) considered that this very distinct snake was most closely allied to *C. elegantissimus* (Günther) of N.W. Arabia. The very striking similarity in colour pattern undoubtedly played a part, perhaps an unduly large part, in influencing Dr. Günther to this conclusion. There can, however, be little doubt that *C. socotrae* is allied to the *florulentus* group of species (including *elegantissimus*) which it resembles in its lepidosis and colour pattern. The principal differences in the head scales —two preoculars instead of one, three instead of two postoculars and a single labial entering the eye instead of two—could represent either the primitive condition from which the *florulentus* type of head scales has been derived by fusion, or vice-versa. An intermediate condition is, in fact, shown by one of the types of *socotrae* (a female, Brit. Mus. No. 1946.1.14.99); here the two preoculars are partially fused on both sides, a part suture persisting, and on the right side the lower postocular is completely fused with the sixth upper labial, reproducing the *florulentus* condition, i.e., two postoculars and two upper labials, the fifth and sixth, entering the eye.

The proportions of the head shields and the scale counts [1]) are contrasted with the other north-east African forms of the *florulentus* group in the table on pages 42-43. They show considerable similarities with *C. taylori*, but the ventral and subcaudal counts are higher than in any of the other species.

There can be no absolute proof that *C. socotrae* is more or less primitive than its nearest relatives on the mainland, but the following points are suggestive:

(a) In the mainland species a pattern of distinct cross-bars is associated with immaturity; the cross-bars tend to be broken up or to become indistinct with increasing age. In the absence of any evidence that such a distinctive livery is a special adaptation for the young, it is reasonable to regard the presence of the pattern as primitive and its loss as secondary. In *C. socotrae* the pattern is retained in the adult.

(b) In the consideration of another *Coluber* (*C. rhodorhachis*) on a previous page evidence was adduced that the more primitive of two subspecies is characterised by a *higher* number of ventral and subcaudal scales. If, as is possible, this is a general principle in *Coluber*, then *C. socotrae*, with higher counts than its nearest relatives, is more primitive than they are.

(c) There is no evidence that in the Ophidia there is any general evolutionary trend towards the breaking up of a few large head-shields and their replacement by a larger number of smaller ones, though there may be some individual instances of such a happening. On the contrary, in nearly all the obviously specialised genera there is a trend towards fewer and larger head-shields. On this criterion, again, *C. socotrae* shows the more primitive conditions.

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1) The discrepancies between the counts given here and those previously published are due to careful re-counting.

Meizodon Fischer

Meizodon semiornatus (Peters)

Coronella plumbiceps Boettger, 1893, Zool. Anz., vol. 16, p. 117 (Type locality: Ogaden).
Coronella semiornata, Boulenger, 1894, p. 195; Loveridge, 1916, p. 84 (Kismayu); Scortecci, 1928, p. 271 (Vill. Duc. Abruzzi); Idem, 1931, p. 206 (Vill. Duc. Abruzzi).
Coronella semiornata semiornata, Scortecci, 1939 b, p. 275 (Belet Amin).
Coronella somalica Scortecci, 1932 b, Atti Soc. ital. Sci. nat., vol. 71, p. 58 (Type locality: Afgoi).
Meizodon somalicus, Bogert, 1940, p. 49, footnote.
Aeluroglena cucullata (non Boulenger), Loveridge, 1936 b, p. 28 (Sheikh Hussein).
Meizodon loveridgei Bogert, 1940, p. 49, fig. 7 d-f (Type locality: Sheikh Hussein).

Scortecci (loc. cit. supra) recorded two species of *Meizodon* from Somalia under the names *semiornatus* and *somalicus.* Bogert also (loc. cit.) thought that a *Meizodon* from Sheikh Hussein erroneously referred to *Aeluroglena* by Loveridge, represented a species distinct from *semiornatus,* and proposed the name *loveridgei* for it, but later agreed that the type specimen was conspecific with Scortecci's *somalica,* a name which he had overlooked. According to Scortecci's and Bogert's descriptions this second species differs from *semiornatus* in colour pattern, the presence of 1 + 2 temporals (instead of 2 + 2 or 2 + 3), a frontal shield longer than its distance from the end of the snout and a flatter head. Considering these characters seriatim:

(1) Colour pattern. In a series of specimens of *semiornatus* from various localities in Tanganyika Territory, Kenya Colony, Nyasaland and Mozambique (in which country the type specimen of *semiornatus* originated) it is possible to find every condition between a completely black head, and heads coloured like the rest of the body. The black head may be traversed by indistinct lighter areas.

(2) Temporal scales are not uncommonly 1 + 2 in specimens that are unquestionably *semiornatus* in all other respects but the frequency of occurrence of the 1 + 2 condition would appear to be higher in the north of the geographical range of *semiornatus* than in the south. For instance, in the series in the British Museum specimens from A.E. Sudan (4) and Somalia (1) all have the 1 + 2 condition which is otherwise present only in two specimens out of 10 (Athi River, Kenya and Charré, Mozambique). Sufficient material is not available, and records are not sufficiently detailed, to permit of a statistical investigation.

(3) Frontal Shield. Earlier in this paper in the discussion of *Coluber rhodorhachis* it was demonstrated that the anterior part of the head undergoes allometric growth, and the same phenomenon is found in *Meizodon semiornatus.* Figure 8 shows how the ratio of the length of the frontal

to its distance from the end of the snout decreases with size irrespective of geography. The central unbroken line is the estimated mean curve

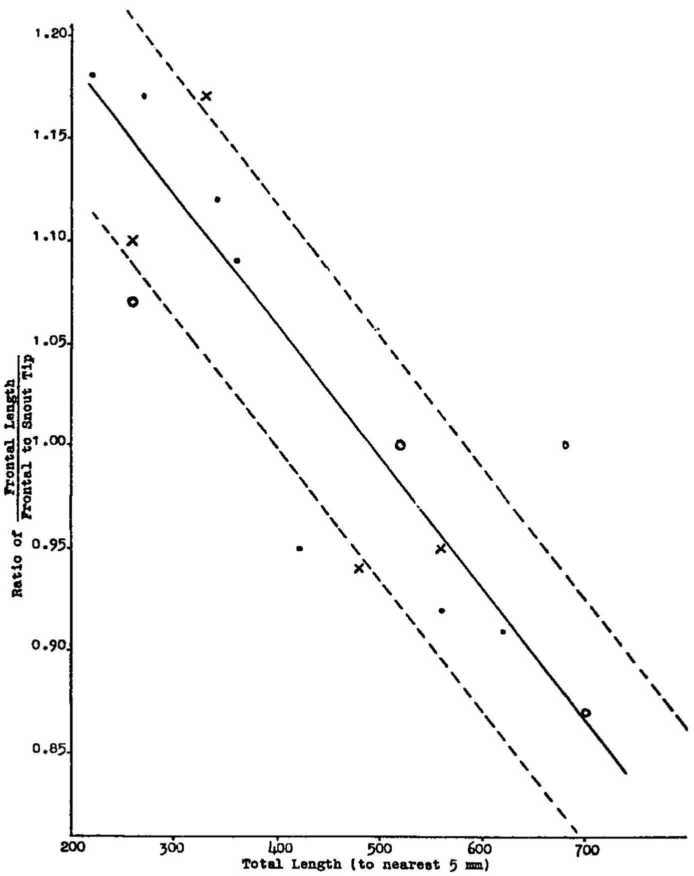

Fig. 8. *Meizodon semiornatus* (Peters). Ratio of frontal shield to its distance from the tip of the snout, plotted against total length from snout to tip of tail. Mean value and limits of standard deviation.
Points, specimens from Portuguese East Africa, Nyasaland and Tanganyka Territory; crosses, specimens from Uganda, Kenya Colony and Somalia (Jubaland); circles, specimens from the Anglo-Egyptian Sudan.

(drawn by eye) and the dotted lines represent the presumed limits of the standard deviation from the mean. The standard deviation was calculated from the comparable ratios obtained by projecting each of the observed values on to an arbitrarily selected length-ordinate (500 mm); it has been assumed that the standard deviation at this length (± 0.06) will be applicable at any other length. From this figure the expected ratio of frontal to fore-head length can be calculated for any size of snake and the expectations are found to accord well with the conditions described for each of the three type specimens from Somaliland which have been regarded as representing a species distinct from *semiornatus*, thus:

"Species"	Locality	Length of Type	Described Ratio	Theoretical ratio in *semiornatus* of similar length
plumbiceps	Ogaden	576 mm	"equal"	0.88-1.0
loveridgei	Sheikh Hussein	362 mm	"longer than"	1.02-1.14
somalica	Afgoi	227 mm	"much longer than"	1.11-1.23

There remains only the somewhat unconvincing, and unmeasurable character of a "flatter" head. The specimen from Lodwar (Lake Rudolf) referred to *semiornatus* (Parker, 1936, p. 606) has a head apparently flatter than is normal in the other specimens examined with more vertical lores and temples; the fauna of this region has many features in common with that of Somaliland.

There is, therefore, the possibility that, when sufficient comparable material is available, it may be possible to recognise in Somalia, extending into the Anglo-Egyptian Sudan and the Yemen, an ill-defined race of *semiornatus* in which the temporal condition is more frequently 1 + 2 than in other areas, in which the head may be flatter with more vertical loreal region and, what has not previously been mentioned, an average higher ventral count. In 39 specimens recorded in literature or available to the author, from the Somali area north of the Juba River the ventral range is from 183 to 204; unfortunately in 31 of these records only the extremes of the range are available and it is not possible to compute the mean, but in the other eight snakes the ventrals number *more than 200.* Again the only available specimens from the A.E. Sudan (4) also have more than 200 ventrals (217, 219, 223 and 224) and the same is true also of the single specimen recorded from the Yemen (Scortecci, 1932 c, p. 46). On the other hand, no specimens appear to have been recorded from Uganda and Kenya southwards with more than 196 ventrals; the recorded range in this area is from 175 to 196. If the recognition of a geographical race proves possible or desirable the oldest applicable name for the northern subspecies would appear to be Boettger's *plumbiceps.*

Aeluroglena Boulenger

Aeluroglena cucullata Boulenger

Aeluroglena cucullata Boulenger, 1898 b, Ann. Mag. nat. Hist. (7), vol. 2, p. 132 (Type locality: Golis Mts.); Parker, 1932, p. 364 (Haud, 2300 ft., and between Bohodle and Berbera); Bogert, 1940, p. 49, fig. 7a-c (Haud).

B.M. 98.5.21.27. ♀. Type; Sc. 21; V. 216; C. 66 + 1. Golis Mts. Lort Philips.
B.M. 1905.10.30.127. ♂; Sc. 21; V. 206; C. 71 + 1. Near Berbera. Bury.
B.M. 1931.7.20.394. ♀; Sc. 21; V. 223; C. 72 + 1. Haud, 46° 30′ E. × 8° 24′ N., 2300 ft. Taylor.

This monotypic, endemic genus appears to be confined to the Haud and Ogo. Bogert (1940) has considered the status of the genus and considers it to be closely allied to *Meizodon*, differing in the possession of a vertical pupil and 15-16 maxillary teeth as opposed to 19-20 in *Meizodon*. Whilst the general conclusion appears sound it must be pointed out that there is probably a greater range of variation in the number of maxillary teeth. The holotype of *Aeluroglena cucullata* has 17 and a specimen of *Meizodon semiornatus* from the Athi River, Kenya, as few as 15.

The specimen collected by Col. Taylor was found on Oct. 27th, in daylight, on sandy ground in an area clothed with trees and bushes. The Somali natives showed great fear of the snake, insisting that it was a juvenile of a very deadly black species.

Pseudoboodon Peracca

Pseudoboodon lemniscatus (Dum. & Bibr.)

Boaedon lemniscatum Duméril & Bibron, 1854, Erpet. Gén., vol. 7, p. 365 (Type locality: Abyssinia); Jan, 1870, Icon. Gén., vol. 3, pt. 36, Pl. III fig. 1 (Abyssinia); Blanford, 1870, p. 457 (Ashangi and Adabagi).

Boodon lemniscatus Boulenger, 1893, p. 329 (Ashangi; Abyssinia); Idem, 1895 b, p. 13 (Upper Ganale); Idem, 1896 a, p. 552 (Let Marefia, near Ancober); Sternfeld, 1908 b, p. 239 (Gadat, 36° 46′ E. × 6° 20′ N.; Ataki; Gara Mulata, 41° 35′ E. × 9° 07′ N.; Omo, 36° 20′ E. × 7° 10′ N.; Baddatino, 38° E. × 9° 30′ N. approx.).

Pseudoboodon lemniscatus Parker, 1930, Ann. Mag. nat. Hist. (10), vol. 6, p. 598; Loveridge, 1936b, vol. 22, p. 22 (Chilalo Mts., Ethiopia); Scortecci, 1940, p. 9 (Javello); Bogert, 1940, p. 25 (Ganamé).

Pseudoboodon gascae Peracca, 1897, Boll. Mus. Zool. Anat. comp. Torino, vol. 12, 273, p. 1, fig. (Type locality: Maldi, Eritrea).

Lamprophis rogeri Mocquard, 1904, Bull. Mus. Hist. nat. Paris, p. 307 (Type locality: near Addis Ababa); Idem, 1905, op. cit., p. 289 (correction).

Lamprophis abyssinicus Mocquard, 1906, Bull. Mus. Hist. nat. Paris, vol. 12, p. 249 (Type locality: Akaki, Abyssinia).

Pseudoboodon erlangeri Werner, 1923, Ann. Nat. hist. Mus. Wien, vol. 36, p. 161 (Type locality: Abyssinia); Scortecci, 1930b, p. 19 (between Balci and Ciadafena, Ethiopia); Bogert, 1940, p. 25 (Ethiopia).

? *Boodon infernalis* (non Günther) Sternfeld, 1908 b, p. 240 (Adoshebaital, 37° 05′ E. × 5° 46′ N. approx.).

The status of the various "species" cited above is difficult to disentangle since so few workers have had more than one or two specimens and there has been some generic confusion.

First there is a group of "species" characterised by a very distinctive colour pattern of longitudinal stripes (vide Jan, 1870, Pl. III fig. 1): *Boaedon lemniscatum* Dum. & Bibr., *Lamprophis rogeri* Mocquard and *Pseudoboodon erlangeri* Werner. The type specimens of those names all had 23 scale rows and there is little or no doubt that they are all conspecific. The present author (1930, p. 598) showed that the characteristic labial pits of *Pseudoboodon* are present in these striped forms.

The genotype of *Pseudoboodon, P. gascae* Peracca, has 21 scale rows and a different colour pattern. The stripes are much less distinct and have irregular edges, the mid-dorsal one being a zig-zag fusion of a series of subcircular spots which, in the nuchal region, remain discrete. To judge from the descriptions there are no morphological features to distinguish *P. gascae* from the striped *P. lemniscatus*.

Next is *Lamprophis abyssinicus* Mocquard, again with 21 scale rows, but with no traces of striping on the body and only an indistinct light band on each side of the head from the snout, along the canthus rostralis and upper temporal region to the sides of the neck where it fades out. Werner (1929, p. 50) has synonymised this name with *P. gascae*.

Werner, in this paper, failed to realise that *lemniscatus* was a *Pseudoboodon* and used the name *P. erlangeri* for the 23-scaled, striped form and *P. gascae* for the 21-scaled obscurely marked one. But Boulenger (1893, p. 329; 1896 a, p. 552) and Sternfeld (1908 b, p. 239) had already shown that scales in the striped form vary from 21 to 25. In the absence of any other apparent morphological differences there remains only colour as a distinguishing feature. The series in the British Museum (7 from various localities), although all of the striped form, shows that, with increase of size, the stripes may become almost obsolete and this raises the possibility that *gascae* is merely a sub-melanistic variant in which the pattern is becoming obliterated and disrupted. The specimen originally described as *abyssinicus* could be a more advanced stage of the same process, the culminating point of which would be in a completely black specimen. Such an individual may well have been the one identified by Sternfeld (1908b, p. 240) as *Boodon infernalis* Günther. This identification is highly improbable, *B. infernalis* being a synonym of *Lamprophis inornatus* Dum. & Bibr., a species restricted to Africa south of the Zambesi. But *Lamprophis* *inornatus* has many characters in common with *Pseudoboodon* which are not found in valid species of *Boaedon* in the Somali region, e.g., no maxillary diastema; scales without apical pits; scale rows 21-23 (or 25), preocular not reaching the upper surface of the head and widely separated from the frontal, eight upper labials of which the 3rd and 5th enter the eye and temporals 1 + 2.

It is therefore considered probable that there is only a single species involved, and the only serious objection to this view is to be found in Bogert's (1940, p. 26) finding of a slight hemi-penial difference, the presence and absence of distal calyces, in "*P. erlangeri*" and "*P. lemniscatus*" respectively. But the range of variation of this organ has been quite inadequately studied and some misidentification in Bogert's material is suspected; the two names he uses appear to be the clearest synonyms.

Whatever may be the final verdict regarding the number of species, *Pseudoboodon* is an endemic genus of the Abyssinian mountain region which reaches the eastern side of the Rift Valley.

Boaedon Duméril & Bibron

SYNOPSIS OF THE SPECIES

I. Scales in 25—29 rows. Nasal shields narrowly separated behind the rostral. Preoculars in contact with the frontal. A light stripe along the upper lip and another along the canthus rostralis and temporal region.
   (a) A row of scales separating the posterior part of the nasal and the loreal from the upper labials. Body with four longitudinal rows of narrowly separated, large, brown, circular spots of which the two middle rows may be partially fused.
   B. maculatus Parker
   (b) No scales between the loreal and labials. Body uniform dark brown or with two lateral light stripes on each side, continuous with those on the head.
   B. lineatus Dum. & Bibr.

II. Scales in 23 rows. Nasal shields widely separated. Preoculars not reaching the upper surface of the head, widely separated from the frontal. Uniform brown.
   B. erlangeri Sternfeld

Boaedon lineatus Dum. & Bibr.

Boaedon quadrilineatum, Mocquard, 1888, p. 130 (Somaliland).

Boodon lineatus Boulenger, 1891, p. 13 (route from Obbia to Berbera); Idem, 1895 c, p. 536 (Sheikh Hussein); Idem, 1895 b, p. 13 (Upper Ganale); Idem, 18 6 c, p. 20 (Brava); Idem, 1896 d, p. 216 (Sheikh Hussein); Idem, 1898 a, p. 720 (between Sancurar and Amarr); Idem, 1909 b, p. 309 (Jumbo, Lower Juba); Idem, 1909 c, p. 311 (Bardera); Lepri, 1911, p. 321 (Mogadiscio neighbourhood); Lönnberg & Andersson, 1913, p. 2 (Kismayu); Loveridge, 1916, p. 83 (Kismayu).

Boaedon lineatus Scortecci, 1929, p. 269 (Vill. Duc. Abruzzi); Idem, 1930 b, p. 15 (Webi Shebeli; Merca); Idem, 1931, p. 203 (Vill. Duc. Abruzzi and Mogadiscio District); Idem, 1939 b, p. 271 (Afgoi; Mahaddei Uen; Vill. Duc. Abruzzi; Belet

Amin; Mogadiscio District); Idem, 1940, p. 9 (Javello = 38° 08′ E. × 4° 55′ N. approx.); Idem, 1943, p. 284 (Gondarabba).

B.M. 1949.2.1.63. ♂; Sc. 29; V. 201; C. 53 + 1. Haud, 45° 09′ E. × 8° 37′ N., 3050 ft.
B.M. 1949.2.1.64. ♂; Sc. 27; V. 197; C. 55 + 1. Haud, 44° E. × 9° N., 4250 ft.
B.M. 1949.2.1.65. ♂; Sc. 27; V. 214; C. 56 + 1. Borama District, 5000 ft.
B.M. 1949.2.1.66. ♂; Sc. 27; V. 212; C. 57 + 1. Haud, 43° E. × 10° N., 4500 ft.
B.M. 1949.2.1.67. ♂; Sc. 27; V. 201; C. 53 + 1. Bohodle (Haud), 2100 ft.
B.M. 1931.12.5.1 ♂; Sc. 25; V. 187; C. 63 + 1. Sheikh, 4800 ft.
B.M. 1949.2.1.68. ♀; Sc. 27; V. 225; C. 50 + 1. Haud, 46° E. × 8° 21′ N., 2100 ft.
B.M. 1949.2.1.69. ♀; Sc. 27; V. 214; C. 44 + 1. Hargeisa.
B.M. 1949.2.1.70. ♀; Sc. 27; V. 218; C. 42 + 1. Bohodle (Haud), 2100 ft.
B.M. 1949.2.1.71. ♀; Sc. 29; V. 225; C. 47 + 1. Haud, 44° 20′ E. × 8° 53′ N., 3900 ft.
B.M. 1905.11.7.43. ♀; Sc. 25; V. 205; C. 46 + 1. Wagar, Golis Mts., 3-4000 ft.

This snake common throughout Africa south of the Sahara, and represented in S. Arabia by either a sub-, or very closely allied species, appears to have failed to maintain itself in the extreme north-east of the Somali peninsula. With the exception of the single specimen reported by Boulenger (1891) as having been taken on the route between Obbia and Berbera it has not been recorded east of the Abyssinian highlands or northeast of the Webi Shebeli. The specimens listed above indicate that it extends into the peninsula, but only apparently along the highlands of the Ogo and the adjacent parts of the Haud at altitudes of 2100 feet and over. The occurrence of a distinct race or species in S. Arabia (*B. arabicus* Parker), and the present distribution suggests that its former range has been reduced by the spread of arid conditions. Comparison of the localities listed above with the rainfall figures given by Taylor (in Parker, 1942, p. 95) shows a clear correlation. Of the seven localities in British Somaliland for which rainfall figures are available, *Boaedon lineatus* was captured at three, and these three (Sheikh, Hargeisa and Borama) are the ones with the markedly highest rainfalls. All the specimens listed were captured in sandy or stony country carrying grass patches and thorn scrub or bushes, chiefly euphorbia and acacia.

