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Article I.—CONTRIBUTIONS TO THE HERPETOLOGY OF
THE BELGIAN CONGO BASED ON THE COLLECTION OF
THE AMERICAN MUSEUM CONGO EXPEDITION,
1909–1915¹

PART II.—SNAKES

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WITH FIELD NOTES BY HERBERT LANG AND JAMES P. CHAPIN

PLATES I TO XXII, 19 MAPS, AND 15 TEXT FIGURES

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¹Scientific Results of The American Museum of Natural History Congo Expedition. Herpetology, No. 2.

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INTRODUCTION

The collection of snakes secured by the American Museum Congo Expedition nearly equals in interest the reptile material which formed the subject matter for Part I¹ of the present paper. The 914 specimens of snakes representing 43 genera and 81 species are distributed among the following families and subfamilies.

		NUMBER OF SPECIMENS
Typhlopidae	1 genus, 6 species	75
Leptotyphlopidae	1 genus, 1 species	1
Boidae		
Pythoninae	2 genera, 3 species	44
Colubridae		
Colubrinae	19 genera, 32 species	347
Dasypeltinae	1 genus, 3 species	20
Boiginae	11 genera, 17 species	170
Elapinae	4 genera, 7 species	71
Viperidae		
Viperinae	4 genera, 12 species	186

As in the preparation of Part I of this report, my thanks are due to Dr. Thomas Barbour for the opportunity to study the valuable Cameroon collections of the Museum of Comparative Zoölogy. Through Mr. Henry W. Fowler the Academy of Natural Sciences of Philadelphia has loaned a small collection of West African snakes for comparative study. In connection with the work on distribution, the criticism and aid of Dr. J. Bequaert has been invaluable, and Messrs. Herbert Lang and James P. Chapin have added comment, criticism and advice to the advantage of the paper. The photographs were taken in the field by Mr. Lang, and form a valuable contribution to the illustration of the African snakes. It has been noted in the captions whether these photographs are from living or dead specimens.

The determination of the species of snakes occurring in the Belgian Congo is greatly facilitated by the 'List of Snakes of the Belgian and Portuguese Congo, Northern Rhodesia, and Angola,' by Dr. G. A. Boulenger (1915, Proc. Zoöl. Soc. London, pp. 193-223, Figs. 1-2), supplemented by the 'List of the Snakes of West Africa, from Mauretania to the French Congo' by the same author (1920, Proc. Zoöl. Soc. London, 1919, pp. 267-307, Figs. 1-2), which together serve as check lists of the snakes of the Rain Forest and the Sudan.

¹Schmidt, 1919, Bull. Amer. Mus. Nat. Hist., XXXIX, p. 385.

LIST OF LOCALITIES FROM WHICH SPECIMENS ARE RECORDED WITH THEIR
APPROXIMATE LATITUDE AND LONGITUDE

Aba.—3° 50' N., 30° 10' E.	Irebu.—0° 35' S., 17° 50' E.
Akenge.—2° 55' N., 26° 50' E.	Leopoldville.—4° 25' S., 15° 20' E.
Avakubi.—1° 20' N., 27° 40' E.	Malela.—6° S., 12° 40' E.
Babonde.—2° 17' N., 27° 40' E.	Medje.—2° 25' N., 27° 30' E.
Bafuka.—4° 20' N., 27° 50' E.	Nala.—2° 50' N., 27° 50' E.
Bafwabaka.—2° 10' N., 27° 50' E.	Ngayu.—1° 40' N., 27° 40' E.
Banana.—6° S., 12° 20' E.	Niangara.—3° 40' N., 27° 50' E.
Batama.—1° N., 26° 40' E.	Niapu.—2° 15' N., 26° 50' E.
Boma.—5° 50' S., 13° 10' E.	Pama.—2° 25' N., 27° 50' E.
Dungu.—3° 30' N., 28° 30' E.	Poko.—3° 10' N., 26° 50' E.
Faradje.—3° 40' N., 29° 40' E.	Rungu.—3° 0' N., 28° 0' E.
Fort Beni.—0° 30' N., 29° 30' E.	Stanleyville.—0° 30' N., 25° 15' E.
Gamangui.—2° 10' N., 27° 20' E.	Yakuluku.—4° 20' N., 28° 50' E.
Garamba.—4° 10' N., 29° 40' E.	Zambi.—6° S., 12° 50' E.