Bogert (1940, p. 21) recognises three subspecies of *B. lineatus* in Africa and Scortecci considers *arabicus* also to be only subspecifically distinct. There would, therefore, be justification for using trinomials to designate the Somali population. This has not been done since there is evidence (Bogert, 1940, Loveridge, 1936 a, p. 237 and Loveridge, 1942, p. 263) of the existence of other local geographical or ecological races in Africa and until a more extensive study of the problem has been undertaken the use of a trinomial might be very misleading. The only name that can be applied with certainty is *lineatus* but if this name were used as a trinomial it would imply that the Somali population is racially the same as that of the Gold Coast, which is far from proven and is, indeed, unlikely. The following tabular arrangement shows the variation in lepidosis in the northern and eastern parts of the range of the species [1]).

Arabia	(11 specs.)	Sc. 28—33	V. 220-250
Eritrea & N. Abyssinia (West of Rift Valley)	(7 specs.)	Sc. 29—33	V. 216-239
N. Somaliland (Highlands)	(11 specs.)	Sc. 25—29	V. 187-225
S. Somaliland (Lowlands)	(14 specs.)	Sc. 29—31 (rarely 27)	V. 181-237
Kenya Coastlands (Below 500 ft.)	(56 specs.)	Sc. 25—27	V. 186-213
Kenya & Uganda (Interior plateau, 2000-7000 ft.)	(62 specs.)	Sc. 29—34	V. 201-238
Tanganyika Territory (Coastlands below 500 ft.)	(58 specs.)	Sc. 27—29 (rarely 30—31)	V. 187-218
Tanganyika Territory (Central Lake Region)	(52 specs.)	Sc. 23—31 (rarely 33)	V. 196-235

Clearly no taxonomic divisions are possible on these figures alone and statistical analysis, taking account of sex differences, is necessary. Insufficient material is available to the author, and in the literature too little regard has been paid to the sexing of specimens recorded. In the British Somaliland material the sex-variation is:

♂♂	(6 specs.)	Ventrals 187—214	Caudals 54—64
♀♀	(5 specs.)	Ventrals 205—225	Caudals 43—51

Boaedon maculatus Parker

Boaedon maculatus Parker, 1932, Proc. zool. Soc. Lond., p. 363 (Type locality: Bihen, 1500 ft., 48° 25′ E. × 8° 25′ N.).

This may prove not to be a valid species. The name was proposed on the basis of a single individual and no others like it have been captured. The scale counts (Sc. 29; V. 227; C. 55) are not incompatible with *B. lineatus*, female, the young of which species may sometimes have a livery of obscure dark blotches and spots. None, however, has been seen with such a clearly marked pattern as the type of *maculatus*, nor have any individual aberrations of *lineatus* been recorded which show any approach to the labio-loreal condition of *maculatus*.

Boaedon erlangeri Sternfeld

Boodon erlangeri Sternfeld, 1908a, S.B. Ges. naturf. Fr. Berl., vol. 4, p. 92 (Type locality: "Somaliland"); Idem, 1908b, p. 240, figs. 1 & 2.

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1) Counts from specimens in the British Museum and those recorded by Loveridge (1936 & 1942) and Scortecci (1929, 1039 b, 1931, 1932 c, 1939).

This species, like the preceding, must be regarded as of uncertain status, being based on a single individual and not having been recorded subsequently. From its ventral (205) and subcaudal (46) counts it could be based on a female *B. lineatus*, but the mid-body scale rows, given as 21 in the original description but amended to 23 in the second, are too low. Again, the figure of the head indicates the nasal shields widely separated, and the preoculars not reaching the upper surface of the head and widely separated from the frontal, in both of which characters it is different from any Somali *Boaedons* that have been examined.

Lycophidion Dum. & Bibr.

Lycophidion capense (A. Smith)

Lycophidium abyssinicum Boulenger, 1893, Cat. Snakes Brit. Mus., vol. I, p. 342, Pl. XXII fig. 1 (Type locality: S. Abyssinia); Idem, 1895 c, p. 536 (Sheikh Hussein); Idem, 1896 a, p. 553 (Eritrea); Sternfeld, 1908 b, p. 240 (Lake Haramaia); Lepri, 1911, p. 322 (Mogadiscio neighbourhood).

Lycophidium capense, Boulenger, 1896 c, p. 20 (between Comia, 43° 28′ E. × 1° 04′ N. and Matagoi, 43° 11′ E. × 2° N.); Idem, 1896 d, p. 216 (West of the Juba River); Lönnberg & Andersson, 1913, p. 2 (Kismayu); Loveridge, 1929, p. 20 (between Abyssinia and Kenya Colony); Scortecci, 1930 b, p. 16 (between Awash and Addis Ababa; Somalia); Idem, 1931, p. 20 (Mogadiscio; Vill. Duc. Abruzzi).

Lycophidium capense capense, Loveridge, 1936 b, p. 23 (Harar); Scortecci, 1939 b, p. 272 (Afgoi, Belet Amin, Balad).

Lycophidium jacksoni, Sternfeld, 1908 b, p. 240 (Suksuki River; Sheikh Hussein).

? *Lycophidium semicinctum,* Scortecci, 1930 b, p. 16 (Beled).

B.M. 1949.2.1.72. ♂ juv.; V. 174; C. 35 + 1. Haud, 44° 24′ E. × 8° 52′ N., 3800 ft.
B.M. 1949.2.1.73. ♂; V. 169; C. 35 + 1. Borama Distr., 43° 15′ E. × 9° 45′ N., 5000 ft.
B.M. 1949.2.1.74. ♀; V. 177; C. 27 + 1. Borama Distr., 43° E. × 10° 50′ N., 5000 ft.
B.M. 1949.2.1.75. ♀; V. 168; C. 27 + 1. Borama Distr., 43° E. × 10° N., 4500 ft.
B.M. 1949.2.1.76. ♂; V. 174; C. 34 + 1. Borama Distr., 43° E. × 10° N., 4500 ft.
B.M. 1949.2.1.77. ♂; V. 162; C. 29 + 1. Borama Distr., 43° 15′ E. × 9° 50′ N., 4500 ft.
B.M. 1949.2.1.78. ♀; V. 188; C. 26 + 1. Haud, 45° 29′ E. × 8° 30′ N., 2700 ft.
B.M. 1949.2.1.79. ♂; V. 175; C. 26 + 1. Haud, 45° 18′ E. × 8° 34′ N., 2900 ft.
B.M. 1949.2.1.80. ♂; V. 157; C. 33 + 1. Haud, 46° E. × 8° 20′ N., 2100 ft.
B.M. 1949.2.1.81. ♀; V. 165; C. 26 + 1. Haud, 46° E. × 8° 20′ N., 2100 ft.
B.M. 1949.2.1.82. ♀; V. 170; C. 27 + 1. Haud, 45° 34′ E. × 8° 29′ N., 2600 ft.
B.M. 1949.2.1.83. ♀; V. 184; C. 29 + 1. Haud, 44° 15′ E. × 8° 55′ N., 4000 ft.
B.M. 1949.2.1.84. ♀; V. 169; C. 28 + 1. Borama Distr., 43° 05′ E. × 9° 55′ N., 4500 ft.
B.M. 1949.2.1.85. ♀ juv.; V. 177; C. 32 + 1. 43° E. × 10° 50′ N., 5000 ft.
B.M. 1909.12.4.4. ♀; V. 178; C. 30 + 1. Harar.
B.M. 1905.11.7.44. ♀; V. 173; C. 29 + 1. Wagar, Golis Mts., 3-4000 ft.
B.M. 1916.6.24.4. ♂; V. 166; C. 34 + 1. Waramalka.
B.M. 1916.6.24.5. ♀; V. 180; C. 32 + 1. Waramalka.

Although four different names have at various times been given to Wolf-Snakes in the Somali peninsula, only two authors, Sternfeld and Scortecci, have ever believed that there was more than a single species in the material seen by them, and both authors were very dubious about the identity of the specimens they referred to the second species. The foregoing material from the north of British Somaliland and adjacent areas in Abyssinia is almost certainly referable to a single form only, although it shows dimorphism of a type not previously recorded elsewhere in any Wolf-Snake. All of the first-mentioned seven specimens have a larger or smaller white nuchal blotch. The maximum development of this marking is in specimens B.M. 1949.2.1.76 and B.M.1949.2.1.74 when it occupies an area 8-10 scales long on the dorsal surface and forms a complete collar, occupying two or three ventrals on the lower surface. In the remaining specimens it does not descend to the ventrals and may be reduced to an asymmetrically placed obliquely transverse line. It appears, therefore, that the Wolf-Snake population of the area contains a high proportion of individuals with a unique type of colouration, and on that account shows some degree of (incomplete) differentiation from the populations elsewhere.

It also shows a uniformly rather low range of ventral and subcaudal scales, with little or no sex dimorphism, viz.

♂♂ (7)	V. 157—175	C. 26—35 + 1
♀♀ (11)	V. 165—188	C. 26—32 + 1

Loveridge (1942) gives the range of *L. capense capense* from Uganda, Kenya Colony and Tanganyika Territory as

♂♂	V. 184—211	C. 46—57
♀♀		C. 37—41

These figures would indicate that the northern Somaliland population is differentiated in its scale counts and absence of sex-dimorphism as well as in its colour, but it seems that Loveridge has confused the issue not only in the paper quoted but also in others (1933, p. 234, 1936 a, p. 242) by segregating specimens of *L. capense* with low ventral and caudal counts and referring to them as "intermediates between *capense* and *acutirostre*" implying, thereby, that they form a different taxonomic category. Loveridge, following other authors, believed that there was an insular race (*acutirostre*) of *L. capense* in Zanzibar, characterised by very low ventral and subcaudal counts (V. 140-150; C. 18-28), but even had that been the true position [1])

1) It is very doubtful whether the types of *L. acutirostre* originated in Zanzibar. The collection in which they were found was sent by Sir John Kirk from Zanzibar and received in London in 1868; but, in a letter published in the Proceedings of the Zoological Society of London in 1867 (p. 952) he stated that he had a "valuable collection of snakes and insects from *Mozambique*". (italics mine). It may be significant that since 1867 no Wolf-snake has been found in Zanzibar with the low counts of *acutirostre* and

there would have been no justification for segregating the individuals from the mainland with low counts and still less for the segregation of a high-count insular individual (Loveridge, 1933, p. 234) as "intermediates". The most that could have been said would have been that the ranges of the mainland and insular populations showed greater overlap. Adding the "intermediates" to the other specimens recorded by Loveridge from the British East African territories shows:

V. 154-214 Subcaudals 27-57

The Somali population falls within this range of variation, though when a sufficiency of material is available to form true population samples it may be that the mean in northern Somaliland will be found to be significantly lower than in other neighbouring regions. In the meantime it is not proposed to use trinomials; there is a definite indication of differentiation in the area, but far too little is at present known to permit of any attempt at a satisfactory diagnosis or consideration of relationships with other adjacent races. The name *abyssinicum* Boulenger, type locality "Southern Abyssinia", may prove to be available when and if trinomials appear desirable; to use the "typical" name subspecifically would be misleading.

The geographical distribution of the Wolf-Snake within the peninsula and around it is almost precisely the same as that of *Boaedon lineatus*. It has been recorded from the south-western parts of Somalia, from Abyssinia, Eritrea and S. Arabia. In the north of the peninsula it seems to be confined to the mountains of the Ogo and adjacent areas in the Haud west of 46° E., i.e., in the higher rainfall areas; it appears to be absent from the north-eastern parts. The specimens collected by Col. Taylor (those numbered 1949) were all found in sandy or stony country bearing extensive patches of grass and thorn scrub.

Mehelya Csiki

SYNOPSIS OF THE SPECIES

I. Two or three postoculars.	*M. capensis savorgnani* (Mocquard)
II. No postoculars.	*M. capensis fiechteri* Scortecci

Mehelya capensis savorgnani (Mocquard)

Simocephalus poensis, Lepri, 1911, p. 323 (Mogadiscio neighbourhood).
Mehelya (*Simocephalus*) *somaliensis* Lönnberg & Andersson, 1913, Ark. Zool., vol. 8,

that the only one seen by the present writer out of more than 60 examined is one from Kosi Bay, Zululand (♀; V. 156; C. 20) on the southern border of the Portuguese colony.

pt. 20, p. 2 (Type locality: Kismayu).
Simocephalus butleri, Boulenger, 1915, p. 647.
Mehelya chanleri chanleri, Loveridge, 1936 b, p. 24.
Mehelya capensis savorgnani, Loveridge, 1939, p. 137.

Loveridge, in his survey of the genus (1939) refers the few specimens of *Mehelya* recorded from the extreme south of Somalia to a subspecies with an alleged geographical range through Kenya, Uganda and the A.E. Sudan westwards to the Cameroons and southwards through the Congo region to Angola. It may well be doubted whether such an extensive range, covering such vastly different types of environmental conditions, is populated only by one infra-specific category and future collecting may show that the population of the savannah areas in the Sudan — Uganda — Kenya — Somali region is differentiated from the forest populations to the west and southwest; the few specimens available to the writer suggest that in the Cameroon region, at least, the head-shields and scales are more markedly rugose. In that event the name *chanleri* (Type locality: Wange, Kenya) would probably be the correct one.

What, however, is more important from the point of view of the present investigations is that the *Mehelya* even further to the north-east, in the true Somali region, is recognisably differentiated as:

Mehelya capensis fiechteri Scortecci

Mehelia (Simocephalus) fiechteri Scortecci, 1929, Atti Soc. ital. Sci. nat., vol. 68, p. 269 (Type locality: Vill. Duc. Abruzzi).
Mehelya chanleri fiechteri Loveridge, 1936 b, p. 25 (Somaliland).
Mehelya capensis fiechteri, Loveridge, 1939, p. 141.

B.M. 1949.2.1.86. ♂ juv. Haud, 44° E. × 9° N., 4250 ft. 22.10.32.

This specimen is the one from "Somaliland" mentioned by Loveridge in the two papers quoted above. It agrees well with the type and only other known specimen of this race, and extends the geographical range considerably to the north.

Philothamnus A. Smith

Philothamnus semivariegatus subsp.

Philothamnus semivariegatus, Boulenger, 1896c, p. 20 (Lugh and between Comia and Matagoi); Idem, 1896 d, p. 216 (Mada); Meek, 1897, p. 179 (Sheikh); Boulenger, 1898 a, p. 720 (Lugh and between Dimé and Lake Rudolf); Idem, 1909 c, p. 311 (Bardera); Idem, 1912, p. 332 (Dolo); Lönnberg & Andersson, 1913, p. 4 (Kismayu); Calabresi, 1918, p. 124 (between Jelib and Margherita); Scortecci, 1931, p. 206 (Mogadiscio); Idem, 1939 b, p. 274 (Afgoi; Mahaddei Wen; Vill. Duc. Abruzzi; Belet Amin); Idem, 1940, p. 11 (Dolo).
Philothamnus semivariegatus semivariegatus Loveridge, 1936 b, p. 32 (Sheikh).

B.M. 1899.5.30.5. ♀. Golis Mountains.
B.M. 1905.11.7.50. ♂. Wagar, Golis Mts., 3-4000 ft.

B.M. 1949.2.1.87. ♂. Bohodle, Haud, 2100 ft. 0.4.32.
B.M. 1949.2.1.88. ♀. Haud, 44° 15′ E. × 8° 55′ N., 4000 ft. 22.9.32.
B.M. 1949.2.1.89. ♀. Haud, 44° E. × 9° N., 4250 ft. 14.10.32.
B.M. 1949.2.1.90. ♂ juv. 43° E. × 10′ N., 4500 ft. 25.9.33.

Loveridge (1936 b, p. 32, 1945, p. 2) uses the trinomial of the typical subspecies in referring to examples of this snake from Somaliland and Eritrea but in the later paper expresses a doubt whether these north-eastern populations ought to be referred to the typical form. This doubt seems very justifiable and many local races will probably prove to be recognisable and worthy of nomenclatorial recognition when sufficient comparative series are available. The present writer has examined a series representative of populations from most parts of the range of the species (excluding the Yemen from which it has been recorded by Scortecci, 1932 c, p. 45) and although there are indications, the numbers are insufficient for statistical examination. Differences are noticeable in colour pattern, in the labials entering the eye [1]), in the relative lengths of the nasal and loreal shields and in the numbers of ventral and subcaudal scales. For example:

West Africa from Gambia to Northern Nigeria (13 examples).

Ventrals 167-201. Subcaudals 117-146. Ratio of the lengths of the lower borders (sutures with labials) of nasal and loreal 0.8-1.3 (average 1.11). Fourth upper labial constantly entering the eye. Green, uniform or with some dark edgings to the scales anteriorly, which when heavily developed form indefinite cross-bars. Semilunar white spots on the lower halves of scales frequently developed and often numerous. No specimens showing regular dark spots anteriorly.

Anglo-Egyptian Sudan and Uganda (7 examples).

Ventrals 170-205. Subcaudals 127-140. Ratio of nasal to loreal 0.9-1.4 (average 1.23). Fourth upper labial constantly entering the eye. Colour as in the preceding but white semilunar spots less common and less distinct; juvenile strongly cross-banded with black anteriorly.

Northern Somaliland (6 examples).

Ventrals 168-177. Subcaudals 121-138. Ratio of nasal to loreal 0.8-1.1 (average 0.99). Fourth upper labial constantly entering the eye. Anterior portion of body with regularly arranged, longitudinal series of subequal black spots. No distinct semilunar white spots.

Southern Somaliland (Juba Province) and coastal Kenya (9 examples).

Ventrals 166-183. Subcaudals 138-151. Ratio of nasal to loreal 0.75-0.95 (average 0.82). Fourth upper labial constantly excluded from the eye.

1) Where it is clear that there is fusion of any labials as an individual variation allowance has been made and the fused shield counted as two.

Anterior part of body frequently with black edges to the scales or with irregularly arranged and varying sized blotches and spots. No semilunar white spots.

Loveridge (1936 a, p. 248) records 3 out of 16 Kenya snakes in which the fourth labial enters the eye. Scortecci (1939 b, p. 274) records subcaudals up to 162 in snakes from southern Somaliland but in all of the eleven specimens the fourth labial is excluded from the eye.

PEMBA ISLAND (6 examples).

Ventrals 168-178. Subcaudals 149-164. Ratio of nasal to loreal 1.22-1.33 (average 1.26). Fourth upper labial entering the eye in 4, excluded in 2. Scales dark edged anteriorly; no regular black spots nor semilunar white ones.

TANGANYIKA TERRITORY, ZANZIBAR AND MAFIA (14 examples).

Ventrals 169-195. Subcaudals 121-157. Ratio of nasal to loreal 0.7-1.3 (average 0.89). Fourth upper labial entering the eye in four, excluded in ten. Anterior part of body with dark edges to the scales or dark blotches and spots which may form cross bars. Sometimes a few semilunar spots at the mid-body region.

Loveridge (1942, p. 274) reporting on 26 snakes from Uganda and Tanganyika Territory reports the fourth labial excluded from, or entering the eye in about equal proportions.

NYASALAND, MOZAMBIQUE (16 examples).

Ventrals 168-200. Subcaudals 132-157. Ratio of nasal to loreal 0.8-1.2 (average 1.07). Fourth upper labial entering the eye in 6, excluded in 10. Anterior part of body with regularly arranged rows of spots or cross bars; sometimes all scales dark edged; no semilunar white spots.

RHODESIA, NATAL, CAPE PROVINCE (11 examples).

Ventrals 178-192. Subcaudals 125-138. Ratio of nasal to loreal 0.95-1.7 (average 1.09). Fourth upper labial constantly entering the eye. Anterior part of body with transverse dark bars or spots and blotches with indications of a transverse arrangement; sometimes a few semilunar white spots in the mid-body region.

KALAHARI AND S.W. AFRICA (4 examples).

Ventrals 181-192. Subcaudals 122-127. Ratio of nasal to loreal 1.0-1.1. Fourth upper labial entering the eye in three, excluded in one. Black pigment distributed as in the preceding, but more abundant; two examples are black ventrally.

These groups cannot be considered as representing taxonomic units, with the possible exception of the population of Pemba Island which has a noticeably high subcaudal count and a high nasal/loreal ratio.

In making the measurements for the above analysis it became clear that the species undergoes allometric growth of the head which increases in length more rapidly than in width. Figure 9 shows this; in it the ratio of the combined loreal and nasal length (measured along the sutures with the

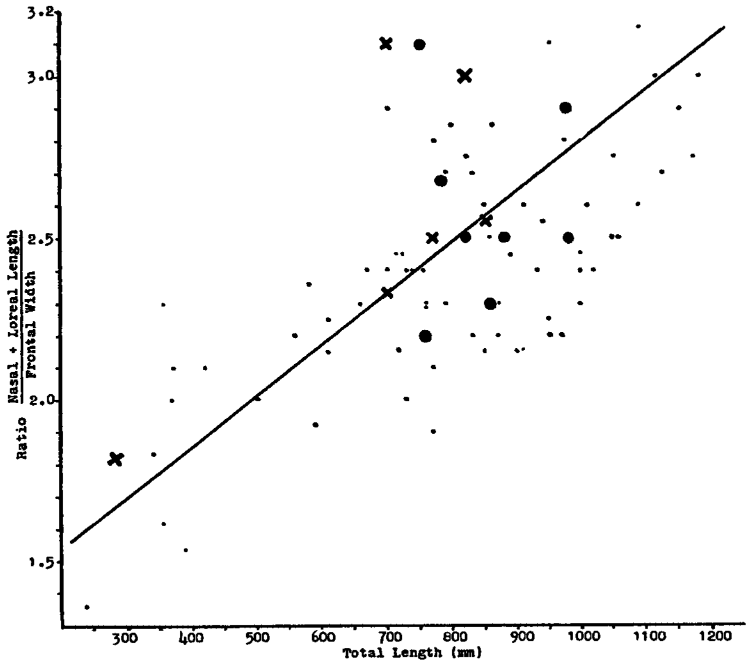

Fig. 9. *Philothamnus semivariegatus* (A. Smith). Allometric growth. Ratio of combined loreal and nasal length (measured on labial suture) to frontal width (measured at posterior border of supra-oculars), plotted against total length.
Crosses, specimens from British Somaliland; large spots, specimens from southern Somaliland and Kenya coastlands; dots, specimens from other localities.

labials) to the width of the frontal at the level of the points of contact with the posterior edges of the supraoculars is plotted against the total length. In specimens up to 550 mm in length the ratio does not exceed 2.3, whereas in specimens of more than 1000 mm the ratio always exceeds this figure. The high degree of scatter of the points is ascribable to individual variation plus experimental error, but in spite of it a mean curve can be drawn with some confidence. It will be noticed that the northern Somaliland specimens all fall close to, or above the mean curve for the species as a whole and this might be taken to indicate a racial differene. A more probable explanation, however, is that the allometric growth is proportional to *age*, whereas the diagram uses the criterion of absolute length and these two cannot be accepted as completely correlated. Stunting through adverse conditions, equally with stunting for genetical reasons, would result in a higher ratio being attained at a lower total length; a stunted population would have a steeper mean curve. Pitman (1938, p. 98) states that "This species appears to have a definite association with water, in the vicinity of which I have come across all my specimens both in Uganda and Northern Rhodesia...". In British Somaliland, although the snake has been found only in the higher rainfall areas of the western Haud and the mountains of the Ogo, conditions must be adverse for a water-loving snake and the population might well be stunted on that account. The mean curve for the short series of this population (crosses) could well be a steeper one than the average curve.