NEW GENUS

Limnonaja. Type, *Boulengerina christyi* Boulenger p. 124

LIST OF NEW SPECIES WITH THEIR TYPE LOCALITIES

<i>Typhlops awakubæ</i>	Avakubi	p. 51
<i>Typhlops sudanensis</i>	Garamba	p. 51
<i>Chlorophis bequaerti</i>	Niangara	p. 75
<i>Rhamnophis ituriensis</i>	Niapu	p. 81
<i>Calamelaps niangaræ</i>	Niangara	p. 117
<i>Miodon unicolor</i>	Poko	p. 119

SUMMARY OF THE DISTRIBUTION OF AFRICAN REPTILES

In the following pages I have attempted to gather the observations on the zoögeography of African reptiles, made during the systematic work embodied in this and the preceding paper, into a coherent form. If the resulting outline should prove useful as a basis for further work in this field, my end will have been accomplished. The account has accordingly been made as much descriptive and as little speculative as possible. The Malagasy fauna has not come within the scope of the present paper, and only a cursory examination of that intensely interesting subregion has been possible.

The real foundation of the zoögeography of African reptiles remains to be laid by future discoveries in the little-known tertiary palæontology of the continent, since experience has shown that even a small amount of palæontological evidence is of greater importance in the elucidation of a

faunal history than the best-founded inferences from present faunæ. Even from the standpoint of the present, however, the last word must be said by the monographer of the families in question, dealing authoritatively with the relations of their genera.

In the maps of the ranges of genera the outlines have been sketched boldly, a considerable element of error being inherent in the imperfection of the data. The object of such maps is to exhibit graphically types of distribution rather than to establish the exact limits of ranges.

The method of zoögeographic study outlined by Tillyard (1914, Proc. Linn. Soc. New South Wales, XXXIX, p. 21) offers a most useful means of presenting distribution data. His method of mapping genera by means of lines ("specific contours") passing through localities with the same number of species is less practicable for vertebrates, for which lists of species from single localities are available only in the most intensively studied areas. The classification of types of distribution as Palæogenic, Entogenic, and Ectogenic is as useful in reptiles as in insects. Tillyard's definition of these terms (1917, 'The Biology of Dragonflies,' p. 281) may be quoted.

1. PALÆOGENIC GROUPS, or those archaic remnants whose distribution is discontinuous, extending over one or more regions. They are the last remains of groups which were once more widely spread.

2. ENTOGENIC GROUPS, or those groups which form the autochthonous or peculiar fauna of each region. They are not necessarily confined to a single region, since they frequently develop sufficient energy to spread over two or more regions. A group is, however, only ENTOGENIC in that region in which it forms a definite ZOO-CENTRE (region of greatest density), placed definitely within the region.

3. ECTOGENIC GROUPS, or those groups which, being entogenic in a neighboring region, have invaded the region under discussion and have gained a footing in some part of it, thus modifying the composition of the fauna of that part. No ZOO-CENTRE is formed by any group in the region in which it is ECTOGENIC.

The term zoöcenter, proposed by Tillyard for the area of occurrence of the greatest number of forms of a group, is a concept quite independent of the "Center of Dispersal." It is here used as a purely descriptive term, without inference as to the origin of the group concerned, and it can be defined as the geographical center of distribution of the group. Tillyard has applied his method chiefly to the distribution of genera, studied by means of the sum of their species. In the present account, the families of reptiles are units, and are studied by means of the distribution of their genera. An ideal method of presenting the graphical results would be a composite photograph of the ranges of the genera of a family.