Chlorophis Hallowell

Chlorophis irregularis hoplogaster (Günther)

Chlorophis irregularis, Lepri, 1911, p. 324 (Mogadiscio).
Chlorophis neglectus Lönnberg & Andersson, 1913, p. 4 (Kismayu).
Chlorophis hoplogaster, Scortecci, 1939 b, p. 274 (Belet Amin).

Bogert (1940, p. 54) considers it very probable that *C. irregularis* and *C. hoplogaster* are probably only races and not very clearly marked at that. The former has been recorded (Loveridge, 1936 b, p. 30) from Ethiopia and *C. neglectus*, a synonym of the latter, also from Ethiopia west of the Rift Valley [Boulenger, 1896 a, p. 553 — Let Marefia, Shoa — Boulenger, 1909 a, p. 193 — near Lake Tsana — and Sternfeld, 1908 b, p. 240 — Gadat (Gofa)]. In addition there are Ethiopian specimens in the British Museum from Addis Ababa (2), Lake Tsana (2) and Guder, 6500 ft. One of the specimens from Addis Ababa shows the labial condition of *irregularis* (three labials entering the eye) whilst the other has the *hoplogaster* condition (two). There is no other apparent difference to warrant their separation and this lends support to Bogert's view.

A survey of the distribution of specimens of *Chlorophis* of this complex shows that the three-labial, *irregularis*, condition predominates, in the West African region from Senegal to N. Nigeria, in Uganda, the Anglo-Egyptian Sudan and perhaps Angola; the two-labial, *hoplogaster*, condition is predominant in S. Africa, Natal, Mozambique, Tanganyika Territory, Kenya and Ethiopia. In many of these areas there are to be found specimens showing the other condition, but it is doubtful whether the sampling is adequate for an assessment of the frequency of occurrence of one condition or the other except in the most general terms. Of 49 examples from Rhodesia, Nyasaland and the Belgian Congo 28 have the *irregularis* labial condition.

Pitman (1938, p. 98) reports *Chlorophis* as much more aquatic in its habits than the allied *Philothamnus*. The latter (q.v.) only extends into Somaliland in the damper regions of the south and in the mountains of the west of the Haud and Ogo, so that *Chlorophis* is likely to be confined to the permanent rivers of the south only.

Scaphiophis Peters

Scaphiophis albopunctatus raffreyi Bocourt

Scaphiophis raffreyi Bocourt, 1875, Ann. Sci. nat. Zool. (2) Art. 3 (Type locality: Devatabar, 2500 m, Ethiopia).

Scaphiophis albopunctatus, Fischer, 1885, p. 100, Pl. III fig. 6 (Nubia); Boulenger, 1896 a, p. 553 (Rappé, near Antoto, Ethiopia).

Scaphiophis calciattii Scortecci, 1928, Atti Soc. ital. Sci. nat., vol. 67, p. 300, fig. 5 (Type locality: Cunana region, Eritrea); Idem, 1930 c, p. 201 (Barenta, Eritrea).

B.M. 1916.6.24.8. ♀; Sc. 28; V. 246; C. 69. Walankit (39° 20′ E. × 8° 42′ N.).

B.M. 1916.6.24.9. ♀ juv.; Sc. 28; V. 238; C. 66. Walankit (39° 20′ F. × 8° 42′ N.).

Loveridge (1936 a, p. 256) suggested that Boulenger had been at fault in regarding Bocourt's *S. raffreyi* as a synonym of *albopunctatus* and that the former might be a valid species, with *calciattii* as a synonym. Many of the characters considered both by Bocourt and Scortecci to distinguish the northern *Scaphiophis* are of doubtful value, but examination of material from the whole range of the genus and of records in the literature confirm that the northern population of Eritrea, "Nubia" and Ethiopia differs from those elsewhere to the south and west (from the Guinea coast around the periphery of the Rain Forest region to the lower Congo) in the mid-body scale rows and the ventral count, as, e.g., in the table on p. 63.

It is proposed to regard the Eritrean-Ethiopian population as subspecifically rather than specifically distinct owing to the fact that there appears to be a general increase in the number of scale rows from south to north in the eastern part of the range of the species. In the series recorded below under heading (2) the lowest number of mid-body scales (21) was only observed in the Kasai-Katanga region of the Belgian Congo whereas the highest number (25) was not seen south of Uganda; Schmidt (1923, p. 90) also records no specimens with a higher count than 23 in the Belgian Congo. There is, thus, a distinct probability of the two groups being found to intergrade.

No specimens have yet been recorded from Somaliland but the British

(1) ETHIOPIA, "NUBIA" AND ERITREA

	Sc.	V.	C.	Sex
Bocourt (1875) (Type)	27	232	55	? ♂
Fischer (1885)	27	225	65	? ♂
	29	240	64	? ♀
Boulenger (1896a, p. 553) . .	27	?	?	?
Scortecci (1928) (Type of *calciattii*)	27	242	62	? ♂
Scortecci (1930 c)	26	210	71	? ♂
Brit. Mus.	26—29	246	69	♀
	28	238	66	♀
Total Range:.	28	210—246	55—71	
Possible sex ranges: ♂	26—27	210—242	55—71	
♀	28—29	238—246	64—69	

(2) NIGERIA TO UGANDA, KENYA, TANGANYIKA TERRITORY AND THE BELGIAN CONGO

Sc. 21—25 V. ♂ 176—214, ♀ 185—236 C. ♂ 54—73, ♀ 51—66

Museum specimens mentioned above were collected at the southern end of the Danakil depression and it is reasonable to expect the species to occur in the westernmost parts of the Ogo and Haud.

Prosymna Gray

SYNOPSIS OF THE SPECIES

I. A single internasal. Ventrals ♂ 130, ♀♀ 143-154. *P. agrestis* Scortecci
II. Internasals paired. Ventrals ♂♂ 114-126, ♀♀ 132-144. *P. somalica* Parker

Prosymna agrestis Scortecci

Prosymna agrestis Scortecci, 1929, Atti Soc. ital. Sci. nat., vol. 68, p. 272, fig. (Type locality: Vill. Duc. Abruzzi); Idem, 1939 b, p. 273 (Belet Amin).

Scortecci (1930 b, p. 18) recording a specimen of *Asthenophis ruspolii*, remarks that the genera *Asthenophis* and *Prosymna* are easily confused with one another, the more so in that the characters of the unique species (*A. ruspolii*) are almost common to those of *P. agrestis*. There is indeed nothing to distinguish these two alleged species, to judge from the descriptions, except the dentition. It seems very desirable that the only two examples of "*Asthenophis*" should be re-examined; it is difficult not to suspect that this genus is based on a specimen of *Prosymna* in which the enlarged posterior maxillary teeth have been lost or overlooked.

Whatever may be the outcome of such an investigation the *Prosymna* of the south of Somaliland appears to be closely related to the single species of the genus known from the neighbouring countries of Kenya and Uganda, viz., *P. ambigua stuhlmanni* (Pfeffer). This latter has ventrals ranging from 122-140 in 14 males and from 140-153 in fourteen females examined by the writer or recorded by Loveridge (1936 a, p. 254; 1942, p. 281); the subcaudal range in the same series is, males, 28-34 and females, 19-28. Unfortunately Scortecci has not recorded in detail the sexes and counts of his series of twenty *agrestis* but so far as can be seen from those details that are mentioned there is no difference in this respect between *P.a. stuhlmanni* and *P. agrestis*. The latter would, however, appear to have a less prominent rostral whose upper surface is not longer than the internasal, whose maximum width is much less than the length of the frontal and almost constantly a single postocular; in *stuhlmanni* the portion of the rostral visible from above is much longer than the internasal whose width is almost or quite as great as the length of the frontal, and there are usually two postoculars.

Prosymna somalica Parker

Prosymna somalica Parker, 1930, Ann. Mag. nat. Hist. (10), vol. 6, p. 605 (Type locality: Haud, British Somaliland, 2,000 ft.); Idem, 1932, p. 364 (Burao, 3400 ft.).

B.M. 1949.2.3.15. ♂ ; V. 126; C. 30 + 1. Bohodle, Haud. 21.1.32.
B.M. 1949.2.1.91. ♀ ; V. 132; C. 23 + 1. Haud, 44° 15′ E. × 8° 55′ N., 4000 ft. 22.9.32.
B.M. 1949.2.1.92. ♂ juv.; V. 122; C. 33 + 1. Borama Distr., 5000 ft. 6.2.33.
B.M. 1949.2.1.93. ♀ ; V. 144; C. 29 + 1. 42° 50′ E. × 10° 10′ N., 4500 ft. 6.8.33.
B.M. 1949.2.1.94. ♀ ; V. 141; C. 24 + 1. 43° E. × 10° N., 4500 ft. 25.9.33.
B.M. 1949.2.1.95. ♀ ; V. 140; C. 24 + 1. 43° E. × 10° N., 4500 ft. 25.9.33.
B.M. 1949.2.1.96. ♂ ; V. 118; C. 33 + 1. 43° E. × 10° N., 4500 ft. 25.9.33.
B.M. 1949.2.1.97. ♂ ; V. 114; C. 36 + 1. 43° E. × 10° N., 4500 ft. 25.9.33.
B.M. 1949.2.1.98. ♂ ; V. 124; C. 35 + 1. 43° E. × 10° N., 4500 ft. 30.9.33.
B.M. 1949.2.1.99. ♀ ; V. 142; C. 28 + 1. 43° E. × 10° N., 4500 ft. 30.9.33.

The above mentioned 10 specimens collected in sandy and stony country with patches of grass and acacia-euphorbia bush show only slight variations from the existing description based on scanty material from the same general area. In addition to the ventral and subcaudal variations given above, one specimen (B.M.1949.2.1.94) has two preoculars on each side and another (B.M.1949.2.1.91) has the prefrontal divided (i.e., paired); both these two specimens have the dark colour of the dorsum invading the region of the throat.

The constancy of the morphological characters must be accepted as evidence that this, the most northerly known population of the genus, represents a distinct form. The paired internasal condition is known elsewhere in the genus only in *P. sundevallii* (Smith) and its races from South and South-west Africa and in *P. greigerti* Mocquard, known from a single specimen only, from the French Sudan (Lobi District); the latter, however, has only 5 upper labials, ventrals 171 and subcaudals 19 + 1. These figures, assuming the type to be a female, agree closely with those of *P. meleagris* from the same geographical region (12 ♂♂, V. 140-165, C. 31-35; 12 ♀♀, V. 155-189, C. 21-25) and are much higher than anything from the Somali region. There is no evidence of any overlap with the neighbouring forms *P. agrestis* (q.v.), *P. meleagris* or *P. ambigua stuhlmanni*, and consequently *somalica* must be regarded as a separate, distinct, endemic species. The paired internasal condition may well be primitive and supporting evidence that the species is primitive may also be found in the teeth. The maxillary arrangement is that typical of the genus but the specialised character of the enlargement of the posterior teeth is less marked. In an example of *stuhlmanni* 250 mm long the posterior "fangs" are each 1.6 mm long whereas in an example of *somalica* of similar size they are much shorter, each measuring only 1.0 mm.

The distribution of similar, and possibly primitive, forms in northern Somaliland and S.W. Africa is paralleled in *Bitis lachesis* (q.v.).

Asthenophis Boulenger

Asthenophis ruspolii Boulenger

Asthenophis ruspolii Boulenger, 1896b, Ann. Mus. Stor. nat. Genova (2), vol. 17, p. 12 (Type locality: Magala Umberto Island, Ganale Doria); Scortecci, 1930 b, p. 18 (Jonderma).

As indicated in the discussion of *Prosymna agrestis*, above, there is a doubt about the status of this monotypic genus known from only two specimens. The type, said to be a male, had 135 ventrals and 32 subcaudals, which is within the known range of males of *P. ambigua stuhlmanni* and within the presumed range of *P. agrestis*. But the second specimen with almost identical counts (V. 136, C. 32) is said to be a female, which, if correct, is completely outside the range of both and indicates an absence of the sex variation which is characteristic of *Prosymna*.

Eirenis Jan

Eirenis africana (Boulenger)

Contia africana, Boulenger, 1914, Ann. Mag. nat. Hist. (8), vol. 14, p. 483 (Type locality: Erkowit, Red Sea Prov., Sudan); Scortecci, 1930 c, p. 200, fig. (Asmara).

This snake, apparently rare, may be found to extend into the Guban.

The distribution of the genus *Eirenis* recalls that of its close ally *Coluber*; both are represented in Africa by a small remnant confined to the north-east of the continent.

Duberria Fitzinger

Duberria lutrix abyssinica (Boulenger)

Homalosoma lutrix, Blanford, 1870, p. 458 (Ashangi).
Homalosoma abyssinicum Boulenger, 1894, Cat. Snakes Brit. Mus., vol. 2, p. 276, Pl. XIII fig. 2 (Type locality: Ashangi); Sternfeld, 1908b, p. 240 (Gara Mulata).
Homalosoma lutrix var. *abyssinicum* Boulenger, 1912, p. 332 (Webi Marra).
Duberria lutrix abyssinicum, Bogert, 1940, p. 40 (Grau); Loveridge, 1944, p. 139 (revision).

Although Boulenger in 1912 (loc. cit. supra) was the first to recognise that the northern populations of *lutrix* could be distinguished from those to the south (Boulenger's "vars." included geographical subspecies) he did not indicate the geographical range of the "variety". Bogert (1940) believed the name to be applicable to the Ethiopian populations only, referring specimens from Uganda to the subspecies *shiranum.* The latest commentator, Loveridge (1944), restricts *shiranum* to the highlands of southern Tanganyika Territory and Nyasaland and uses the name *abyssinica* to embrace all populations to the north.

It seems likely that Bogert's conception is nearer to the truth; Loveridge appears not to have seen any Ethiopian specimens. The few specimens available to the present writer from Ethiopian localities [Ashangi (Type), and Addis Alam (♂♀)] lack a loreal shield, whereas this shield is very commonly present (in 90 %, fide Loveridge) in the populations of Uganda and Kenya. When the loreal is absent in these latter the nasal shield is relatively much longer than in Ethiopian specimens. If this distinction is proved when adequate material becomes available the name to be applied to the populations of Uganda, Kenya, Ruanda, N.E. Congo and northern Tanganyika Territory would be *atriventris* Sternfeld (Type locality: Kisengi).

The species has not been recorded from Somaliland, but may be encountered in the better watered areas of the south and the mountainous west.

Dasypeltis Wagler

Dasypeltis scaber (Linn.)

Dasypeltis scaber var. *medici,* Mocquard, 1888, p. 131 (Somaliland).
Dasypeltis scaber, Boulenger, 1896 a, p. 553 (Shoa); Idem, 1896 c, p. 20 (between Comia and Matagoi); Idem, 1898 a, p. 720 (Lugh); Sternfeld, 1908b, p. 240 (between Irru and Chirru; Lake Haramaia); Boulenger, 1912, p. 332 (Addis Ababa); Lönn-

berg & Andersson, 1913, p. 4 (Kismayu); Scortecci, 1931, p. 208 (Vill. Duc. Abruzzi); Loveridge, 1936 b, p. 34 (Harar); Scortecci, 1939 b, p. 276 (Giobar; Belet Amin; Idem, 1943, p. 285 (El Dire).

B.M. 1949.2.2.1. ♂; Sc. 23; V. 197; C. 55. Haud, 46° E. × 8° 20′ N., 2100 ft. 20.4.32.
B.M. 1949.2.2.2. ♂; Sc. 24; V. 195; C. 62. Haud, 46° E. × 8° 20′ N., 2100 ft. 20.4.32.
B.M. 1949.2.2.3. ♀; Sc. 24; V. 211; C. 44. Haud, 46° E. × 8° 20′ N., 2100 ft. 1.5.32.
B.M. 1949.2.2.4. ♀; Sc. 24; V. 207; C. ?. Hargeisa Dist., 44° 05′ E. × 9° 35′ N., 4000 ft. 19.5.32.
B.M. 1949.2.2.5. ♂; Sc. 23; V. 218; C. 59. Ogo, 42° 50′ E. × 10° 10′ N., 4500 ft. 6.8.33.

In recent years it has become customary to use trinomials in reference to the Egg-eating snakes, but so ill-defined and little understood are the forms involved that the trinomial is at present meaningless and, possibly, confusing. The latest commentator (Loveridge, 1942, p. 283) proposes to recognise four "ecological races" in east and central Africa, but these have a geographical flavour and it seems very possible that there are two distinct, overlapping species each of which is tending to geographical race formation.

The British Somaliland series listed above "key" by the characters Loveridge used into the typical subspecies, as do other examples from southern Somaliland (Lugh) and southern Arabia (El Kubar). A short series from Ethiopia west of the Danakil depression contains individuals which by their colour are of the same form but others which are of the race *palmarum*.

Thelotornis A. Smith

Thelotornis kirtlandii kirtlandii (Hallowell)

Thelotornis kirtlandii, Lönnberg & Andersson, 1913, p. 4 (Kismayu); Scortecci, 1934, p. 70, fig. 30 (along the lower Juba); Idem, 1939 a, p. 159, figs. 88, 89 (along the lower Juba and near Mogadiscio); Idem, 1939 b, p. 283 (Belet Amin).
Thelotornis kirtlandii, Loveridge, 1944, p. 149 (Belet Amin; Kismayu; Mafi).

As indicated in the preceding records this snake is only to be found in the extreme south of Somalia. The race to which the population in this area is referred by Loveridge in his recent revision of the genus (1944) extends from Portuguese Guinea completely round the Rain Forest Province, but does not extend into the A.E. Sudan and Ethiopia.

Psammophis Boie

Synopsis of the Species

I. Mid-body scale rows 17—19.
  A. Sixth upper labial as long as the eye; normally 9 upper labials; subcaudals 143—178.
    (1) A median dorsal, but no lateral, dark stripe. Subcaudals 158—178.
    P. punctulatus punctulatus Dum. & Bibr.

(2) A mid-dorsal and lateral dark stripes. Subcaudals 143—163.
P. punctulatus trivirgatus Peters

B. Sixth upper labial shorter than the eye.

(1) Belly without a clearly marked dark line on each side.

(a) Normally 9 upper labials, four in front of the anterior subocular. Preocular normally in contact with the frontal. No transverse light bars on the head, but an uninterrupted dark streak through the eye. Subcaudals (Somaliland only) 88—97. *P. schokari* (Forskål)

(b) Normally 8 upper labials, three in front of the anterior subocular. Preocular normally separated from the frontal. Some transverse light bars on the head of which traces, at least, usually persist on the pre- and post-oculars. Subcaudals 107—121. *P. sibilans* (Linn.)

(2) Belly with a clearly marked black line on each side. Head colour as in *P. sibilans.*

(a) Normally nine upper labials, three in front of, and three entering, the eye. *P. subtaeniatus subtaeniatus* Peters

(b) Normally eight upper labials, three in front of, and two entering, the eye. *P. subtaeniatus sudanensis* Werner

II. Mid-body scale rows 15.

A. Normally three upper labials entering the eye. *P. biseriatus tanganicus* Loveridge

B. Normally only two upper labials entering the eye. *P. biseriatus biseriatus* Peters

III. Mid-body scale rows 13. *P. pulcher* Boulenger

Psammophis punctulatus Dum. & Bibr.

Psammophis punctulatus, Loveridge, 1940, pp. 19 and 21.

(a) *P. punctulatus punctulatus* Dum. & Bibr.

B.M. 1949.2.2.6. ♀; V. 184; C. 166. Guban, 42° 40′ E. × 10° 30′ N., 3500 ft. 20.3.33.
B.M. 1949.2.2.7. ♂; V. 188; C. ? . Guban, 42° 40′ E. × 10° 35′ N., 3000 ft. 4.11.33.
B.M. 1949.2.2.8. ♀; V. 182; C. 173. Guban, 42° 40′ E. × 10° 35′ N., 2500 ft. 25.4.34.
B.M. 1949.2.2.9. ♀; V. 185; C. ? . Guban, 42° 54′ E. × 10° 30′ N., 3500 ft. 6.7.33.
B.M. 1949.2.2.10. ♀; V. 192; C. ? . Guban, 42° 54′ E. × 10° 30′ N., 3500 ft. 6.7.33.
B.M. 1949.2.2.11. ♂; V. 184; C. ? . Guban, 42° 54′ E. × 10° 30′ N., 3500 ft. 12.7.33.
B.M. 1949.2.2.12. ♀; V. 185; C. ? . Guban, 42° 55′ E. × 10° 55′ N., 1500 ft. 11.6.34.

(b) *P. punctulatus trivirgatus* Peters.

B.M. 1949.2.2.93. ♀; V. ?; C. ?. Haud, 45° 34′ E. × 8° 29′ N., 2600 ft. 31.5.32.
B.M. 1949.2.2.94. ♀; V. 193; C. ?. Haud, 45° 50′ E. × 8° N., 2500 ft. 5.11.34.

Loveridge (loc. cit. supra), in his revisionary study of the genus, recognises two geographical races of this species and gives full bibliographic records of both. The forms are:

(a) *P. punctulatus punctulatus* Dum. & Bibr. possessing a median dark dorsal stripe, but no dorsolaterals, and with a range of subcaudals from 158 to 178. Specimens of this form have been recorded previously from:

A.E. Sudan: Butana, Kasala Prov.; Gebel Maya, lower Blue Nile.

Eritrea: Agordat; Barentu; Ghinda; Monte Dongallo; Saati; Tessenei.

Ethiopia: Gaare; Harrar es Saghir.

Arabia: very doubtful record.

(b) *P. punctulatus trivirgatus* Peters, characterised by a dorsolateral dark stripe on each side of the mid-dorsal and subcaudal range from 143 to 163. This form has been recorded from:

SOMALILAND: Nogal Valley; Ogaden; Belet Amin; Dolo; Lugh; Vill. Duc. Abruzzi.

KENYA COLONY: Athi River crossing; Guaso Nyiro; Kaliokwell; Lodwar; Loiyangallani; Mbolo Mt.; Teita.

UGANDA: Records doubtful.

TANGANYIKA TERRITORY: Arusha.

Loveridge makes two assumptions concerning the distribution of the species, viz.:

(a) That the distribution is continuous around the north of the Ethiopian mountains, but not round the south, and

(b) that the *trivirgatus* form extends throughout the Somali peninsula and into N.E. Ethiopia, meeting the typical form there.

The material now available suggests that these two assumptions may both be erroneous either wholly or in part. In the first place the specimens from the Lake Rudolf area recorded by Parker (1936, p. 608) are not all of the *trivirgatus* colouring (the subcaudal character cannot be used owing to the great frequency of damaged tails); one of them, a female from the Kaliokwell River, has the colour pattern of the northern subspecies. This suggests either that the area south of the Ethiopian mountains is one in which there is intergradation between the Sudan and Somalia, with individuals of both types, or that the single striped form may occur sporadically in populations otherwise of the three-striped form.

Again, the material from British Somaliland listed above is divisible (on colour pattern) into two groups corresponding with the two recognised subspecies. The first group (a) of seven specimens are all of the single striped, "typical" form; the other two have the *trivirgatus* pattern. There is an obvious geographical correlation, the first mentioned group being all from the north-western edge of the Guban in which no specimens with the other type of colouring were found, and the second group from south of the mountain chain, an area from which the *trivirgatus* colour only has been reported. The British Museum possesses examples with this colour pattern also from the Golis Mts. and near Berbera. There would appear to be no question of any age- or size-correlation with the colour pattern and the most probable explanation of the observed distributional phenomena would appear to be that the species has a distribution around the Ethiopian mountain mass both north and south of it, with differentiation to the north-east and south-west. In the south there may be intergradation in the Lake Rudolf area and in the north the north-western form extends into the coastal region of British Somaliland but appears not to cross the mountains into the Haud. There is, at present, no evidence of any intergradation in this area. This type of distribution with continuity to the south of the Ethiopian mountains but apparent geographical separation and no intergradation in the north in British Somaliland is very similar to that of *Eryx colubrinus* (q.v.).

Psammophis sibilans (Linn.) and **Psammophis schokari** (Forskål)

Psammophis sibilans sibilans and *P. sibilans schokari*, Loveridge, 1940, pp. 24 & 30.

Until 1940, *Psammophis sibilans* (Linn.) and *Psammophis schokari* (Forskål) were regarded as two distinct species, the former Ethiopian in distribution and the latter Saharo-Sindian, with a zone of overlap along the Nile valley and adjacent territories; in this zone of overlap the two were reported to be ecologically separated (e.g., Flower, 1933, pp. 823, 824). Loveridge in his review of the genus preferred to regard them as subspecies. He does not, however, regard the population of the zones of overlap as a zone of intergradation from one form to the other but continues to record individuals as either *sibilans* or *schokari*, and adduces no evidence that there is, in fact, intergradation; he makes a plea for a critical study of the records from within the area.

Somaliland lies at the south-eastern margin of the area of overlap and the small population-sample available to the author is listed in the table on page 71 in geographical, northwest to southeast order. Three characters said to be useful in distinguishing the forms have been investigated:

(a) THE PREOCULAR-FRONTAL RELATIONSHIP. The normal condition in *schokari* is for these shields to form a suture; in *sibilans* they are separated.

(b) THE LABIAL CONDITION. In *schokari* there are normally 9, four in front of the anterior subocular; in *sibilans* there are 8, with only three in front of the subocular.

(c) COLOUR PATTERN. In *sibilans* there are often light transverse bars on the top of the head, descending on to the loreal and temporal regions and even when they are almost obsolete traces persist on the pre- and post-oculars. In *schokari* there is almost always a dark lateral stripe along the loreal and temporal regions, passing through the eyes and *not* interrupted on the pre- and post-oculars.

Simple inspection of this table shows clearly that:

No.	Locality	Sex	*schokari*			*sibilans*			Subcaudals
			Preocular	Labials	Pattern	Preocular	Labials	Pattern	
	GUBAN AND COASTAL PLAIN								
1949.2.2.13	Guban, 43° 15′ E. × 11° 25′ N., 150 ft.	♂	+	+	+	.	.	.	96
1949.2.2.14	Guban, 43° 15′ E. × 11° 15′ N., 500 ft.	♂	+	+	+	.	.	.	?
1949.2.2.15	Guban, 43° 15′ E. × 11° 25′ N., 150 ft.	♂	+	+	+	.	.	.	97
1949.2.2.16	Guban, 42° 45′ E. × 10° 45′ N., 2000 ft.	♂	+	+	+	.	.	.	88
1949.2.2.17	Guban, 43° 05′ E. × 11° N., 1000 ft.	♂	+	.	+	+	+	.	93
1949.2.2.18	Guban, 42° 40′ E. × 10° 30′ N., 3500 ft.	♀	+	+	+	.	+	.	91
1949.2.2.19	Guban, 43° E. × 11° N., 1500 ft.	♀	+	.	+	.	+	.	96
1949.2.2.20	Guban, 43° 15′ E. × 10° 30′ N., 3000 ft.	♀	+	.	+	.	+	.	88
1931.7.20.398	Coastal Plain, 49° E. × 11° 5′ N., 600 ft.	♂	+	+	+	.	.	.	?
	MARITIME MOUNTAINS								
1949.2.2.21	Ogo, 43° E. × 10° N., 4500 ft.	♀	+	.	.	.	+	+	109
1949.2.2.22	Ogo, 43° E. × 9° 55′ N., 6000 ft.	♂	+	.	.	.	+	+	110++
95.7.17.24	Inland from Berbera	♂	.	.	.	+	+	+	?
99.5.30.7	Golis Mts.	♀	.	.	.	+	+	+	107
99.5.30.6	Golis Mts.	♀	+	+	+	.	+	.	?
1905.11.7.53	Wagar Range, 3—4000 ft.	♀	.	.	.	+	+	+	108
1905.11.7.54	Wagar Range, 3—4000 ft.	♂	.	.	.	+	+	+	111
1905.10.28.131	Near Berbera	♂	.	.	.	+	+	+	?
1905.10.30.128	Near Berbera	♂	.	.	.	+	+	+	109
1905.10.30.129	Near Berbera	♀	.	.	.	+	+	+	111
1905.10.30.130	Near Berbera	♀	.	.	.	+	+	+	113
1931.10.2.1	Sheikh, Golis Mts., 4800 ft.	♂	.	.	.	+	+	+	?
	HAUD								
1949.2.2.23	46° 10′ E. × 8° 15′ N., 2200 ft.	♀	+	.	.	.	+	+	112
1949.2.2.24	46° E. × 8° 20′ N., 2100 ft.	♂	+	.	.	.	+	+	104+
	SORL HAUD								
1931.7.20.397	48° 46′ E. × 10° 13′ N., 3100 ft.	♂	.	+	+	+	.	.	118

(1) In this area there exist individuals that combine the characters of the two forms under discussion.

(2) Although there are eight possible permutations and combinations of the three characters used, they are not all represented and, of those that are represented, two predominate. These two correspond with normal *schokari* and *sibilans*.

3) There is eco-geographical segregation of these two main types. The population of the very dry Guban is almost exclusively *schokari*; in the maritime mountain chain it is equally predominantly *sibilans* [1]).

In attempting to assess the meaning of these observations it is first necessary to determine whether the "intermediate" individuals are more numerous in the Somali population than in areas where there is unlikely to be intergradation or hybridisation. For this purpose samples of comparable size from Rhodesia (= *sibilans*) and from southern Arabia (= *schokari*) have been analysed in respect of the same three characters. The percentage frequency of appearance of the "wrong" character of those selected, is as follows:

	aberrant
A. S. ARABIA: *schokari*: 25 specimens	
Colour	0 %
Preoculars	4 %
Labials	10 %
B. RHODESIA: *sibilans*: 20 specimens	
Colour	0 %
Preoculars	5 %
Labials	0 %

Colour is the only character showing no aberration in either case and assuming the same to hold good in Somaliland the aberrations in the other two characters are:

	aberrant
C. SOMALILAND: *schokari:* 11 specimens	
Preoculars	14 %
Labials	36 %
sibilans: 13 specimens	
Preoculars	31 %
Labials	0 %

Clearly, therefore, there is a higher proportion of "intermediates" in the area under consideration. The fact that the intermediates are not uniformly

1) Specimen 99.5.30.6 from the Golis Mts. could have been collected in the foothills on the coastal plain; it is mainly *schokari* but has been left in the Maritime Mountain section of the table deliberately to avoid any suspicion of prejudging the position.

distributed through the whole potential range of variation militates against the probability of the Somali population being just a straightforward intermediate one between two geographical subspecies, and this is supported by the ecological evidence. It appears, therefore, that we may have to do with either

(a) Two overlapping species which hybridise in the area of overlap; the reduced viability of the hybrids will keep their numbers low in relation to the number of fully fertile non-hybrids, or

(b) Two subspecies prevented from free intermixture by differing ecological preferences, or

(c) Two non-genetic ecotypes.

Breeding experiments would readily produce direct evidence as to which of these alternatives is the correct one, but in the absence of any such information the taxonomist can only attempt to assess the probabilities. In this connexion some indications may be found in another difference — that of the numbers of subcaudals. For *P. schokari*, as a whole, the caudal range is higher (93-149, fide Loveridge) than in *P. sibilans* (78-121). Yet in Somaliland the reverse is the case; in the Guban population, predominantly *schokari*, it is 88 to 97 (mean 92.7) whereas in the Maritime Mountains, predominantly *sibilans*, it is 107 to 113 (mean 109.7). So far as *sibilans* is concerned the mean of the Somali specimens is not greatly different from the average of the species as a whole; the mean of the Somali *schokari* is below the previously recorded minimum for the form.

So many differences in different morphological characters which are not likely to be interdependent and which appear to bear no direct relationship to the ecological differences render the ecotype explanation the least probable.

The subspecific interpretation, too, demands a complex set of circumstances. Consider the subcaudal difference. It seems that within the range of *schokari* there are geographical races (insufficiently defined to demand taxonomic recognition), distinguished by differences in the number of subcaudals. For example:

		Range	Mean
Arabia	(13 counts [1])	109-152	133
Lower Egypt	(16 counts)	110-124	115
A.E. Sudan	(5 counts)	94-105	100
Somaliland	(7 counts)	88-97	92.7

1) So many specimens have almost imperceptibly damaged tails that records in literature, where this character was not under critical examination, are not thoroughly trustworthy.

The Somali population is characterised by the lowest counts in this geographical series, and it appears that *the more deeply schokari penetrates into the territory of sibilans the more differentiated from the latter it becomes* in this character. Such a condition is the exact opposite of the expectation if the two forms were subspecies and the geographical area common to the two forms was an area of intergradation. Any subspecific interpretation would have to be based on the assumption of something in the nature of a linear cline following an irregular course (around the Sahara) and crossing itself in the region from the A.E. Sudan and Somaliland to Lower Egypt; there could be continuity and free interbreeding along the line but the two terms in the cline where the lines cross, having a measure of ecological segregation, might fail to interbreed freely. Phenomena such as this have been recorded, as for instance in the Rodent *Peromyscus* (Mayr, 1942, p. 184) but they must be infrequent and in the instance under discussion there is no evidence to back up the idea. The simplest explanation appears to be that of two distinct species, a northern Saharo-Sindian one adapted essentially to dry conditions and a southern Savannah species with a preference for moister conditions. Spread of the latter northwards down the Nile and of the former southwards through Egypt to Eritrea and Somaliland, would, assuming occasional hybridisation, account for all the facts at present known. The penetration of a Saharo-Sindian form into the Guban district of Somaliland is a relatively common feature noted many times elsewhere in this paper.

Psammophis biseriatus tanganicus Loveridge

Psammophis biseriatus tanganicus Loveridge, 1940, p. 57.

B.M. 1949.2.2.25. ♂; V. 152; C. 115 + 1; Suboc. 3. Guban, 42° 54′ E. × 10° 45′ N., 2000 ft.

B.M. 1949.2.2.26. ♂; V. 150; C. 103 + n; Suboc. 3. Guban, 42° 54′ E. × 10° 45′ N., 2000 ft.

B.M. 1949.2.2.27. ♀; V. 158; C. 99 + n; Suboc. 3. Ogo-Guban, 42° 50′ E. × 10° 20′ N., 3500 ft.

B.M. 1949.2.2.28. ♀; V. 160; C. 106 + 1; Suboc. 3. Ogo-Guban, 42° 50′ E. × 10° 20′ N., 3000 ft.

B.M. 1949.2.2.29. ♂; V. 156; C. ?; Suboc. 3. Ogo-Guban, 42° 50′ E. × 10° 20′ N., 3500 ft.

B.M. 1949.2.2.30. ♀; V. 161; C. 99 + n; Suboc. 3. Ogo, 42° 50′ E. × 10° 10′ N., 4000 ft.

B.M. 1949.2.2.31. ♂; V. 148; C. 64 + n; Suboc. 3. Ogo, 42° 50′ E. × 10° 10′ N., 5000 ft.

B.M. 1949.2.2.32. ♂; V. 151; C. 100 + 1; Suboc. 3. Ogo, 42° 50′ E. × 10° 10′ N., 5000 ft.

B.M. 1949.2.2.33. ♀; V. 155; C. 74 + n; Suboc. 3. Ogo, 43° E. × 10° 05′ N., 5000 ft.

B.M. 1949.2.2.34. ♀; V. 160; C. ?; Suboc. 3. Ogo, 43° E. × 10° 05′ N., 5000 ft.
B.M. 1949.2.2.35. ♂; V. 148; C. 100 + 1; Suboc. 3. Ogo, 43° E. × 10° 05′ N., 5000 ft.
B.M. 1949.2.2.36. ♂; V. 153; C. 105 + n; Suboc. 3. Borama Distr., 43° 05′ E. × 9° 55′ N., 4500 ft.
B.M. 1949.2.2.37. ♂; V. 158; C. ?; Suboc. 3 2. Borama Distr., 43° 05′ E. × 9° 55′ N., 4500 ft.
B.M. 1949.2.2.38. ♀; V. 157; C. 99 + n; Suboc. 2 3. Borama Distr., 43° 10′ × 9° 55′ N., 5500 ft.
B.M. 1949.2.2.39. ♂; V. 153; C. 97 + n; Suboc. 3. Borama Distr., 43° 10′ E. × 10° 10′ N., 5000 ft.
B.M. 1949.2.2.40. ♂; V. 150; C. ?; Suboc. 3. Borama Distr., 43° 10′ E. × 9° 55′ N., 4500 ft.
B.M. 1949.2.2.41. ♂; V 156; C. 106 + 1; Suboc. 3. Borama Distr., 43° 30′ E. × 9° 30′ N., 5000ft.
B.M. 1949.2.2.42. ♀; V. 165; C. 101 + n; Suboc. 3. Burao (Haud), 3500 ft.
B.M. 1949.2.2.43. ♂; V. 143; C. 100 + n; Suboc. 2. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.44. ♀; V. 160; C. 110 + 1; Suboc. 3. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.45. ♂; V. 157; C. 110 + 1; Suboc. 3. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.46. ♂; V. 152; C. 119 + 1; Suboc. 3. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.47. ♂; V. 166; C. 116 + 1; Suboc. 3. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.48. ♂; V. 159; C. 115 + 1; Suboc. 3. Bohodle (Haud), 2100 ft.
B.M. 1949.2.2.49. ♀; V. 164; C. 106 + n; Suboc. 3. Milmil, 43° 40′ E. × 8° 10′ N., 3000 ft.
B.M. 1949.2.2.50. ♂; V. 152; C. ?; Suboc. 3. Daggah Bur, 43° 30′ E. × 8° 13′ N., 3500 ft.
B.M. 1949.2.2.51. ♂; V. 152; C. 108 + 1; Suboc. 2 3. Haud, 44° 54′ E. × 8° 42′ N., 3300 ft.
B.M. 1949.2.2.52. ♀; V. 162; C. 103 + 1; Suboc. 3. Harradigit, 44° 25′ E. × 7° 45′ N., 3000 ft.
B.M. 1949.2.2.53. ?; V. ?; C. ?; Suboc. 3. Ado, 45° 15′ E. × 7° 20′ N., 2100 ft.
B.M. 1949.2.2.54. ♂; V. 163; C. 73 + n; Suboc. 2/3. Ado, 45° 15′ E. × 7° 20′ N., 2100 ft.

This snake, which is arboreal in habits, occurs throughout the north of Somaliland where suitable scrub exists, without any sign of local differentiation. The subspecies ranges, according to Loveridge (1940, p. 57), from Libya through the A.E. Sudan, southwards through Uganda to central Tanganyika Territory and eastwards to Ethiopia, and Somaliland north of the Nogal Valley. It is replaced in Somaliland south of the Nogal Valley, Kenya and N.E. Tanganyika Territory by the typical subspecies, the line of demarcation between the two being, in the north, "along the border between Ethiopia and Italian Somaliland". The foregoing series, however, indicates that *tanganicus* extends well into the Ogaden without any appreciable increase in the percentage of individuals with the typical number of suboculars; and it is clear from the localities cited by Loveridge that the boundary between the two, or rather the transitional zone, must lie considerably further to the east.

Psammophis biseriatus biseriatus Peters

Psammophis biseriatus biseriatus, Loveridge, 1940, p. 60.

As indicated above this subspecies replaces the preceding in the south-eastern parts of the peninsula. Full citations and localities are given in the revisionary work cited.

Psammophis subtaeniatus sudanensis Werner

Psammophis subtaeniatus sudanensis, Loveridge, 1940, p. 50.

This snake has twice been recorded from the Somali area, once (Calabresi, 1918, p. 124), from the left bank of the Juba River, and once from Bodessa, Sidamo country (Scortecci, 1939 a, p. 150). The first of these is rejected by Loveridge as doubtful. There is some doubt about the status of the species in relation to *Psammophis sibilans* (see Loveridge, loc. cit. supra) but the latest reviser's views are accepted at least until more evidence is forthcoming. The subspecies *sudanensis* ranges from the A.E. Sudan through Ethiopia, Uganda, N. Kenya Colony, Tanganyika Territory to Nayasaland and Mozambique where it meets the typical subspecies that ranges westward to Angola and S.W. Africa.

Psammophis pulcher Boulenger

Psammophis pulcher, Boulenger, 1895 c, Proc. zool. Soc. London, p. 537, P. XXX fig. 3 (Type locality: Webi Shebeli at approximately 42° 12′ E. × 7° 11′ N.); Loveridge, 1940, p. 67.

This apparently very distinct species is still known only from the unique holotype. Relevant references are given in the revisionary study of Loveridge. It appears to be an inhabitant of bush country with high temperatures and high rainfall.

Dispholidus Duvernoy

Dispholidus typus (A. Smith)

Bucephalus typus, Boettger, 1893, p. 120 (Warandab and Dugubleh).
Dispholidus typus, Boulenger, 1896c, p. 21 (between Komia and Madagoi); Idem, 1898 a, p. 721 (between Badditu and Dimé); Lönnberg and Andersson, 1913, p. 5 (Kismayu); Scortecci, 1939 b, p. 284 (Belet Amin); Idem, 1939 a, p. 161, figs. 90-92; Idem, 1940, p. 15 (Arero; Moyale).
Dispholidus typicus (err. typ.) Boulenger, 1896 d, p. 216 (Sheikh Hussein).

B.M. 1949.2.2.55. ♀; Sc. 19; V. 182; C. 91 + 1. Hargeisa, 4100 ft.

This is the first record of this widespread, arboreal snake from the British Protectorate. In Somaliland generally it is distributed wherever its essential requirements, trees, are found. In spite of an enormous geographical range, from the Cape Province to the A.E. Sudan and Eritrea westward to Senegal (except the continuous Rain Forest), no subspecific differentiation has been found.

Rhamphiophis Peters

SYNOPSIS OF THE SPECIES

I. Scales in 19 rows at mid-body. Ventrals 211—241. Subcaudals 130—160. *R. rubropunctatus* (Fischer)

II. Scales in 17 rows at mid-body. Ventrals 148—192. Subcaudals 90—125. *R. rostratus* Peters

Rhamphiophis rubropunctatus (Fischer)

Rhamphiophis rubropunctatus, Sternfeld, 1908 b, p. 240 (Metaker, Ennia District, 41° 40′ E. × 8° 30′ N. approx.); Scortecci, 1929, p. 278 (Kismayu); Idem, 1934, p. 64; Idem, 1939 a, p. 135, figs. 73, 74; Idem, 1939 b, p. 280 (Vill. Duc. Abruzzi; Belet Amin); Idem, 1943, p. 286 (Gondaraba).

B.M. 1949.2.2.56. ♂; V. 240 approx.; C. 123 +n. Haud, 45° 9′ E. × 8° 37′ N., 3050 ft. 2.7.32.

This species ranges from the Tanganyika Territory — Kenya Colony border in the coastal zone (Voi, Tanga, Arusha, Kilimandjaro) to the southern part of the A.E. Sudan and north on the east of the Rift Valley to the Haud; it has not been recorded from Uganda.

Rhamphiophis rostratus Peters

Rhamphiophis oxyrhynchus (non Reinhardt) Boulenger, 1895 c, p. 539 (Booree, Arussi Country); Idem, 1896 b, p. 12 (Rufa, Web Valley); Idem, 1896 c, p. 21 (Lugh); Idem, 1896 d, p. 216 (Lake Rudolf); Idem, 1898 a, p. 721 (Lugh); Sternfeld, 1908 b, pp. 240, 241 (Gunda Kore, 42° 06′ E. × 9° 10′ N.; Gumboworen, between Zeila and Jaldessa; Dadab, 43° 15′ E. × 11° N.); Boulenger, 1909 c, p. 311 (Bardera); Idem, 1912, p. 332 (Dolo); Calabresi, 1927, p. 32 (between Obbia and Magangib; Biomal); Scortecci, 1929, p. 277 (Kismayu).