I am indebted also to Dr. A. Avinoff for valuable suggestions. In Dr. Avinoff's maps of distribution of Asiatic *Lepidoptera*, the classifica-

tion of ranges as TYPICAL, confined to a given province, and EXTRA LIMITAL, showing the limits of influence of a given fauna, is most interesting, and in fact stands in close relation to the method of Tillyard.

I have attempted to combine the methods above outlined with the systematic survey of older zoögeographies, and the following account is accordingly divided into a systematic and a faunal part, the first a review of the distribution of the African genera of reptiles, the second an account of the faunæ of the zoögeographical subdivisions of the Ethiopian Region.

Distribution of Taxonomic Units

FAMILIES OF REPTILES IN AFRICA AND MADAGASCAR

FAMILY	NUMBER OF GENERA IN AFRICA	NUMBER OF GENERA IN MADAGASCAR	GENERAL CHARACTER OF DISTRIBUTION
Testudinata			
1. Testudinidæ	3	2	Palæogenic
2. Pelomedusidæ	2	2	Entogenic
3. Trionychidæ	3	0	Ectogenic
Loricata			
4. Crocodylidæ	2	1	Entogenic
Squamata			
5. Gekkonidæ	28	8	Palæogenic
6. Uroplatidæ	0	1	Entogenic
7. Agamidæ	5	0	Ectogenic
8. Iguanidæ	0	2	Palæogenic
9. Zonuridæ	4	0	Entogenic
10. Anguidæ	1	0	Ectogenic
11. Varanidæ	1	0	Ectogenic
12. Amphisbænidæ	11	0	Polyentogenic
13. Lacertidæ	17	0	
14. Gerrhosauridæ	3	2	Entogenic
15. Scincidæ	18	10	Palæogenic
16. Chamæleontidæ	2	2	Entogenic
17. Typhlopida	1	1	Palæogenic
18. Leptotyphlopida	1	0	Ectogenic
19. Boidæ			
a. Boinæ	1	4	Palæogenic
b. Pythoninæ	2	0	Ectogenic
20. Colubridæ			
a. Colubrinæ	39	14	Polyentogenic
b. Dasypeltinæ	1	0	Entogenic
c. Boiginæ	32	8	Polyentogenic
d. Elapina	9	0	Polyentogenic
21. Viperidæ			
a. Viperinæ	7	0	Entogenic

Testudinata

The distribution of African turtles has been briefly dealt with in Part I of the present paper (Schmidt, 1919, *Bull. Amer. Mus. Nat. Hist.*, XXXIX, p. 401). Of the three families of turtles represented in the region, none is confined to it, and only one is entogenic. These families in turn are poorly developed, with only eleven genera in all.

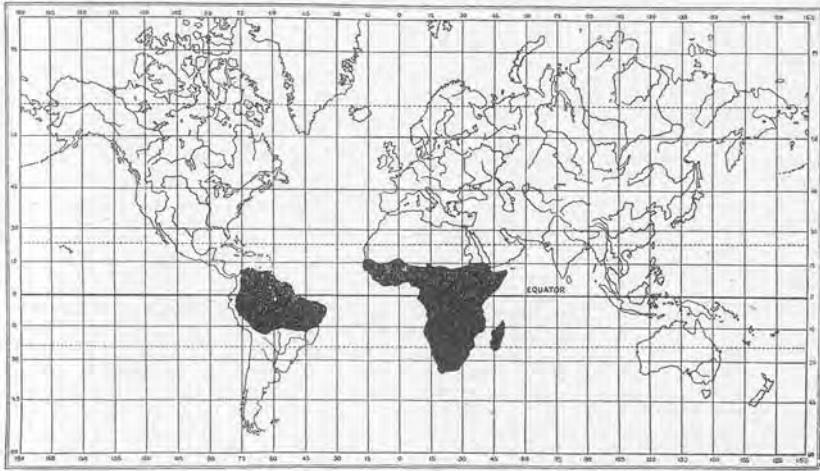


Map 1. The zoological subdivisions of Africa (see p. 37).