Rhamphiophis rostratus, Parker, 1932, p. 221 (Kaliokwell River); Scortecci, 1934, p. 65, fig. 27; Parker, 1936, p. 606 (British Somaliland); Scortecci, 1939 a, p. 137, fig. 75; Idem, 1940, p. 12 (Arero; Mogadiscio).

B.M. 1949.2.2.57. Skin ♀; V. 189; C. 121 + 1. Haud, 45° 43′ E. × 8° 26′ N., 2350 ft. 18.5.32.

B.M. 1949.2.2.58. Skin ♂; V. 186; C. 124 + 1. Haud, 45° 34′ E. × 8° 29′ N., 2500 ft. 31.5.32.

B.M. 1949.2.2.59. ♂; V. 176; C. 120 + n. Haud, 45° 50′ E. × 8° N., 2500 ft. 26.11.34.

B.M. 1949.2.2.60. ♂; V. 181; C. 121 + 1. Haud, 45° 50′ E. × 8° N., 2500 ft. 26.11.34.

B.M. 1924.5.8.1. ♂; V. 169; C. ?. Near Berbera.

The above series is that mentioned by the author (Parker, 1936, p. 606) in a survey of the geographical variation of the species. In this survey an error was made in the sex of one specimen, but this does not invalidate the conclusion that in Somaliland, the extreme northern range of the species, the subcaudal count is higher than elsewhere. There is evidently geographical variation, but the available material is insufficient to indicate whether it is anywhere discontinuous; it appears to be in the nature of a regular cline from north to south thus:

British Somaliland	(5)	121-124
Lake Rudolf area	(4)	115-118
S. Kenya and Tang. Territory	(9)	94-110
Nyasaland	(4)	92-100

The taxonomic recognition of any of these populations by a distinctive subspecific name appears to be at present unwarrantable. Loveridge (1942, p. 290) has, however, proposed to reduce the East African *rostratus* to the status of a geographical race of the West African *R. oxyrhynchus* Reinhardt "in view of Pitman's finding" both forms in Uganda. Such an action seems to be at least premature since there is not the slightest evidence of any intergradation in Uganda. Geographical overlap without intergradation may, of course, occur between subspecies when there are ecological or other non-genetic factors segregating the two and preventing crossing, but is more commonly found as a result of interspecific sterility.

In Somaliland, as in other areas, this snake frequents sandy, thorn bush areas.

Hemirhagerrhis Boettger

SYNOPSIS OF THE SPECIES

I. Mid-dorsal stripe with straight edge; lateral stripe present. Venter with 3 stripes each of which is incompletely longitudinally divided. Ventral scales 148-157. Pupil vertically oval. *H. kelleri* Boettger

II. Mid-dorsal stripe with festooned edges (composed of a series of transverse spots). Lateral stripe often absent or composed of rows of spots. Venter without regular stripes. Ventral scales 154-187. Pupil round. *H. nototaenia* (Günther)

Hemirhagerrhis kelleri Boettger

Hemirhagerrhis kelleri Boettger, 1893, Zool. Anz., vol. 16, p. 119 (Type localities: Webi Valley; Abdallah; Ogaden); Boulenger, 1895 c, p. 537 (Sunderarler, Upper Webi Valley); Idem, 1896 b, p. 12 (Dabanac; Ogaden); Idem, 1896 e, p. 119; Idem, 1912, p. 332 (Dolo; Rahanuin Country); Lönnberg & Andersson, 1913, p. 4 (Kismayu); Calabresi, 1927, p. 32 (Wardavel); Scortecci, 1929, p. 277 (Kismayu; Afmadu); Idem, 1931, p. 210 (Vill. Duc. Abruzzi); Idem, 1934, p. 77, fig. 34; Loveridge, 1936a, p. 260; Scortecci, 1939 a, p. 123, figs. 65, 66; Idem, 1939 b, p. 279 (Belet Amin).

B.M. 1949.2.2.62. ♀ juv.; V. 151; C. 55 + n. Haud, 46° E. × 8° 20′ N., 2100 ft.

This species has not previously been found in the British Protectorate, but as the preceding citations indicate it is widely distributed south and east of the Ethiopian mountains to the coastlands of Kenya Colony as far south as Mombasa. An unfortunate miscount of specimen "b" of Boulenger's Catalogue (1896 e, p. 119) has led to the ventral range of the species being constantly exaggerated in descriptions; the specimen, reported to have 173 ventrals has, in fact, only 155 and in sixteen published records or specimens consulted by the author the range appears to be from 148 to 157. This scarcely overlaps the range of the only other species in the genus, *H. nototaenia,* of which individuals may closely resemble *H. kelleri* in colour and other characters.

Hemirhagerrhis nototaenia (Günther)

Amplorhinus nototaenia, Boulenger, 1895 c, p. 537 (Western Somaliland); Idem, 1896 b, p. 12 (between Lugh and Bardera; Dolo; Meddo-Erelle); Idem, 1896 c, p. 21 (Brava; Lugh; Web; Pozzi Meddo-Erelle); Idem, 1898 a, p. 721 (between Sancurar and Amarr).

Anoplorhinus nototaenia (err. typ.), Boulenger, 1912, p. 332 (Dolo; Rahanuin Country).

Amplorhinus nototaenia, Loveridge, 1916, p. 85 (Kismayu); Scortecci, 1929, p. 277 (Kismayu); Idem, 1934, p. 66, fig. 28; Idem, 1939 a, p. 125, figs. 67, 68.

Hemirhagerrhis nototaenia nototaenia, Bogert, 1940, p. 73.

B M. 1949.2.2.63. ♀ juv.; V. 167; C. 93 + 1. Ado, Ogaden, 45° 15′ E. × 7° 20′ N., 2100 ft.

B.M. 1949.2.2.64. ♂ juv.; V. 166; C. 95 + 1. Harradigit, Ogaden, 44° 25′ E. × 7° 45′ N., 3000 ft.

These two specimens are the most northerly records of this species which in Somaliland has a range similar to *H. kelleri,* but which extends outside the peninsula, from the A.E. Sudan southwards to Nyasaland, Mozambique and Northern Rhodesia; it is represented in Angola by a recognisably different form which Bogert (tom. cit., p. 75) regards as a subspecies, *H. n. viperinus* Bocage.

Cerastes Laurenti

Cerastes tritaeniatus multisquamis Loveridge

Trimerorhinus tritaeniatus (Günther), Sternfeld, 1908 b, p. 240 (Addis Ababa; Didda, 39° 40′ E. × 8° N. approx.); Boulenger, 1912, p. 332 (Addis Ababa).

Trimerorhinus tritaeniatus multisquamis Loveridge, 1932, Proc. Biol. Soc. Washington, vol. 45, p. 84 (Type locality: Nairobi); Loveridge, 1936 b, p. 36 (Allata, 38° 30′ E. × 6° 33′ N.; Webi Shebeli); Scortecci, 1939 a, p. 128, figs. 69, 70.

Cerastes tritaeniatus multisquamis Bogert, 1940, p. 78 (Addis Ababa; Albasso Plateau, 39° 30′ E. × 7° 50′ N.).

The Schaapsteeker, which ranges from the Cape Province to Ethiopia, shows a south to north increase in ventral count. Loveridge believing that the increase is discontinuous, with a break in the region of central Tanganyika, has proposed the name *multisquamis* for the northern form.

The species is a mountain form and, in the Somali Peninsula, has only been recorded from the highlands bordering the Rift Valley.

Micrelaps Boettger

In his 1940 study of the African snake genera, Bogert (p. 12) places this genus with *Xenocalamus, Chilorhinophis* and *Macrelaps,* all opisthoglyphous genera lacking hypapophyses on the posterior vertebrae and having undivided hemipenes in which the sulcus spermaticus is also undivided. De Witte and Laurent (1947, pp. 10 & 18) also place it with *Macrelaps* and *Xenocalamus.* Examination of the hemipenes of *Micrelaps muelleri* Boettger, the type-species, and of *M. boettgeri* Boulenger, shows, however, that the organ is very deeply bifurcated and the sulcus spermaticus correspondingly divided. The genus, therefore, falls into the same group as *Aparallactus, Miodon, Calamelaps* and *Rhinocalamus* in Bogert's system. The last three of these genera have the penis only very slightly bifurcate, the arms being less than one fourth of the length of the proximal undivided portion, and in *Aparallactus* also (*A. concolor* examined) the arms are relatively short, about one third of the basal part. In *Micrelaps,* however, bifurcation takes place at about the middle of the organ. If, therefore, Bogert is correct in regarding the deeply bifurcate condition as the primitive one from which the type with the unforked sulcus has been derived on many occasions, then *Micrelaps* must be regarded as the most primitive genus of the group in so far as that character is concerned. In its reduced dentition and the degree of the reduction of the head-shields it is clearly less primitive than *Aparallactus* and most nearly comparable with *Calamelaps.*

SYNOPSIS OF THE SPECIES

I. Prefrontals nearly twice as long as the nasal. Ventral scales 171.
M. vaillanti (Mocquard)

II. Prefrontal not more than 1.25 times the length of the nasal. Ventral scales 200-245.
M. boettgeri Boulenger

Micrelaps vaillanti (Mocquard)

Elapsoschema vaillanti Mocquard, 1888, Mem. Soc. philom. Paris, p. 123, Pl. 12 fig. 1 (Type locality: Somaliland).

Micrelaps vaillanti Boulenger, 1896 e, p. 249; Lepri, 1911, p. 326 (near Mogadiscio); Scortecci, 1934, p. 76; Idem, 1939 a, p. 166; de Witte & Laurent, 1947, p. 20, figs. 6-8.

In his 1934 paper Scortecci states that, in addition to a specimen without precise locality (presumably the type), the species has also been found near Mogadiscio (presumably Lepri's record); but the range of the ventral scales he mentions, 171-203, clearly includes the type of *boettgeri,* which was first reported under the name *vaillanti.* In his later (1939 a) paper, as ventral range of the species he gives the figure 171 only, which was that of the type; the ventral count of Lepri's specimen has not been recorded.

Micrelaps boettgeri Boulenger

Calamelaps vaillanti (non Mocquard) Boettger, 1893, p. 117 (Abdallah, north of the Webi Valley).
Micrelaps vaillanti (partim) Boulenger, 1896 e, p. 249.
Micrelaps boettgeri Boulenger, 1896 c, Ann. Mus. Stor. nat. Genova (2), vol. 17, p. 13 (Type locality: Dolo); Calabresi, 1918, p. 124 (Gilebi Margherita); Scortecci, 1929, p. 278 (Vill. Duc. Abruzzi); Idem, 1931, p. 210 (Mogadiscio); Idem, 1934, p. 77, fig. 33; Idem, 1939 a, p. 167, figs. 93, 94, 95; Idem, 1939 b, p. 284 (Balad; Belet Amin); de Witte and Laurent, 1947, p. 21, figs. 9-10.
Micrelaps nigriceps Sternfeld, 1910, Mitt. zool. Mus. Berlin, vol. 5, p. 69 (Type locality: Abd el Kadr, South of Harar).

B.M. 1949.2.2.65. ♂; V. 207; C. 26 + 1. Ogo, 43° E. × 10° 05′ N., 5000 ft.
B.M. 1949.2.2.66. ♀; V. 200; C. 27 + 1. Ogo, 43° 10′ E. × 9° 55′ N., 6000 ft.
B.M. 1949.2.2.67. ♂; V. ?; C. 29 + 1. Haud, 45° 29′ E. × 8° 30′ N., 2700 ft.

These specimens are the most northerly recorded hitherto though not far distant from the type locality of *nigriceps* and the specimen recorded by Boettger. They agree closely with the existing descriptions except that the first mentioned is almost uniform dark brown above and beneath. The species appears to range southwards and eastwards from the mountains of the Ogo to the south bank of the Juba river; Scortecci (1939 a, p. 167) states that it also occurs in Uganda, but Pitman makes no mention of the species and the record has not been traced.

Brachyophis Mocquard

SYNOPSIS OF THE SPECIES

I. Upper surface yellowish-white with reddish brown transverse bars. Ventral scales yellowish white, broadly edged with brown in front. *B. revoili revoili* Mocquard
II. Upper surface white, uniform or the scales slightly edged with black or with narrow transverse lines. Head with a blackish spot. Lower surfaces uniform black or very dark red-brown. *B. revoili corni* Scortecci

Brachyophis revoili revoili Mocquard

Brachyophis revoili Mocquard, 1888, Mem. Cent. Soc. philom. Paris, p. 125 (Type locality: Somaliland); Boulenger, 1896 e, p. 254 (Somaliland); Sordelli, 1908, p. 21 (Benadir); Lönnberg & Andersson, 1913, p. 5 (Kismayu); Calabresi, 1927, p. 33 (Mahaddei Region); Scortecci, 1932 c, p. 46 (Yemen); Idem, 1934, p. 72, fig. 31 (Benadir & Trans-Juba); Idem, 1939 a, p. 170, figs. 96, 97, 98 (Benadir, especially the coastal and lowland regions; Kismayu); Idem, 1939 b, p. 285 (Afgoi; Mahaddei Wein; Mogadiscio); de Witte & Laurent, 1947, p. 95, figs. 103-105.

The reputed occurrence of this snake in the Yemen constitutes a very remarkable instance of discontinuous distribution and seems to call for further investigation. The typical subspecies of *B. revoili* is otherwise known only from the coastal and lowland areas of the south-east of the Somali region and the adjacent territory to the west of the Juba River, being replaced to the north by the race *corni,* which has a very limited geographical distribution. This is paralleled by conditions in the *Tarbophis dhara* complex (see below) where the form found in southern Somaliland also appears to be similar to that in S. Arabia, with a more differentiated form in between.

Brachyophis revoili corni Scortecci

Brachyophis revoili (part) Calabresi, 1927, p. 33 (between Durgale and Magghiole).
Brachyophis revoili corni Scortecci, 1932 a, Atti Soc. ital. Sci. nat., vol. 71, p. 267 (Type localities: between Durgale and Magghiole; near Obbia; Obbia); Idem, 1934, p. 74 (region between Obbia and Mereg); Idem, 1939 a, p. 172 (Sultanate of Obbia and region of Mereg); de Witte & Laurent, 1947, p. 96.

This colour variety, as indicated, has apparently a very restricted distribution on the northern edge of the Somaliland range of the species.

Aparallactus A. Smith

SYNOPSIS OF THE SPECIES

I. Two postoculars; temporals separating the labials from the parietals. *A. jacksoni* (Günther)
II. A single postocular; labials and parietals in contact behind the postocular. *A. lunulatus* (Peters)

Aparallactus jacksoni (Günther)

Aparallactus jacksoni, Boulenger, 1898 a, p. 721 (between Dime and Lake Rudolf).

This species, otherwise confined to the dry uplands of Kenya Colony and Tanganyika Territory, has been recorded once on the periphery of, but outside, the area under discussion.

Aparallactus lunulatus scorteccii nom. nov.

Aparallactus concolor boulengeri (non Werner) Scortecci, 1931, Atti Soc. ital. Sci. nat., vol. 70, p. 12 (Type localities: Mogadiscio and Vill. Duc. Abruzzi).
Aparallactus concolor, Loveridge, 1944, p. 192.
Aparallactus lunulatus, de Witte and Laurent, 1947, p. 110, figs. 117-119.

In the two recent revisions of the genus *Aparallactus* cited above (in which will be found all references to records from Somaliland) there is some disagreement. The later revisers' concept is of a single species with a circum-Rain Forest distribution in which 5 ill-defined geographical races can be distinguished, viz.:

(1) MOZAMBIQUE, NYASALAND, S. TANGANYIKA TERRITORY.

Nasal constantly in contact with the preocular; a dark bar across the occiput, followed by one or more less distinct ones on the anterior part of the dorsum. Ventrals 151-168. *A. l. lunulatus* (Peters).

(2) "EAST AFRICA" (i.e., N. Tang. Territory, Kenya Colony).

Nasal generally separated from the preocular; uniform dark brown. Ventrals 143-158. *A. l. concolor* (Fischer).

(3) SOMALILAND, ETHIOPIA, ERITREA.

Nasal frequently in contact with the preocular; uniform dark brown. Ventrals 140-173. *A. l.* subsp.

(4) N. CONGO, UGANDA (? A.E. Sudan).

Nasal in contact with, or separated from the preocular (50 % of each); a black collar. Size smaller. *A. l. nigrocollaris* Chabanaud.

(5) NIGERIA TO TOGO.

Nasal in contact with the preocular. A black nuchal collar and seven mid-dorsal scales with dark spots. Ventrals 170-174. *A. l. liddiardae* Parker.

Loveridge, on the other hand, believed *nigrocollaris* to be a synonym of the not very closely allied species *modestus*. If this were true then the complex regarded by de Witte and Laurent as a single species had the appearance of discontinuous distribution and *A. liddiardae* was treated as a distinct species apparently widely separated geographically from the *lunulatus-concolor* group. The latter were regarded as two species, a northern *concolor* with an ill-defined race in Somaliland, Eritrea and Ethiopia, and a southern *lunulatus*.

No material is available to the present writer which throws any light on the status of *nigrocollaris* and the western part of the complex, but the series listed on page 84 indicates that in all probability the eastern group is a single species with some geographical variation.

From this table it appears that the "*lunulatus*" naso-preocular condition (in contact) is more prevalent in the north and the south of the total geographical range, with the "*concolor*" condition (separated) more prevalent in the centre. So far as colour is concerned the "*lunulatus*" type, with a black nuchal collar, occurs sporadically throughout the area but in the north and centre at least is not common; it may be more common in the south. The numbers of ventrals and subcaudals appear to be constant throughout the area; sex differences are shown by the former but not the latter. Summarised the position is:

Locality	Sex	Length mm	Ventrals	Caudals	Preocular-nasal		Colour	
					contact	no contact	*lunulatus*	*concolor*
SOMALILAND								
Bohodle (Haud), 2100 ft.	♂	370	153	51	+	.	.	+
Bohodle (Haud), 2100 ft.	♂	300	149	47	.	+	.	+
Ogo, 43° E. × 10° N., 4500 ft.	♂	320	147	57	+	.	.	+
Ogo, 43° E. × 10° N., 4500 ft.	♂	170	140	58	+	.	+	.
Ogo, 42° 50′ E. × 10° 10′ N., 4500 ft.	♂	365	151	68	+	.	.	+
Ogo, 42° 50′ E. × 10° 20′ N., 3500 ft.	♂	340	159	59	+	.	.	+
Ogo, 43° 10′ E. × 9° 55′ N., 4500 ft.	♂	170	142	?	+	.	.	+
Ogo, 43° 10′ E. × 9° 55′ N., 5000 ft.	♂	130	?	61	+	.	.	+
Bohodle (Haud), 2100 ft.	♀	375	172	44	.	+	.	+
Ogo, 43° E. × 10° 5′ N., 5500 ft.	♀	420	166	58	+	.	.	+
Ogo, 42° 50′ E. × 10° 10′ N., 4500 ft.	♀	440	165	63	+	.	.	+
Ogo, 43° E. × 10° N., 4500 ft.	♀	185	168	56	+	.	+	+
ETHIOPIA								
Waramalka (Nr. Awash)	♀	375	166	50	+	.	.	+
Boran Country	♀	460	158	71	.	+	.	+
A.E. SUDAN, N. UGANDA, LAKE RUDOLF REGION								
Lado, A.E. Sudan	♀	335	152	55	.	+	.	+
Lodwar, N.W. Kenya	♀[1]	110+	158	?	.	+	.	+
Turkana, N.W. Kenya	♀	300	158	62	+	.	.	+
Rom Mt., N. Uganda	♂	255	146	?	.	+	+	.
S. KENYA, TANGANYIKA TERRITORY, NYASALAND								
Fort Hall	♂	320	150	52	+	.	+	.
Voi	♂	110+	145	?	.	+	.	+
S. of Tsavo	♂	190	145	61	.	+	.	+
Mbuyuni	♀	490	153	57	.	+	.	+
Taru	♀	160+	151	?	.	+	.	+
Near Tendaguru	♀	365	171	56	+	.	.	+
Near Tendaguru	♀	440	165	57	+	.	.	+
Lake Tanganyika	♂	400	153	52	+	.	+	.
Lake Nyasa	♂	335	151	57	+	.	+	.

1) Wrongly sexed by Parker (1936, p. 608).

BRITISH SOMALILAND AND ADJACENT ETHIOPIA (14 specs.).

♂♂ V. 140-159, C. 47-68. ♀♀ V. 158-172, C. 44-71.

Naso-preocular condition predominantly "*lunulatus*" (78 %). Colour predominantly "*concolor*" (85 %).

A.E. SUDAN, N. UGANDA, LAKE RUDOLF REGION (4 specs.).

♂ V. 146, C. ?. ♀♀ V. 152-158, C. 55-62.

Naso-preocular condition mainly "*concolor*" (75 %). Colour mainly "*concolor*" (75 %).

SOUTH EASTERN KENYA COLONY AND NORTHERN TANGANYIKA TERRITORY (7 specs.).

♂♂ V. 145-150, C. 52-61. ♀♀ V. 153-171, C. 56-57.

Naso-preocular condition not predominantly of either type (43 % '*lunulatus*", 57 % "*concolor*"). Colour predominantly "*concolor*" (86 %).

SOUTHERN TANGANYIKA TERRITORY AND NYASALAND (2 specs.).

Both specimens "*lunulatus*" by colour and naso-preocular condition.

Both Loveridge and de Witte & Laurent have pointed out that the name proposed by Scortecci for the race in Somaliland is not acceptable, being preoccupied; but they proposed no substitute since they were uncertain whether the race merited taxonomic recognition. The differences are admittedly few and there is no clearly marked, narrow transition zone from one form to the other; but the differences undoubtedly exist, are geographically correlated and almost certainly are symptomatic of evolutionary change proceeding within the species. In the Somali area the race appears to be widespread south of a line from the Obbia region to the mountains of the Ogo.

Tarbophis Fleischmann

Migiurtinophis Scortecci, 1935, Ann. Mus. Stor. nat. Genova, vol. 59, p. 1.