The TESTUDINIDÆ have been considered palæogenic as a group because of the discontinuous distribution of *Testudo*, the relatively poor development of the family, and its presence in the Malagasy Islands. Aquatic genera of this family do not reach the Ethiopian Region, though *Clemmys* and *Emys* are found in Barbary.¹ Two distinct genera of land turtles (*Kinixys* and *Homopus*) have been developed on the continent, and two more (*Pyxis* and *Acinixys*) in Madagascar, all probably from an

¹The discovery of *Clemmys leprosa* in Dahomey (Chabanaud, 1917, *Bull. Mus. Hist. Nat., Paris*, XXIII, p. 105) is an important exception.

ancestral *Testudo* stock, though the relation is an ancient one. *Testudo* itself reaches a remarkable development, with two zoöcenters. The group of giant turtles in the Seychelles, Aldabra, Mauritius, Bourbon, and Madagascar is obviously on the decline with many recently extinct species in Madagascar and Mauritius. The "specific contours," although difficult to draw for this subregion, would show an area of least density of species at the center, or what Tillyard terms a "lacuna." It seems quite possible that this form of specific contour may be characteristic of declining groups. The South African group of species, on the other hand, with no less than twelve species south of the Zambezi, two in East Africa, and one in the Sudan and Abyssinia, presents a typical entogenic contour,



Map 2. The present distribution of the Pelomedusidæ (Turtles).

and it is impossible to resist the conclusion that South Africa has become a secondary center of differentiation for a stock which arrived from the north, independently of the Malagasy group.

The PELOMEDUSIDÆ is an essentially African family, with four genera (including the fossil *Stereogenys*) known from the region. Of these, *Podocnemis*, with living species in Madagascar and northern South America, had a much wider distribution in the Eocene, when it reached northwest India, England, Egypt, and the Congo. Although the oldest known form (Palæocene) is from the lower Congo and fossil species are unknown from North America, the hypothesis of a northern pre-Eocene center of dispersal seems at least as well founded as the invocation of

Gondwana Land to account for the present distribution (Dollo, 1913, Ann. Mus. Congo Belge, (3) I, pp. 60-62, Figs. 1-3). Dollo (*loc. cit.*, p. 62) reaches the conclusion that the absence of *Podocnemis* from India and Africa at the present time is due to the competition of *Amyda*. The rather sparing representation of the Trionychidæ in Africa and the fact that they co-exist with *Pelusios* and *Pelomedusa*, quite as aquatic genera as *Podocnemis*, tell against this hypothesis. The range of *Pelusios* at present includes the entire Ethiopian Region, the Madagascan forms being so slightly differentiated as to suggest a recent or continued arrival. *Pelomedusa* is less widespread, being absent from the Rain Forest and from Madagascar.



Map 3. The present and past distribution of the genus *Podocnemis* of the Pelomedusidæ.

The TRIONYCHIDÆ is the most recent group of turtles to reach Africa, being absent from Madagascar and even from South Africa. The zoöcenter of *Amyda* is in eastern India and only a single species reaches Africa, where its range includes the Nile, Congo, and Niger river systems. To have reached so wide a distribution without differentiation argues a rapid and recent spread, although fossil species of this genus are known from the Miocene of Egypt (Dollo, *loc. cit.*). *Cycloderma* and *Cyclanorbis* form with the East Indian *Emyda* a well differentiated section of the family and, with much more restricted ranges in Africa, appear to have reached that continent at a much earlier date than *Amyda*.

Genera of Gekkonidæ in Africa and Madagascar

GENUS	CHARACTER OF DISTRIBUTION IN AFRICA	AREA IN WHICH ENTOGENIC	AREA IN AFRICA IN WHICH ECTOGENIC	REMARKS
1. <i>Hemitheconyx</i>	Entogenic	West Sudan	.....	Monotypic
2. <i>Holodactylus</i>	Entogenic	Northeast Africa	.....	Monotypic
3. <i>Chondrodactylus</i>	Entogenic	South Africa	.....	Monotypic
4. <i>Ptenopus</i>	Entogenic	South Africa	.....	Monotypic
5. <i>Palmatogeco</i>	Entogenic	South Africa	.....	Monotypic
6. <i>Stenodactylus</i>	Ectogenic	Southwest Asia	North Africa	Map 4
7. <i>Tropicolotes</i>	Entogenic	Barbary	.....	.....
8. <i>Narudasia</i>	Entogenic	South Africa	.....	Monotypic
9. <i>Bunopus</i>	Entogenic	Northeast Africa	.....	.....
10. <i>Gymnodactylus</i>	Ectogenic	Polyentogenic	North Africa	World Wide
11. <i>Saurodactylus</i>	Entogenic	Barbary	.....	Monotypic
12. <i>Pristurus</i>	Entogenic	Northeast Africa	.....	Map 5
13. <i>Paragonatodes</i>	Entogenic	East Africa	.....	.....
14. <i>Ancylodactylus</i>	Entogenic	Cameroon	.....	.....
15. <i>Phyllodactylus</i>	Ectogenic	Polyentogenic	.....	World Wide
16. <i>Diplodactylus</i>	Palæogenic	Australia	East and West Africa	Map 6
17. <i>Ebenaria</i>	Palæogenic	Madagascar	.....	Australian
18. <i>Ædura</i>	Palæogenic	Australia	South Africa	.....

Genera of Gekkonidæ in Africa and Madagascar (*Continued*)

GENUS	CHARACTER OF DISTRIBUTION IN AFRICA	AREA IN WHICH ENTOGENIC	AREA IN AFRICA IN WHICH ECTOGENIC	REMARKS
19. <i>Ptyodactylus</i>	Entogenic	North Africa	.....	Reaches Sind
20. <i>Hemidactylus</i>	Polyentogenic	Rain Forest Northeast Africa	South Africa	World Wide
21. <i>Geckonia</i>	Entogenic	North Africa	.....	.....
22. <i>Bunocnemis</i>	Entogenic	Sudan	.....	.....
23. <i>Lygodactylus</i>	Polyentogenic	Madagascar	Central Africa	.....
24. <i>Microscalaboles</i>	Entogenic	Madagascar	.....	.....
25. <i>Blæsodactylus</i>	Entogenic	Madagascar	.....	.....
26. <i>Homopholis</i>	Entogenic	South Africa Madagascar	.....	.....
27. <i>Geckolepis</i>	Entogenic	Madagascar	.....	.....
28. <i>Æluroonyx</i>	Entogenic	Madagascar	.....	.....
29. <i>Tarentola</i>	Entogenic	North Africa	Sudan?	.....
30. <i>Platypholis</i>	Entogenic	Northeast Africa	.....	.....
31. <i>Pachydactylus</i>	Entogenic	South Africa	East Africa	.....
32. <i>Colopus</i>	Entogenic	South Africa	.....	Monotypic
33. <i>Phelsuma</i>	Entogenic	Madagascar	East Africa	.....
34. <i>Rhoptropus</i>	Entogenic	South Africa	.....	.....
35. <i>Peropus</i>	Ectogenic	East Indies	Madagascar	Accidental

Loricata

In the crocodiles, in which the fossil forms had a greater range of development and a wider distribution than the living, speculation from the distribution of the living forms alone is profitless. Dollo (1915, Rev. Zool. Africaine, IV, p. 210), in discussing the discovery of a Mesosuchian (*Congosaurus bequaerti*) in the Palæocene of Landana, has commented on the parallel between the persistence of European Mesozoic types into the Tertiary in Africa and the survival there of the living crocodiles, which became extinct in Europe in the Pliocene.