SYNOPSIS OF THE SPECIES

I. Mid-body scales 21. Ventrals 169; C. 44. — *T. barnum-browni* Bogert
II. Mid-body scales 19-25. Ventrals 204-256; C. 57-84. — *T. dhara* Forskål
III. Mid-body scales 17-18. Ventrals 174-180; C. 57-58. — *T. pulcher* (Scortecci)

Tarbophis barnum-browni Bogert

Tarbophis barnum-browni Bogert, 1940, Bull. Amer. Mus. nat. Hist., vol. 77, p. 66, fig. 9 (Type locality: Jijiga at 6500 ft.).

The single specimen which is the type of this name is so different in its ventral and sub-caudal counts from any other example of the genus recorded from the Somali-Sudanese area that the recognition of a distinct mountain species seems perfectly justifiable. Speculation concerning its relationships is scarcely profitable until more is known of it but, as its describer has pointed out, it has much in common with "*T. savignyi*" (= *T. syriacus* Boettger) of the Syria and Palestine region.

Tarbophis dhara (Forskål)

Dipsas (Telescopus) obtusus, Boettger, 1893, p. 119 (Berbera).

Tarbophis obtusus, Mocquard, 1888, p. 133 (Somaliland); Boulenger, 1895 b, p. 15 (Ogaden); Idem, 1896 c, p. 20 (Lugh); Idem, 1898 a, p. 721 (Lugh); Idem, 1909 b, p. 309 (Jumbo); Idem, 1909 c, p. 311 (Bardera); Loveridge, 1916, p. 85 (Kismayu); Scortecci, 1929, p. 277 (Kismayu); Parker, 1932, p. 364 (Nogal Valley); Scortecci, 1934, p. 82 (along the Juba; Trans-Juba; Benadir); Scortecci, 1939 a, p. 112, figs. 58, 59 (Nogal Valley; Garoe; various localities in Benadir; Trans-Juba; Ogaden); Idem, 1939 b, p. 276 (Balad); Idem, 1940, p. 12 (Mogadiscio).

Tarbophis guentheri (non Anderson) Lönnberg & Andersson, 1913, p. 4 (Kismayu); Scortecci, 1934, p. 83, fig. 36 (Kismayu); Idem, 1939 a, p. 115 (numerous localities in Benadir and Trans-Juba); Idem, 1939 b, p. 276 (Afgoi; Balad; Belet Amin).

B.M. 1949.2.2.68. ♂; Sc. 23; V. 254; A. 2; C. 79 + 1. Guban, 43° 15′ E. × 11° 25′ N., 150 ft.

B.M. 1949.2.2.69. ♂; Sc. 23; V. 238; A. 2; C. 83 + 1. Guban, 42° 55′ E. × 10° 55′ N., 1500 ft.

B.M. 1949.2.2.70. ♂; Sc. 24; V. 252; A. 2; C. 74 + 1. Ogo-Guban, 43° E. × 10° 35′ N., 3000 ft.

B.M. 1949.2.2.71. ♂; Sc. 25; V. 242; A. 2; C. 75 + 1. Ogo, 42° 54′ E. × 10° 20′ N., 5000 ft.

B.M. 1949.2.2.72 ♂; Sc. 22; V. 222; A. 2; C. 66 + 1. Ogo, 42° 50′ E. × 10° 20′ N., 3500 ft.

B.M. 1949.2.2.73. ♂; Sc. 21; V. 211; A. 2; C. 72 + 1. Ogo, 43° 10′ E. × 9° 55′ N., 4500 ft.

B.M. 1949.2.2.74. ♀; Sc. 23; V. 256; A. 2; C. 74 + 1. Ogo, 43° E. × 10° N., 1300 ft.

B.M. 1949.2.2.75. ♀; Sc. 23; V. 218; A. 2; C. 64 + 1. Haud, 44° 10′ E. × 8° 57′ N., 4100 ft.

B.M. 1949.2.2.76. ♀; Sc. 23; V. 223; A. 2; C. 64 + 1. Haud, 44° 15′ E. × 8° 55′ N., 4000 ft.

B.M. 1949.2.2.77. ♂; Sc. 23; V. 204; A. 2; C. ?. Haud, 44° 15′ E. × 8° 55′ N., 4000 ft.

B.M. 1949.2.2.78. ♂; Sc. 22; V. 215; A. 1; C. ? .
B.M. 1949.2.2.79. ♂; Sc. 22; V. 224; A. 2; C. 57 + 1. } Haud, between 44° 44′ E. × 8° 45′ N. and 44° 24′ E. × 8° 52′ N., 3500—3800 ft.

B.M. 1949.2.2.80. ♀; Sc. 22; V. 227; A. 2; C. 74 + 1. Haud, 45° 09′ E. × 8° 37′ N., 3050 ft.

B.M. 1949.2.2.81. ♂; Sc. 22; V. 217; A. 2; C. 73 + 1. Haud, 45° 09′ E. × 8° 37′ N., 3050 ft.

B.M. 1949.2.2.82. ♂; Sc. 21; V. 228; A. 2; C. 82 + 1. Haud, 45° 34′ E. × 8° 29′ N., 2600 ft.

B.M. 1949.2.2.83. ♀; Sc. 22; V. 233; A. 2; C. ? . Haud, 45° 43′ E. × 8° 26′ N., 2350 ft.

B.M. 1949.2.2.84. ♀; Sc. 23; V. 251; A. 2; C. 76 + 1. Haud, 45° 43′ E. × 8° 26′ N., 2350 ft.

B.M. 1949.2.2.85. ♀; Sc. 23; V. 232; A. 1; C. 69 + 1. Haud, 46° E. × 8° 20′ N., 2100 ft.

Scortecci (1939 b, p. 276), in discussing 19 specimens of *Tarbophis* from

Southern Somaliland, suggested that *T. guentheri* and *T. obtusus* ought, perhaps, to be united. Specimens from the same general area, with no apparent ecological habitat-preferences, could be referred by their morphological characters to two species. The same is true of the foregoing series from the north of the peninsula. Two specimens of the eighteen have the undivided anal of *guentheri*, others have 21 mid-body scale-rows also said to characterise that species and two others, numbers 1949.2.2.79 and 1949.2.2.73, have only two labials entering the eye which is the normal condition in the West African *guidimakaensis* Chabanaud.

The taxonomic recognition of *guentheri* and *obtusus* also fails to present a convincing geographical picture, the former having a discontinuous distribution. The records in the literature give the following distributions; where records are few their numbers are shown in parentheses:

T. obtusus. Mauritania to N. Nigeria; A.E. Sudan; Kenya Colony west of the Rift Valley; Somaliland; Eritrea; Saudi Arabia (1); Yemen (1).

T. guentheri. Muscat; Hadramaut; Aden; Yemen; Saudi Arabia; Palestine (2); Sinai (1); Southern Somaliland and adjacent eastern Kenya Colony.

The evidence of Scortecci's series and that mentioned above make it seem very probable that the anal shield, hitherto regarded as immutably single in *guentheri* and always divided in *obtusus*, is variable and once that is admitted the occasional records of one within the range of the other can be discounted. The resultant geographical scheme is as follows; the second column refers to specimens examined or literature records included.

	Area	No.	Scales	Lab. on eye	Anal 1	Anal 2	Ventrals	Subcaudals
I	Muscat to Aden	16	19-21	3	100%	—	229-274	59 72
II	Yemen to Sinai	8	21-23	3	50%	50%	230-244	58-82
III	Egypt, A.-E. Sudan, Turkana.	19	21-23	3	—	100%	230-272	60-86
IV	Eritrea	3	23	3	—	100%	255-278	67-86
V	British Somaliland	21	21-25	3(2)	10%	90%	204-256	57-84
VI	S. Somaliland and adjacent Kenya.	32	19-24	3(4)	62%	38%	205-244	56 82
VII	Mauritania to N. Nigeria.	8	21-23	2	—	100%	205-227	58-79

The picture thus presented is of a central group in Egypt, the A.E. Sudan and Eritrea with 21-23 scale rows, constantly two anals, three labials entering the eye and a high ventral count, 230-278. The name for this population is *obtusus* Reuss; type locality: Egypt.

To the west this form gives place to one distinguished by the presence of only two labials entering the eye and a lower ventral count, 205-227. The name *guidimakaensis* Chabanaud, type locality Guidimaka, Mauritania, is available. Intergradation with *obtusus* has not been demonstrated and there is an apparent, geographical gap between the two. The name could, therefore, be used specifically.

The population of the extreme south of Arabia differs from *obtusus* in a lower number of mid-body scales, 19-21 vice 21-23, and a single anal; the number of ventrals remains high. The name hitherto used for this race is *guentheri* Anderson, 1895, but this must give place to the much older *dhara* Forskål, 1775, which was rejected as incertae sedis when it was believed that there were two species of *Tarbophis* in the Yemen whence came Forskål's material. The population of the Yemen to Sinai area links the southern Arabian race both geographically and morphologically with that of Egypt so that *obtusus* and *dhara* stand in relation to one another as subspecies, the latter name replacing *obtusus* for the species as a whole.

The population of southern Somaliland and adjacent Kenya differs from that of the central area, *obtusus*, in the occasional reduction of the mid-body scale rows to 19, the frequent (62 %) presence of an undivided anal and a lower number of ventral shields, 205-244 vice 230-278. In the first two of these characters this population resembles that of southern Arabia, which accounts for previous records of "*guentheri*" from Somaliland. The number of ventrals, however, is appreciably lower in Somaliland than in Arabia or Egypt and in this character the resemblance is to the West African *guidimakaensis*. There is no geographical or morphological discontinuity between the southern Somaliland population and *obtusus* and the population of northern Somaliland is intermediate in regard to the frequency of occurrence of the undivided anal and a slightly higher ventral count. It is, therefore, appropriate to regard the southern population as a subspecies of the *dhara* complex; no name is available and **Tarbophis dhara somalicus** is accordingly proposed. The cotypes of this name are B.M. 93.11.21.64, a male from Ngatana with 20 mid-body scales [1]) and a single anal, and B.M. 96.9.24.30, a juvenile female from Lugh with 24 scales [2]) and a divided anal.

1) Boulenger, 1896 e, p. 52 gives 19.
2) Boulenger, 1896 c, p. 20 gives 23.

Tarbophis pulcher (Scortecci)

Migiurtinophis pulcher Scortecci, 1935, Ann. Mus. Stor. nat. Genova, vol. 59, p. 1 (Type locality: Mijarten); Idem, 1939 a, p. 120, figs. 63, 64.

The describer of this species indicated that his genus *Migiurtinophis* was clearly allied to *Tarbophis* and Bogert (1940, p. 13) has expressed the same opinion. Re-examination of the paratype (B.M. 1946.1.4.88 from the Haud, 3500 ft., 44° 44′ E. × 8° 45′ N.) shows that the relationship is so close that retention of a distinct genus for *pulcher* is not justifiable. There are ten anterior maxillary teeth, gradually decreasing in size, followed by a pair of grooved fangs, a dental system not differing in any essential from that of *Tarbophis*. In addition, the paratype has 18 scale rows at mid-body and the presence of an even number is, as may be seen from the list of specimens of *T. dhara*, above, a common one in this genus.

Ditypophis Günther

Ditypophis vivax Günther

Ditypophis vivax Günther, 1881, Proc. zool. Soc. London, p. 462, Pl. 40 (Type locality: Sokotra); Boulenger, 1896 e, p. 46; Idem, 1903, p. 90, fig. (Hadibu Plain; Adho Dimellus; Jena-agahan; Hombril); Steindachner, 1903, p. 14 (mountains and cliffs around Ras Shoab and Wadi Felink).

The affinities of this monotypic genus, endemic in Sokotra, have never been satisfactorily determined. Günther originally described it as being "evidently allied" to *Tachymenis,* but having several characters in common with *Dipsadoboa*. Günther's *Tachymenis* was a composite genus, including what is now known as *Tarbophis,* and Boulenger (1896 e) associated *Ditypophis* with *Tarbophis* and *Pythonodipsas*. The latest commentator, Bogert (1940, p. 12) without material to assist him, inclined to the view that *Ditypophis* and *Pythonodipsas* ought to be grouped with *Geodipsas,* an opisthoglyphous genus with vertebral hypapophyses developed posteriorly and with a bifid hemipenis.

Bogert's surmise is borne out by the examination of the two male specimens in the British Museum. The penis is long, extending to the seventeenth subcaudal, and is bifurcate for one third of its length; it is spinose distally, the spines being subequal and very small, with no enlarged hooks. The penis of *Pythonodipsas* is also long, extending to the thirteenth subcaudal, and is even more strongly bifurcate, to 2/3 its length. Thus in the penial characters, the presence of hypapophyses and of grooved posterior teeth *Ditypophis, Pythonodipsas* and *Geodipsas* form a group amongst the African Colubridae. But *Ditypophis* differs from the other two in the differentiation of its teeth. In both of these genera the solid maxillary teeth form a continuous series, but in *Dityophis* there is a distinct diastema in the row of solid teeth, as shown in figure 10; Boulenger's figure (1896 e, p. 46) is incorrect. This condition is very similar to that found in the Oriental genus *Psammodynastes,* except that in this latter genus there is a group of the small solid teeth in front of the fangs (Smith, 1943, fig. 116), compared with a single tooth in *Dityophis. Psammodynastes* also has a bifurcated hemipenis and hypapophyses, and Smith (op. cit., p. 139) was unable to find that it had close relationship with any other genus of the Oriental region. There would appear, therefore, to be a likelihood that *Geodipsas, Pythonodipsas, Dityophis* and *Psammodynastes* form a natural group (possibly together with some Malagasy-Comoro genera such as

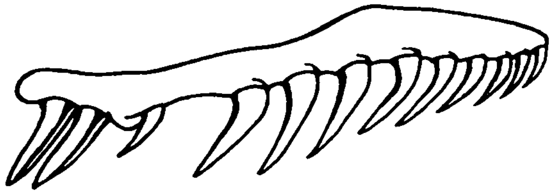

Fig. 10. *Dityophis vivax* Günther ♂. Maxilla. × 10.

Lycodryas and *Stenophis*). Of these *Dityophis* appears, by the degree of differentiation of the maxillary teeth, to be most akin to *Psammodynastes.*

The unique species is a Sokotran endemic and has not been recorded from Abd-el-Kuri or the Brothers.

Naja Laurenti

SYNOPSIS OF THE SPECIES

I. Third upper labial the deepest; sixth & seventh upper labials not in contact with the post-oculars. No suboculars. *N. nigricollis* Reinhardt

II. Sixth (or seventh) upper labial the deepest and in contact with the postocular.
   (a) Eye separated from the labials by a row of suboculars. *N. haje* (Linn.)
   (b) No suboculars. *N. melanoleuca* Hallowell

Naja nigricollis pallida Boulenger

Naia nigricollis Reinhardt, Boulenger, 1895 a, p. 168 (Golis Mt.); Idem, 1896 d, p. 216 (Lake Stephanie; Lake Rudolf); Meek, 1897, p. 179 (Deregodleh); Sternfeld, 1908 b, p. 241 (S. Abyssinia); Parker, 1932, p. 364 (Nogal Valley); Scortecci, 1934, p. 34, fig. 15 (Benadir & Trans-Juba); Idem, 1939 a, p. 194, figs. 107-109 (Southern and Central Somaliland to Rocca Littorio and El Bur); Idem, 1939 b, p. 286 (Vill. Duc. Abruzzi; Belet Amin); Idem, 1940, p. 18 (Arero; Moyale; Mogadiscio); Idem, 1943, p. 287 (El Dire).

Naia nigricollis var. *pallida* Boulenger, 1896 e, Cat. Snakes Brit. Mus., p. 379 (Type localities: Inland of Berbera and Lake Rudolf); Idem, 1896 b, p. 13 (Banas, Gallaland); Idem, 1896 c, p. 21 (Lugh; Pozzi Meddo-Erelle); Idem, 1898 a, p. 721 (Lugh and between Badditu and Dimé); Idem, 1909 c, p. 311 (Bardera); Lönnberg and Andersson, 1913, p. 5 (Kismayu); Calabresi, 1918, p. 124 (between Jelib and Margherita); Idem, 1927, p. 33 (Biomal).

Naja nigricollis nigricollis, Bogert, 1940, p. 88.

Naja nigricollis pallida, Bogert, 1942, p. 4 (Type locality restricted and type designated); Idem, 1943, p. 290.

B.M. 1949.2.2.89. Skin; Sc. 27/23. Guban, 42° 55′ E. × 10° 55′ N., 1500 ft.

B.M. 1949.2.2.86. ♀; Sc. 27/25; V. 216; C. 65 + 1. Borama Distr., 43° 20′ E. × 9° 55′ N., 4000 ft.

B.M. 1949.2.2.87. ♀; Sc. 26/25; V. 211; C. 62 + 1. Haud, 44° 24′ E. × 8° 52′ N., 3800 ft.

B.M. 1949.2.2.88. ♂; Sc. 25/25; V. 201; C. 68 + 1. Daggah Bur, 43° 30′ E. × 8° 13′ N., 3500 ft.

B.M. 1949.2.2.90. Head. Harradigit, 42° 25′ E. × 7° 45′ N., 3000 ft.

In addition to the above mentioned specimens the author has examined 9 other examples from Somaliland and Eastern Ethiopia including the type as restricted by Bogert (1942). This series conforms to the diagnosis of the subspecies *pallida* both in colour and lepidosis; comparison with series from other territories in eastern Africa confirms the validity of this north-eastern race. The scale counts of the material are:

A. Subspecies *pallida*. A.E. Sudan, Ethiopia, Turkana, and Somaliland; 17 specimens.

Scales on neck	25- 31
Scales at mid-body	21- 27
Ventrals	197-228 (mean 210)
Subcaudals	61- 72 (mean 66)

B. Subspecies *nigricollis*.

(1) Uganda; 7 specimens.

Scales on neck	19- 25
Scales at mid-body	17- 23
Ventrals	182-217 (mean 198) [1]
Subcaudals	52- 63 (mean 57)

(2) Senegal to Nigeria; 32 specimens.

Scales on neck	21- 27
Scales at mid-body	19- 25
Ventrals	190-219 (mean 202)
Subcaudals	54- 68 (mean 62)

(3) S. Kenya Colony, Tanganyika Territory (incl. Pemba), Rhodesia, Nyasaland; 44 specimens.

Scales on neck	19- 29
Scale at mid-body	19- 25

1) Bogert (1942, p. 5) by a slip has utilised Pitman's figures of *melanoleuca* instead of those of *nigricollis* and so obtained a fictitiously high count.

Ventrals	180-205 (mean 190)
Subcaudals	50- 66 (mean 58)

In Somaliland this cobra is known from all districts except the Sultanate of Mijarten.

Naja haje haje (Linn.)

Naja haje, Boettger, 1893, p. 121 ("Somaliland").
Naia haie, Scortecci, 1934, p. 31, fig. 14, Pl. ("Somaliland" and Carcar Hills = Kurkar Hills, 49° E. × 10° 15′ N. approx.); Idem, 1939 a, p. 189, figs. 104, 105, 106.

B.M. 1949.2.2.91. Skin; Sc. 21/21; V. 198; C. 59 + 1. Burao, 3500 ft.
B.M. 1949.2.2.92. ♀; Sc. 21/21; V. 204; C. 64 + 1. Borama Distr., 43° 10′ E. × 9° 55′ N., 4500 ft.
B.M. 98.4.29.12. ♂ juv.; Sc. 21/21; V. 195; C. 61. Jifa Uri, inland from Zeila.
B.M. 1932.3.10.1. ♂; Sc. 21/21; V. 207; C. 63. Sheikh.

This cobra appears to be relatively rare throughout its range except in Egypt and the A.E. Sudan. In Somaliland, though only twice recorded previously (supra) it appears to be generally distributed along the northern mountain chain.

Pitman (1938, p. 211) states that it has a preference for "hot and dry localities where water is not scarce", so that it is probably patchy and local in its distribution.

Schmidt (1923, p. 126) has suggested that this species has migrated from Lower Egypt as its distribution centre in relatively recent times. This hypothesis, put forward in the belief that the snake was absent from Engler's botanical "Sudanese Sub-Provinces" and from Angola, is no longer tenable in the light of more recent knowledge. This species is now known from southern and western Arabia (subsp. *arabica*) to Morocco north of the Sahara, along the Nile Valley, and through Ethiopia and Eritrea to Somaliland, and throughout the Savannah Province from Nigeria [1]) to Zululand in the east and Angola and S.W. Africa (subsp. *anchietae*) in the west. It is probable that in this vast area there are other subspecies and local races, but sufficiently large series for an investigation of geographical variation are non-existent.

Naja melanoleuca Hallowell

Naia melanoleuca, Scortecci, 1939 a, p. 199, figs. 110-112 (Ola Uager); Idem, 1939 b, p. 287 (Ola Uager).

This cobra "authentically reported only from the Forest Province and restricted forest islands around the periphery of the continuous forest"

1) Two specimens from Gadau, N. Province and one other from Nigeria in British Museum.

(Bogert, 1943, p. 288) has only once been found in southern Somaliland where the river valleys support a lush forest.

Elapsoidea Bocage

Elapsoidea sundevallii güntheri Bocage

Elapsoidea güntheri, Scortecci, 1939a, p. 183, figs. 101, 102 (Filtu = 40° 38′ E. × 4° 59′ N. approx.); Idem, 1940, p. 17 (Filtu); Idem, 1943, p. 287 (Caschei).
Elapsoidea sundevallii laticincta Werner, Loveridge, 1944, p. 216.

This snake, widely distributed in the Savannah regions of Africa, enters the Somali zone only in the mountain region of the extreme south-west. The species shows a great deal of geographical variation and, if Loveridge's revision of the genus is accepted, the Ethiopian population is the most easterly outpost of a race which ranges westward south of the Sahara to the northern Cameroons and possibly northern Nigeria. It is, however, rather doubtful whether the races that Loveridge recognises are tenable; they are, for the most part, based on very tenuous morphological characters (numbers of ventrals and subcaudals) without adequate series to test the validity of the supposed differences. The material available to the present writer (43 specimens from an area covering most of the range of the species) does nothing to substantiate the differences, but does suggest that the colour pattern, almost entirely neglected by the previous reviser, provides a useful clue to the relationships, and a guide for the separation, of a number of taxonomic groups. The following observations are offered as a basis for further consideration when adequate series are available for a thorough revision.