It is interesting to observe that the African genera parallel the American in many characters. The members of the genus *Crocodylus* are divided into long- and broad-snouted species in both regions. The American *Caiman* and *Alligator* resemble the African *Osteolæmus* and *Osteoblepharon* in the strongly buttressed cranium and are distinguished in the same way, by the presence or absence of a nasal septum.

Crocodylus niloticus is a strong-swimming species, and it is probable that repeated colonization of Madagascar from the mainland has prevented the formation of a very distinct type derived from it in the Malagasy subregion.

Squamata

Thirty-five genera of GEKKONIDÆ are found in Africa and Madagascar, of which seven belong essentially to the North African fauna. These are either ectogenic with a zoöcenter in southwest Asia (*Stenodactylus*, *Gymnodactylus*, *Ptyodactylus* and *Tarentola*) or entogenic in Barbary but closely related to a more widespread form (*Saurodactylus* to *Gymnodactylus*, *Tropicolotes* to *Stenodactylus*, *Geckonia* to ? *Tarentola*).

The twenty-eight remaining genera are nearly half the number in the family, which, but for the restricted or discontinuous distribution of many genera, might therefore be considered entogenic in Africa.

Four genera (*Microscalabotes*, *Blæsdactylus*, *Geckolepis*, and *Æluronyx*) are confined to Madagascar. Two reach the region only in Madagascar (*Ebenavia* and *Peropus*) and of these *Peropus* is probably accidental. Six genera are common to Madagascar and Africa (*Phyllo-dactylus*, *Diplodactylus*, *Hemidactylus*, *Lygodactylus*, *Homopholis* and *Phelsuma*).

The remaining genera are highly interesting, constituting the entogenic gecko fauna of continental Africa. No less than four genera with undifferentiated digital lamellæ are confined to the deserts of South Africa. *Palmatogecko* with its completely webbed toes presents a highly interest-