All the various forms have a common feature, the juvenile livery. This consists of a number (geographically variable) of fairly broad light transverse bars on a black or dark brown background, a large white temporal patch and a curved light transverse bar from eye to eye, convex anteriorly; the dark colour of the neck is connected to a dark transverse interorbital blotch by a narrow median dark stripe. The colour of the adult is derived from this in three, or possibly four, different ways and as there is a geographical correlation, and also some minor morphological ones it is suggested that these ontogenetic lines are also phyletic. The groups are:

I. A CIRCUM-RAIN FOREST FORM, ranging from Senegal to Angola.

In this area, with increasing size the transverse light bars of the body of which there are from 10-34 divide to form pairs, the process commencing at the hinder end of the body and working forwards. The resultant light transverse bars are very narrow, mere lines or even transverse rows of white dots, and equidistantly spaced or approximately so. They, and the light head-markings, become progressively more and more obscure with increasing size and in large individuals are completely lost, leaving a snake with a uniformly dark coloured dorsum; the belly may or may not be lighter but, if it is, there is no sharp line of demarcation between the two. The number of ventral scales varies between 139 and 165 in the series examined, with no secondary sex difference. Subcaudals show such a difference and, again in the material examined, the ranges are males 20-27 + 1 and females 14-23 + 1.

II. Mozambique to S.W. Africa, south of the preceding.

In this area the light bars of the juvenile livery, of which there may be only 8 on the body in the east of the range, are lost and replaced by a different pattern in which the dorsal surfaces are brown, uniform or the individual scales edged with darker, and the belly and outermost scale row on each side white, there being a clearly marked sharp line of demarcation between the two.

Only two specimens of this form are available to the present writer; their counts are ♂ V. 160, C. 27 + 1; ♀ V. 142, C. 27 + 1. It seems possible, therefore, that the marked secondary sex difference in the subcaudals which characterises group I is not found here.

III. Natal.

In this region as in group I, the light bars of the juvenile livery, 18-30 on the body divide and form equidistantly spaced light lines, but these are quite broad and are never lost. The ventrals range from 148 to 184; subcaudals ♂♂ 24-26 + 1; ♀ 17 + 1.

IV. Central Kenya Colony.

As in Group III the transverse bars are persistent, but their subdivision is much less pronounced; they may not be subdivided at all, even in individuals of 600 mm total length, but even when they are, the members of the pairs remain only narrowly separated and the distance between them is much less than the interspace between adjacent pairs. Loveridge reports that the centre of each light bar is pink or red in life. In the specimens examined the ventrals range from 152-160 and the subcaudals of females from 20-25 + 1; the only male available with a complete tail has 27 pairs of subcaudals.

There can be little doubt that these are taxonomic groups, or aggregations of such groups, but whether specific or subspecific remains to be determined.

The fact that they appear to be all allopatric with no geographical overlap suggests the latter and since Loveridge has considered them all as forming only a single species it is proposed to follow the example. The names available are as follows.

Name	Type locality
	Group I
E. güntheri Bocage, 1866	Cabinda and Bissao
E. semiannulata Bocage, 1882	Caconda, Angola
E. hessei Boettger, 1887	Povo Netonna, Lower Congo
E. nigra Günther, 1888	"Ushambola" = Usambara
E. moebiusi Werner, 1897	Kete, Togoland
E. laticinctus Werner, 1919	Kadugli, Kordofan
	Group II
E. decosteri Boulenger, 1888	Delagoa Bay, Mozambique
E. boulengeri Boettger, 1895	Boroma, Zambesi
E. sundevallii fitzsimonsi Loveridge, 1944	Gonodimo Pan, Kalahari
	Group III
E. sundevallii (A. Smith), 1848	South Africa to the east of Cape Colony

Group IV

No name has yet been proposed for this and, since Loveridge has suggested that it may be a valid race it is proposed to call it:

Elapsoidea sundevallii loveridgei subsp. nov.

As indicated above it resembles *E. sundevallii sundevallii* of Natal and differs from all the other populations in retaining a banded colour pattern throughout life. It differs from the typical form in that the light transverse bands of the adult, 17-20 on the body, are only slightly divided, if at all, and having red or pink centres. It also differs from the typical form and the forms of Group I (above) in a higher number of subcaudals in the female (at least), 20-25 vice 14-23; in this respect it resembles *E. s. decosteri* and there may be intergradation with this form in the eastern lowlands of Tanganyika Territory where the number of cross-bars is as low as in both, but where the colour pattern is of the *güntheri* type. The typical material is:

HOLOTYPE.

B.M. 1902.5.26.4. ♀ Machakos, Kenya Colony, 5400 ft. Collected by S. L. Hinde. Total length 560 mm. Seventeen pairs of light bars on the body and two on the tail; width of a pair of bars at mid-body 8 mm separated by 22 mm interspaces. Lower surfaces pale brown, the light annuli encroaching on the outer ends of the ventrals. Chin, throat and posterior upper labials white. Ventrals 156; subcaudals 23 + 1.

PARATYPES (in order of size).

M.C.Z. 40717. ♂ juv. Nairobi. Total length 280 mm. Twenty, single, light bars on the body and three on the tail; mid-body light bars 3.5 mm wide separated by interspaces of 8 mm. Interocular light bar broken up. Additional light spots on the parietals, prefrontals and internasals. Lower surfaces as in the holotype. Ventrals 156; subcaudals 27 + 1.

B.M. 1949.2.2.95. ♀ juv. Nairobi. Coll. C.R.S. Pitman. Total length 340 mm. Twenty, single, light bars on the body and two on the tail; mid-body light bars 5 mm wide, separated by interspaces of 14 mm. Interocular light bar continuous laterally with the light prefrontals, internasals and snout-tip, leaving an oval black blotch on the anterior part of the frontal and adjacent parts of the prefrontals. Ventrals 155; subcaudals 21 + 1.

B.M. 1900.6.29.20. ♀ Mount Kenya. Coll. Lord Delamere. Total length 415 mm. Eighteen, single, light bars on the body and three on the tail; mid-body light bars 6 mm wide separated by interspaces of 15 mm. Lower surfaces as in the holotype. Ventrals 152; subcaudals 25 + 1.

B.M. 1910.10.31.13. ♀ Nairobi. Coll. F. J. Jackson. Total length 465 mm. Nineteen, divided, light bars on the body and three on the tail; mid-body bars (pairs) 8 mm wide and the interspaces 13 mm. Lower surfaces as above. Ventrals 160; subcaudals 23 + 1.

B.M. 1900.6.29.21. ♀ Athi River, Kenya Colony. Coll. Lord Delamere. Total length 540 mm. Seventeen light bars on the body, the more posterior divided, and three on the tail; mid-body bars 8 mm wide and interspaces 22-23 mm. Lower surfaces as above. Ventrals 154; subcaudals 22+ 1.

B.M. 1910.10.31.12. ♂ Nairobi. Coll. F. J. Jackson. Total length 600 mm. Twenty, undivided, light bars on the body and three on the tail; mid-body bars 7 mm wide separated by 24 mm interspaces. Lower surfaces as above. Ventrals 159; subcaudals 20 + n (injured).

M.C.Z. 8170. ♀ Guaso Nyiro Distr. Total length 640 mm. Eighteen light bars on the body, single anteriorly, divided posteriorly, and three on the tail. Mid-body pairs 7 mm wide separated by 25 mm interspaces. Ventrals 157; subcaudals 20 + 1.

It is unlikely that these specimens represent more than a single taxonomic group and the same can be said of the population of Natal, considered above as "Group III", for which there is only one available name — *sundevallii* A. Smith.

Group II may, however, be subdivisible into an eastern form *decosteri* Boulenger, with *boulengeri* as a synonym, and a western one, *fitzsimonsi* Loveridge, with a higher number of ventral scales (162-181, fide Loveridge). The eastern form appears to have, in its juvenile stages, a very low number of cross-bars; the type of *boulengeri* has only 8 on the body and two on the tail. This may indicate a transition in that region to the forms of Group I which have the lowest number of bars in Nyasaland and southern Tanganyika Territory.

Group I shows geographical variation as follows:

Angola and Lower Congo. The few specimens seen have 17-24 bars, or pairs, on the body (tail excluded). The adult co-type of *güntheri* from Cabinda has 23 [1]; since it is possible that the other adult co-type of the name (from Bissao, Portuguese Guinea with 13) may represent a different population, the Cabinda adult is hereby designated lectotype in order to prevent possible future confusion. The type of *hessei* Boettger, from the Lower Congo, has 21, and other records indicate 16-24 as the range of variation in this general area.

N. Rhodesia. Five specimens examined show a range of from 10-22 bars (or pairs of bars).

Nyasaland. Five specimens show variation from 10-13.

Tanganyika Territory. Three specimens from "Ushambola" (type of *niger*), Amani and Lake Rukwa show from 16 to 21, but in the extreme S.E. the number is as low as in the adjacent territory of Nyasaland. Loveridge records a specimen from Lindi, in the extreme south-east of the Territory, with 14, and the British Museum has 6 specimens from Liwale with from 10 to 13.

Uganda. Thirteen specimens range from 18-31.

Western Kenya Colony. Six specimens from Kaimosi Kakamega (M.C.Z. 40720-40724) and the Loita Plains (M.C.Z. 17977) have from 26 to 34. The lowest number is on the Loita Plain specimens.

Ethiopia. The specimens recorded by Scortecci have "una cinquanta", i.e., 25 pairs with, presumably, 22 on the body. There is therefore little doubt that the population of the area is essentially similar to that of

1) Details not given in original description but in Bocage, Herp. Angola et bas Congo, 1895, pp. 129-131.

Uganda, the nearest point at which the genus has yet been found.

A.E. SUDAN. The type of *laticinctus* has 12 light bars on the body.

UBANGI-SHARI REGION. Two specimens in the British Museum from the Shari River have 12-13.

NIGERIA. Three specimens in the British Museum have about 13.

GOLD COAST. One specimen examined has 14.

PORTUGUESE GUINEA. The adult co-type of *güntheri* from Bissao has 16 *black* annuli; this probably indicates 13 light bars on the body only.

Thus the lowest numbers of light bars are found in Nyasaland and the neighbouring countries of southern Tanganyika and N. Rhodesia. There is progressive increase westwards and northwards from this area, culminating in 17-24 in the Lower Congo-Angola region and 18-34 in Uganda, Western Kenya and Ethiopia. There are no obvious breaks in the series and the appropriate taxonomic treatment is to group all under the one name. The selection of a Cabinda cotype of *güntheri* as lectotype fixes that name for this series; synonyms will be *semiannulata, hessei,* and *nigra.*

Proceeding westwards from Uganda and Ethiopia there is an abrupt fall in the number of cross-bars from 18-31 in Uganda to 12 in the A.E. Sudan and 12-14 in countries further to the west. This suggests a Sudanese race for which the oldest name available is *moebiusi* Werner, with *laticincta* Werner as synonym.

Dendroaspis Schlegel

Dendroaspis polylepis antinorii Peters

Dendraspis angusticeps, Boulenger, 1896 d, p. 217 (Somaliland, presumably between the Arussi country and Lake Rudolf); Sternfeld, 1908 b, p. 241 (no precise locality); Loveridge, 1936 b, p. 42; Scortecci, 1939 a, p. 209, fig. 117; Idem, 1943, p. 287 (El Dire, Tertale).

Dendraspis antinorii, Scortecci, 1938, figs. 1 & 2 (Type specimen).

Dendroaspis polylepis, Loveridge, 1949, in press (Amibarra and Wagar).

B.M. 1949.2.2.96. ♀; Sc. 25; V. 263; C. 129 + 1. Ogo, 43° E. × 10° 05′ N., 5000 ft.

B.M. 1949.2.2.97. Head. Ogo, 42° 55′ E. × 10° 10′ N., 4500 ft.

B.M. 1949.2.2.98. Head & skin; Sc. 25; V. 236; C. ?. Haud, 43° 30′ E. × 8° 13′ N., 3500 ft.

B.M. 1949.2.2.99. Head & skin; Sc. 25; V. 248; C. ?. Haud, 43° 30′ E. × 8° 13′ N., 3500 ft.

With the exception of the specimen from Wagar (= Wagar Range) the few previous records of mambas in the Somali area were from the highlands bordering the eastern side of the Rift Valley. The new material recorded above links the Wagar record with the others and indicates that the mamba is widely distributed in the mountain areas as far east as the Wagar range; the four specimens listed above were all taken in areas of thick acacia and euphorbia bush, and it is probable that the snake is restricted to this ecological environment.

Only one species has been reported to the east of the Rift Valley, the "black" mamba previously confused with, and recorded as, *D. angusticeps*. This species has also been recorded from the Ethiopian mountains to the west of the Rift Valley but a second alleged species was described by Peters from the Anseba, Eritrea, as *D. antinorii*. Loveridge (1936 b) suggested that this name was probably a synonym of "*angusticeps*", but subsequent authors have continued to refer to *D. antinorii* as a valid species known only from the single type.

No typical or topotypical material of *antinorii* has been seen, but six specimens from Somaliland and Ethiopia (those listed above and the two recorded by Loveridge, 1949) have been examined. Five of these, the ones from the Ogo, Haud and Amibarra on the Awash River, show a labial condition approximating to that supposed to characterise *antinorii*, i.e., the second comparatively small and not in contact with the prefrontal. The example recorded by Scortecci from the Tertale district also shows this condition on one side and the same asymmetrical condition has been observed in a specimen from Mt. Moroto in north-west Uganda. Elsewhere to the south in all the specimens examined, including the holotype of *polylepis*, the second labial is larger and forms a long suture with the lateral border of the prefrontal. In this respect, therefore, it would appear that the northern populations are partly but incompletely differentiated from those further to the south. Supporting evidence for this belief is to be found in the number of scales at mid-body. Out of the eight Ethiopian and Somali specimens in which the number has been counted or recorded four have 25 scales, a number which has only once been recorded (Loveridge, 1949, Kitau, Manda Island) in any other part of the range of the species. It is, therefore, proposed to use the name *antinorii* in a subspecific sense for the "black" mambas of Eritrea, Ethiopia and western Somaliland.

Causus Wagler

SYNOPSIS OF THE SPECIES

I. Snout blunt. Colour dull grey or brownish with dark rhomboidal or V-shaped markings. *C. rhombeatus* (Licht.)
II. Snout pointed and usually upturned. Colour velvety green with black interstitial skin and dark chevron shaped markings. *C. resimus* (Peters)

Causus rhombeatus (Lichtenstein)

Causus rhombeatus, Boulenger, 1895 c, p. 539 (Sheikh Hussein; Durro = ? 41° 15′ E. × 7° 50′ N. approx.); Idem, 1898 a, p. 721 (between Sancurar and Amar; between Badditu and Dimé); Scortecci, 1939 a, p. 224, figs. 124, 125 (Harrar region; Galla Sidamo area; Amhara region).

It is remarkable that this species, so widely distributed and so common throughout the Savannah regions of Africa, appears to be confined to the western uplands in the Somali region and to be relatively uncommon. The Ethiopian region is its extreme northern limit in the east of Africa and it may be that it is a recent immigrant along the higher lands in which there are permanent streams; Pitman (1938, pp. 248, 251) stresses the close association of the species with water.

The same author also points out that the highest number of ventral scutes, 165, was found in an Ethiopian specimen. This number occurs in a female captured at Zaguala on the Awash River (specimen now in British Museum), but those recorded by Boulenger (1895 c) also have unusually high numbers, 158 and 166. Thus, in the very few specimens for which counts are available there is a very high proportion of individuals with more ventral scutes than are known elsewhere and this suggests some degree of geographical differentiation. The material available is, however, far from adequate for investigating the possibility further.

Causus resimus (Peters)

Causus resimus, Boulenger, 1896 c, p. 22 (between Komia and Madagoi); Idem, 1909 c, p. 311 (Bardera); Idem, 1912, p. 332 (Rahanuin Country); Lönnberg & Andersson, 1913, p. 5 (Kismayu); Scortecci, 1929, p. 279 (Vill. Duc. Abruzzi); Idem, 1931, p. 214 (Mogadiscio; Vill. Duc. Abruzzi); Idem, 1934, p. 38, fig. 16, Pl. (Benadir and Trans-Juba); Idem, 1939 a, p. 29, figs. 121-123 (Vill. Duc. Abruzzi; Vitt. d'Africa; Mogadiscio; Alessandra; Belet Amin; Af-madu).

This adder, though sympatric with *C. rhombeatus* in the A.E. Sudan, Uganda and Kenya appears to be segregated from it in the Somali area and to have been found only in the southern lowlands.

Bitis Gray

Although only one species, *Bitis lachesis,* has been recorded from Somalia it is possible that there may be two distinct races in the area. The only material available to the author, that listed below, is from the British Protectorate and it appears to represent a very distinct subspecies. This is the more remarkable in that the species as a whole appears to be very constant over an enormous geographical area; Loveridge (1945, p. 4) with

Eritrean material before him writes "The common Puff Adder, ranging from Southern Morocco to the Cape has defied all attempts to separate it into geographical races." With no material from Italian Somaliland for comparison the geographical range of the new subspecies cannot be determined and so, in the following synonymy, records from these areas are segregated as uncertain.

Bitis lachesis somalica subsp. nov.

Vipera arietans, Boettger, 1893, p. 121 (Ogaden; Abdallah country).

Bitis arietans, Boulenger, 1896 e, p. 494 (Somaliland); Idem, 1896 b, p. 13 (Sassabaneh; Audo Mts.; Elba; Lake Abaia); Idem, 1896 d, p. 217, part ("Stonybrook 19.8.94", i.e., in Arussi Galla country); Parker, 1932, p. 365 (Nogal Valley); Scortecci, 1939 a, p. 231 part (Galla Sidamo Territory; Ogaden).

?? *Bitis arietans*, Boulenger, 1896 c, p. 22 (between Madagoi and Lugh); Idem, 1896 d, p. 217 (West of Juba River); Idem, 1898 a, p. 721 (between Sancurar and Amar; between Badditu and Dimé); Scortecci, 1930 b, p. 20 (Merca; Somaliland); Idem, 1934, p. 51, fig. (Benadir and Trans-Juba); Idem, 1939 a, p. 231, figs. 128-130 part (Merca; Gelib; Vill. Duc. Abruzzi; Oddur; Belet Amin; Alessandra); Idem, 1939 b, p. 289 (Vill. Duc. Abruzzi, Oddur; Island of Kismayu; Belet Amin); Idem, 1940, p. 19 (Javello; Moyale; Mogadiscio); Idem, 1943, p. 290 (El Banno; El Diré; Murle; Mega).

COTYPES

B.M. 1949.2.3.1. ♀ 360 mm; Sc. 30; V. 137; C. 21 + 1. Bohodle, 2100 ft.
B.M. 1949.2.3.2. ♀ 420 mm; Sc. 29; V. 139; C. 17 + 1. Bohodle, 2100 ft.
B.M. 1949.2.3.3. ♀ 215 mm; Sc. 35; V. 143; C. 21 + 1. Bohodle, 2100 ft.
B.M. 1905.10.30.133. ♂ 430 mm; Sc. 30; V. 143; C. 30 + 1. Near Berbera.
B.M. 1905.10.30.134. ♀ juv. 250 mm; Sc. 33; V. 139; C. 17 + 1. Near Berbera.
B.M. 1905.11.7.58. ♂ 880 mm; Sc. 30; V. 139; C. 27 + 1. Wagar Range, 3-4000 ft.
B.M. 1931.7.20.409. ♀ 345 mm; Sc. 33; V. 142; C. 16 + 1. Bihen, 48° 24′ E. × 8° 24′ N., 1500 ft.
B.M. 1931.10.2.2. ♂ 460 mm; Sc. 33; V. 139; C. 22 + n. Sheikh, 4800 ft.
B.M. 1931.7.20.408. Skin 760 (approx.) mm; Sc. 33; V. 129; C. 28 + 1. Nogal Valley, 48° 10′ E. × 8° 10′ N., 2500 ft.

These nine specimens agree with one another and differ from all the Puff-adders that have been examined from other localities in having the subcaudal scales proportionally narrower and keeled distally. The comparative material includes specimens from southern Arabia, Eritrea, the A.E. Sudan, West Africa from the Cameroons to Morocco and from Uganda to the Cape Province of South Africa; in these specimens the subcaudals are always broader than long at the middle of the tail, and are all smooth.

The keels in the Somali sample are always most strongly developed distally, becoming progressively less distinct proximally, and there is individual and sexual variation in the number of subcaudals that bear keels, thus:

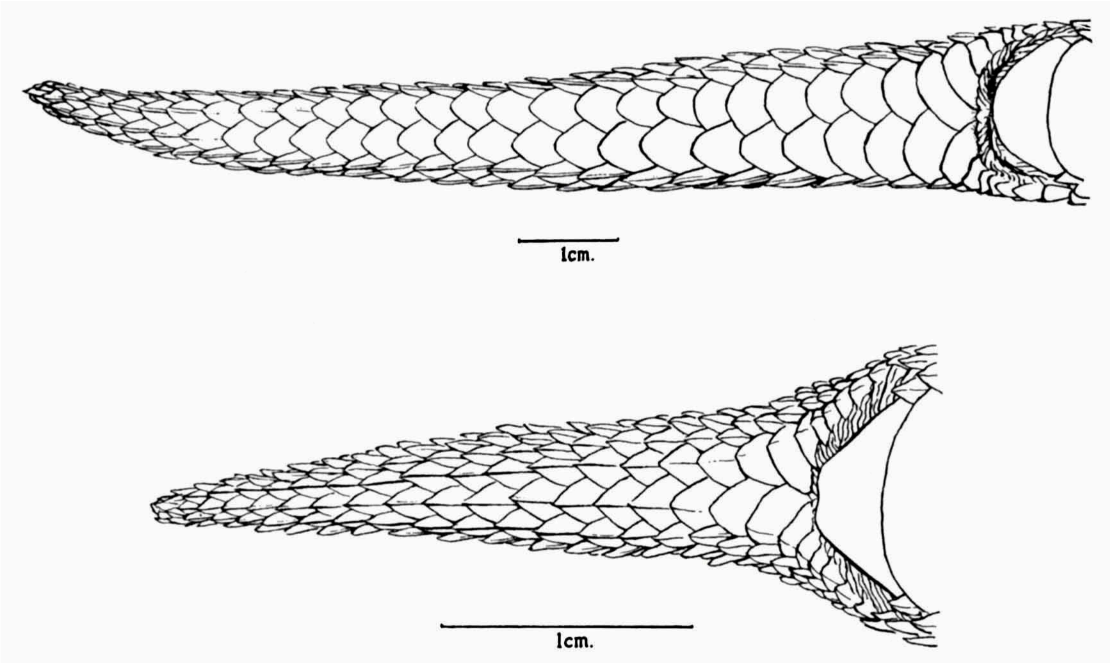

Fig. 11. Subcaudal scutes of *Bitis lachesis somalica* subsp. n. Maximum keeling, Cotype ♀ No. 1949.2.3.2; minimum keeling, Cotype ♂ No. 1905.11.7.58.

Sex	Length (mm)	No. of Subcaudals	Percentage Keeled
♀	215	21	70
♀	250	17	65
♀	345	16	50
♀	360	21	90
♀	420	17	90
♂	430	30	50
♂	460	22+	50 (approx.)
♂	760	28	45
♂	880	27	40

Females clearly have the character more developed than males and in the latter sex there are indications that there may be progressive reduction with increasing size (age).

When more material becomes available it is possible that, in addition to the difference already discussed, the Somali population may also be shown to be partially differentiated in its scale counts. The material available is inadequate for a statistical investigation for significance, but the following figures are of interest:

	Sample	Mid-body Scales	Ventrals	Subcaudals ♂♂	Subcaudals ♀♀
Cape Province, Natal and Zululand	10	33-41	132-144	26-34	16-22
S.W. Africa and Angola	54[1])	30-36	125-143	21-36	13-20
Rhodesia, Transvaal, Nyasaland, Mozambique	18	31-35	127-139	28-33	16-22
Tang. Terr., Kenya Col., Uganda, A.E. Sudan and Eritrea	27	29-35	132-145	31-39	16-22
Morocco, Senegal, Nigeria, N. Cameroons	5	31-35	120-144	30	16-21
British Somaliland	9	29-35	129-143	27-30	16-21
Dhufar, Hadramaut, Aden & Yemen	7	25-33	126-138	22-25	16-18

There is, apparently, a slight progressive south to north decrease in the number of mid-body scales, the lowest number occurring in the isolated population of S. Arabia. The ventrals remain constant throughout the whole area but the number of subcaudals in the male sex appears to drop suddenly in the Somali and Arabian samples. If the figures can be taken as a guide it would appear that in regard to the number of subcaudals (a) The Somali population is intermediate between that of S. Arabia and those of other regions in Africa, and (b) Amongst the smooth-tailed populations the one in S. Arabia may be different, and possibly even distinct, with an appreciably lower number; the observed maximum in S. Arabia is 25 whereas the observed minimum in its geographically nearest neighbour is 31.

In the Squamata it is a commonplace that great development of spines and rugosity is in some way associated with arid environmental conditions. It is, therefore, of interest that within the genus *Bitis* keeled subcaudals, more pronounced in females than in males, occur in two comparable arid zones, and to study the implications. In the north-east the form described above is apparently not completely distinct from, and is not sympatric with *B. lachesis*; in the comparably arid south-west there are two forms, *B. caudalis* (A. Smith) and *B. cornuta* (Daudin) which are specifically distinct from, but also sympatric with, *B. lachesis*. If aridity alone were the causative agency it would be reasonable to expect:

(a) That the Sahara and Central Arabian deserts would have been at least as productive of keel-tailed forms as the Kalahari and

(b) That *B. lachesis* in the Kalahari region and its neighbourhood would also show a keel-tailed race.

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1) Includes 37 recorded by FitzSimons (1935, p. 328) and 15 by Bogert (1940, p. 99).

Neither expectation is fulfilled. In addition, account must be taken of the facts that: (a) *Bitis* apparently is not tolerant of full desert conditions; it is absent from the Sahara and Central Arabian deserts, and (b) The keeled condition in *Bitis* may well be the more primitive one. Characters persistent in females but lost in adult males, as appears to be the case with the subcaudal keels, are usually juvenile and primitive ones.

Whether primitive or secondary, the present distribution of the keel-tailed forms is susceptible of rational explanation on the hypothesis of exactly the same sequence of climatic changes and time factors, viz.: A period of increasing desiccation in the south followed by a regression from extreme aridity in the latitude of the present Kalahari desert; during this latter phase there has been progressive desiccation in the north. Such an alternation of opposites in the north and south is the natural expectation if climatic fluctuations are controlled by alternating northerly and southerly migrations of the caloric equator, with no other overriding influences at work. This series of changes could have operated on *Bitis* as follows:

(a) *If the keels are primitive,* at the period of maximum aridity in the latitude of the Kalahari, or thereabouts, any widely distributed keel-tailed *Bitis* would have been split into two isolated groups, one north and one south of the belt of maximum aridity; it has been noted above that the genus is not tolerant of extreme desert conditions. Whilst this condition persisted the southern keel-tailed form underwent a further evolutionary change resulting in the production of *B. caudalis* and *B. cornuta.* Simultaneously in the north a smooth-tailed mutation spread from some central point, eventually permeating the whole population except that in the extreme north-east of the continent. With the reversal of the climatic conditions, the lessening aridity in the south opened the way for the smooth-tailed form to penetrate into the *caudalis-cornuta* country and the spread of extreme desert conditions in the north eliminated the smooth-tailed form from the Sahara, Egypt, Palestine and northern Arabia.

(b) *If the keels are secondary* and develop in association with arid conditions, then during the hypothetical sequence of climatic changes outlined above, the necessary conditions having been operative for a much longer time in the south two keeled forms developed there. During the isolation of the southern populations at the height of the southern desiccation a sterility barrier developed so that when, in the most recent phase, the parental stock, or its descendants, re-entered the southern territory, interbreeding was no longer possible. In the north, with the onset of arid conditions a parallel development of keeled sub-caudals took place, but, with no geographical isolation to stop protoplasmic interchange, full specific differentiation has not developed. The weakness of this theoretical explanation lies in the fact that in the north there is an isolated population (Arabia) living under arid or semi-arid conditions, in which no keel-tailed race has developed.

Echis Merrem

SYNOPSIS OF THE SPECIES

I. Mid-body scales 31-35; subcaudals 43-52. Nasal separated from the rostral by small scales. Two rows of scales between eye and labials. Scales of upper surface of head not strongly keeled. *E. coloratus* Günther

II. Mid-body scales 25-33 (Africa); subcaudals 29-43 (Africa). Nasal shield in contact with the rostral. Four or five rows of scales between eye and labials. Scales of upper surface of head strongly keeled or tuberculate. *E. carinatus* (Schneider)

Echis coloratus Günther

Echis coloratus Günther, 1881, p. 463 (Sokotra); Boulenger, 1896 e, p. 407; Idem, 1903, p. 91.

A single specimen of this species was brought back by the Balfour Expedition of 1879. As subsequent explorers have not rediscovered it and it has not been recorded in Africa south of about latitude 25° N. some doubt has been thrown on the authenticity of the record. Flower (1933, p. 835) for instance doubts the locality, referring to a specimen in the British Museum "said to have come from Socotra" and Mertens (1934, p. 50) appears to doubt the accuracy of the determination, for he precedes the name by a question mark. It is true that the expedition also collected (at least botanical material) in Southern Arabia around Aden, a region in which *E. coloratus* is well known, but there is no evidence that any herpetological material was obtained there; the other specimens received from Balfour with the *Echis* are *Pachycalamus brevis, Typhlops socotranus, Coluber socotrae* and *Ditypophis vivax,* all of which have been confirmed by other collectors as Sokotran species. In addition Balfour quotes Günther's remarks about the viper of Sokotra, and it is unlikely that he would have done so without comment if there were any doubt regarding the locality, the more so as his whole collection contained only the one viper.

The possibility of accidental importation into Sokotra cannot be ignored entirely, but for the present it must be assumed that this viper has a discontinuous distribution; it occurs, in addition to Sokotra, from Palestine southwards on both sides of the Red Sea, reaching about 25° N. on the west side and to Hadramaut and Oman on the east. The most probable explanation of the discontinuity is that it is a relic in Sokotra, the species as a whole having at one time had a greater distribution over northern Africa and S.W. Asia; the absence of any apparent insular race-formation despite long isolation indicates conservatism and stability, features noticeable also in its congener *E. carinatus.*

Echis carinatus (Schneider)

Echis carinatus Boulenger, 1896 e, p. 506 (Somaliland); Idem, 1896 d, p. 217 (Lake Stephanie); Meek, 1897, p. 179 (Hullieh); Boulenger, 1901, p. 49 (Gan Lebar, 5900 ft.); Sternfeld, 1908 b, p. 241 (Dadab; Abesso; Warabod); Calabresi, 1927, p. 34 (Steppe between Hamur and Gambeia); Parker, 1932, p. 364 (Sorl Haud; Coastal Plain; Dagah Shabell); Scortecci, 1934, p. 47, Pl., fig. 20 (Nogal Valley; Garoe; Oasis of Sugure, Mijarten); Loveridge, 1936 b, p. 46 (Hullieh); Scortecci, 1939 a, p. 247, figs. 137-139 (as 1934); Idem, 1943, p. 289 (Gondaraba; Elolo).

In addition to the material mentioned above by Boulenger (1896 e) and Parker (1932), eighteen other specimens from various localities in the Ogo and Guban at altitudes between sea level and 3000 ft., have been examined. The species appears to have a wide distribution in Somaliland in the northern and drier areas. Within this area it varies in its scale counts, as follows:

Mid-body scale rows 25-31; ventrals 156-179; subcaudals 29-43. The species throughout its vast geographical range is very variable and, though there are no recognisable races, the number of mid-body scales shows some association with geography; in this character the Somali population contains a small percentage of individuals with the lowest recorded numbers. The highest counts are confined to the most northerly area, centred by Afghanistan, falling both to the south east and south west, thus in the material examined:

Iran, Afghanistan, Transcaspia,
Punjab, Baluchistan
30-37

Hejaz-Dhufar
27-32

Peninsular India
27-31

Senegal-Algeria —— Egypt & A.E. Sudan
29-32 27-33

Gold Coast to Nigeria
28-32

Ethiopia, Eritrea,
Somaliland, Kenya Colony
25-31

Atractaspis A. Smith

SYNOPSIS OF THE SPECIES

I. Anal divided; subcaudals paired; mid-body scale-rows 19; tip of snout rounded, the portion of the rostal visible from above about 1/3 its distance from the frontal. Fourth labial only entering the eye. *A. engdahli* Lönnberg & Andersson

II. Anal entire; subcaudals single.

(a) Tip of snout rounded, not markedly prominent, the portion of the rostral visible from above 1/2 to 3/4 its distance from the frontal. Usually the third and fourth labials, rarely the fourth only, entering the eye. Uniform dark brown or black above and below.

(1) Mid-body scale rows 25-29. Haud to Mijarten and Obbia. *A. microlepidota magrettii* Scortecci

(2) Mid-body scale rows 29—37. Territory to the south of the foregoing. *A. microlepidota microlepidota* Günther

(b) Tip of snout rounded and moderately prominent, the portion of the rostral visible from above as long as its distance from the frontal. Third and fourth labials entering the eye. Sides and lower surfaces of the head and the nape white. Upper surfaces of body and tail black with a median dorsal white stripe; throat black; belly white, this colour extending on to the four lower rows of lateral scales on each side. Mid-body scale rows 23. *A. leucomelas* Boulenger

(c) Tip of snout pointed and very prominent, the portion of the rostral visible from above longer than its distance from the frontal. Fourth labial only entering the eye. Sides and lower surfaces of the head and the nape white. Dorsum uniform black, this colour extending to the ventrals and subcaudals which are white but more or less heavily brown-dusted. Mid-body scale rows 23-25. *A. scorteccii* sp. n.

In addition to the foregoing, all of which have been recorded from within the area under discussion in the present paper, there may also be found *A. irregularis conradsi* Sternfeld, a species with divided anal, paired subcaudals, 23-25 mid-body scales; portion of the rostral visible from above ½ to as long as its distance from the frontal; two labials entering the orbit. This form has been recorded from Uganda and Eritrea.

Atractaspis engdahli Lönnberg & Andersson

Atractaspis engdahli Lönnberg & Andersson, 1913, Ark. Zool., vol. 8, pt. 20, p. 5, fig. 1 (Type locality: Kismayu); Scortecci, 1934, p. 41, fig. 17; Idem, 1939 a, p. 261 (Belet Amin); Idem, 1939 b, p. 289 (Belet Amin).

This species, known from only two specimens both taken in the south of Somaliland, resembles *A. aterrima* Günther (West Africa to N. Uganda) in its rounded snout, short rostral and low number of mid-body scales; it is differentiated, however, in having only a single labial entering the eye and a lower number of ventral scutes, 223-232 (vice 244-300).

Atractaspis microlepidota magrettii Scortecci

Atractaspis microlepidota, Boulenger, 1895 b, p. 15 (Ogaden); Meek, 1897, p. 179 (Harsi Barri, Ogaden); Sternfeld, 1908 b, p. 241 (Wajam = 41° E. × 8° N. approx.); Loveridge, 1936 b, p. 47.

Atractaspis microlepidota magrettii Scortecci, 1939 a, p. 258, figs. 141, 142 (Gardo and Obbia region).

B.M. 1949.2.3.4. ♀ juv.; Sc. 25; V. 236; C. 28. Haud, 46° E. × 8° 20′ N., 2100 ft.
B.M. 1949.2.3.5. ♂; Sc. 27; V. 240; C. 34. Haud, 46° E. × 8° 20′ N., 2100 ft.
B.M. 1949.2.3.6. ♀; Sc. 29; V. 251; C. 31 + n. Haud, 46° E. × 8° 20′ N., 2100 ft.
B.M. 1949.2.3.7. ♂; Sc. 29; V. 246; C. 30. Haud, 45° 20′ E. × 8° 15′ N., 2700 ft.

These specimens were all caught by day in a region of sandy soil with thorn scrub and patches of grass. They support Scortecci's view that in the north of Somalia the mid-body scale rows do not exceed 29, and furnish other evidence that the population of this area is differentiated; but whether subspecifically or specifically is uncertain. In the A.E. Sudan the number of mid-body scales in a sample of 12 individuals varies between 25 and 32, but in this and other areas the ratio between the lengths of the prefrontals and internasals and between the frontal and its distance from the end of the snout are somewhat different, perhaps significantly so, thus:

	Mid-body scales	Prefrontal / Internasal Suture	Rostral / Distance between Rostral & Frontal	Tip of Rostral to Frontal / Frontal length
N. Nigeria (2)	25	0.87	1.0—1.4	0.71—0.77
A.E. Sudan (12).	25—32	0.42—0.87	0.46—0.94	0.62—0.94
A. andersoni (8).	23—25	0.4 —0.67	0.55—1.0	0.66—0.79
micropholis (Type)	25	1.0	0.79	0.79
microlepidota (Type)	31	1.0	0.58	0.62
magrettii (4)	25—29	1.1—1.5	0.5—0.73	0.57—0.69

It was also noticed that in males from the A.E. Sudan (4) the hemipenis extends back to the 9th-13th subcaudal, in the types of both *micropholis* and *microlepidota* it reaches the 11th and in four males of *A. andersoni* Boulenger, between the 10th and 13th. In two males of *magrettii* it is appreciably longer, reaching the 16th.

Thus in the mountain and arid region from Eritrea to Mijarten and Obbia there appears to be a form recognisably different and possibly distinct from a complex of forms ranging at least from the Sudanese parts of Nigeria to Tanganyika Territory and with an isolated outlier in southern Arabia (*A. andersoni* Boulenger).

Atractaspis microlepidota microlepidota Günther

Atractaspis microlepidota, Boulenger, 1895 c, p. 539 (Tooroo); Idem, 1896 b, p. 14 (Dolo); Idem, 1896 c, p. 23 (between Komia and Madagoi); Idem, 1898 a, p. 721 (Lugh); Idem, 1912, p. 332 (Dolo); Calabresi, 1927, p. 34 (salt deposits of Agherron, near Lugh); Scortecci, 1934, p. 44, fig. 19, Pl. (Benadir and probably Trans-Juba); Idem, 1939 a, p. 257 (Benadir; Trans-Juba; Southern Ethiopia); Idem, 1939 b, p. 290 (Belet Amin).

These records from southern localities, where figures are given, mention a number of mid-body scale rows exceeding 31, a character in which they agree with the type of *microlepidota* and specimens from Uganda (Lodwar), Kenya Colony and Tanganyika Territory. Specimens from the central areas of Somaliland are needed before it is possible to arrive at any conclusion regarding the status of the northern *magrettii* which has been discussed above.

Atractaspis leucomelas Boulenger

Atractaspis leucomelas Boulenger, 1895 b, Ann. Mus. Stor. nat. Genova (2), vol. 15, p. 16, Pl. 4 fig. 2 (Type locality: Ogaden); Idem, 1896 e, p. 517; Scortecci, 1934, p. 43 (part.); Idem, 1939a, p. 255 (part.).

B.M. 1949.2.3.8. ♂ juv. Guban, 43° 05′ E. × 11° N., 1000 ft.

This specimen measures 250 mm, approximately, overall, has 23 mid-body scale rows, 230 ventrals and 29 subcaudals; otherwise it agrees so closely, both in head shields and colour pattern, with the original description that this might have been prepared from it; the only observed differences are in the temporal region where there is a single large scale between the postocular and the fifth upper labial (2 in the figure of the type) and in the presence of a broad black bar across the throat. It was captured by day in a region of sandy soil, with patches of grass and stunted thorn. It appears to be the second recorded example of this very distinctively marked species; for reasons that are given below it is probable that the viper from Gardo, doubtfully referred to as *leucomelas* by Scortecci (1931, p. 214), really represents a distinct species.

Atractaspis scorteccii sp. nov.

Atractaspis leucomelas Scortecci, 1931, p. 214 (Gardo, Mijarten); Idem, 1934, p. 43 (part.), fig. 18; Idem, 1939a, p. 255 (part.), fig. 140.

HOLOTYPE.

B.M. 1949.2.3.9. ♂. Haud, 46° 20′ E. × 8° 15′ N., 2100 ft.

PARATYPES.

B.M. 1949.2.3.10. ♀. Haud, 46° 20′ E. × 8° 15′ N., 2100 ft.
B.M. 1949.2.3.11. ♀. Haud, 45° 18′ E. × 8° 34′ N., 2900 ft.
B.M. 1949.2.3.12. ♀. Haud, 45°09′ E. × 8° 37′ N., 3050 ft.
B.M. 1949.2.3.13. ♀. Daggah Bur, 43° 30′ E. × 8° 13′ N., 3500 ft.
B.M. 1949.2.3.14. ♂. Daggah Bur, 43° 30′ E. × 8° 13′ N., 3500 ft.

The specimen obtained at Gardo was referred by Scortecci to *A. leucomelas* Boulenger, with considerable hesitation; he remarked that there were obviously very great differences, sufficient perhaps to warrant the erection of a new species, but that it was preferable to wait in the hope of obtaining further material. The foregoing six specimens and the juvenile *A. leucomelas*, mentioned above, provide the necessary new comparative material, and it seems that the erection of a new species is now justified. The six specimens, listed above as type and paratypes, show the same differences from the specimen of *leucomelas* that Scortecci observed between his Gardo specimen and Boulenger's description and figure of the type.

Specimen 1949.2.3.9, the holotype of the name *A. scorteccii*, possesses 25 rows of scales at the middle of the body, has 218 ventrals and 33 subcaudals; it measures approximately 840 mm overall, the tail being 75 mm. The snout is very prominent, the rostral being cuneiform and extending backwards in wedge-fashion between the internasals. The suture between the prefrontals is 1.5 times as long as that between the internasals, and the portion of the rostral visible from above is as long as its distance from the frontal; this latter shield is 1.36 times as long as broad, 1.39 times as long as its distance from the tip of the rostral and 1.2 times as long as the parietal. There are seven upper labials, of which the fourth is the largest and the only one to enter the orbit, being also in contact with the pre- and post-oculars; the fifth is divided by a horizontal suture. Temporals are 2 + 3 and the first lower labials are in contact behind the mental. The upper surfaces are dark brownish black (this colour extending to the outer edges of the ventral and subcaudal scutes) except for a broad white collar behind the parietals; lower surfaces white, very heavily dusted and mottled with dark brown except the chin and throat which are immaculate white.

The paratypes agree, in general, very closely with the holotype, the observed variations being as shown in table on p. 111.

In addition, specimen 1949.2.3.10 has the fifth upper labial divided by an oblique, instead of a horizontal, suture so that the labial is relatively high and reaches the postocular. The colour is constantly of the same character, the only variation noted being in the intensity of the dark stippling of the lower surfaces. In the male paratype the venom gland extends backwards to the level of the 29th ventral and the penis to the 10th subcaudal.

The species appears to be nocturnal (in contrast with *A. m. magrettii* and *A. leucomelas* both of which were captured by day) and to frequent sandy or stony country with scattered grass patches and thin scrub vegetation.

No.	Length	Scales	Ventrals	Caudals	Upper labials	Temporals	Prefrontal times internasal	Rostral times its distance from frontal	Frontal times as long as broad	Frontal times its distance from tip of rostral	Frontal times length of parietal	Sex
Holotype 1949. 2. 3. 9	840	25	218	33	7	2+3	1.5	1.0	1.36	1.39	1.2	♂
1949. 2. 3. 10	720	23	225	32	7	2+3	3.0	1.28	1.36	1.49	1.43	♀
1949. 2. 3. 11	720	23	227	32	7[1])	2+3	1.8	1.14	1.47	1.53	1.30	♀
1049. 2. 3. 12	630	23	220	34	7	2+4	1.67	1.29	1.40	1.53	1.34	♀
1949. 2. 3. 13	750	23	216	32	7[2])	2+3	1.06	1.20	1.31	1.67	1.27	♀
1949. 2. 3. 14	710	23	215	34	7	2+4	1.2	?	1.31	1.65	1.52	♂

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1) The 6th is "squeezed" upwards off the labial margin.

2) The 5th is "squeezed" upwards off the labial margin and is not divided horizontally.

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