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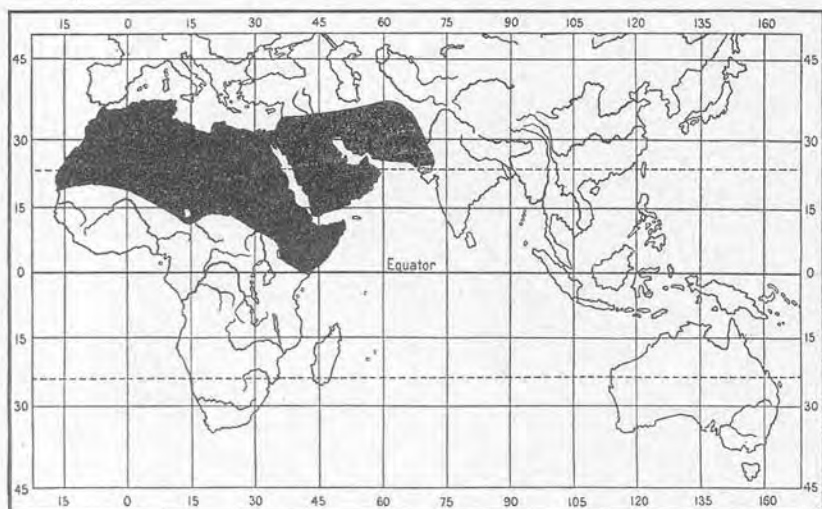
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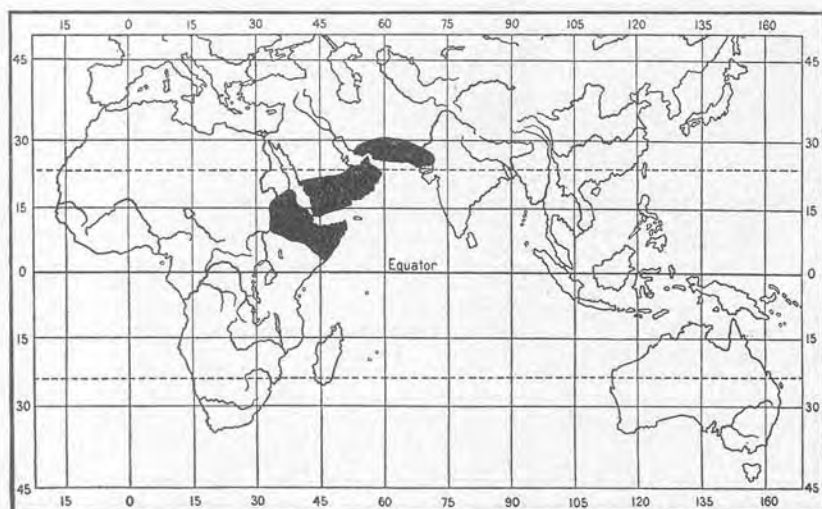
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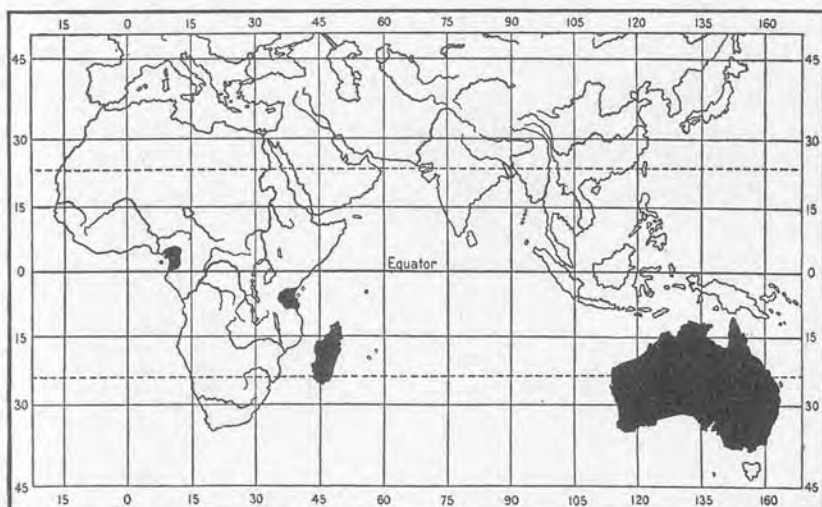
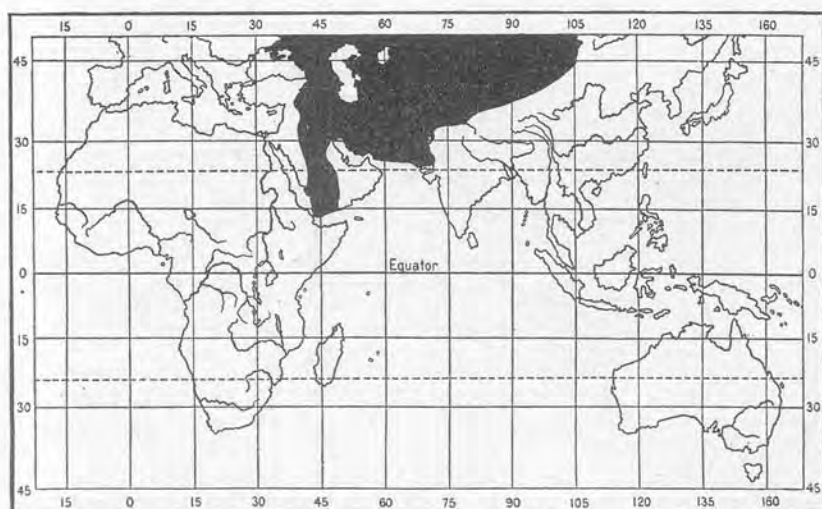
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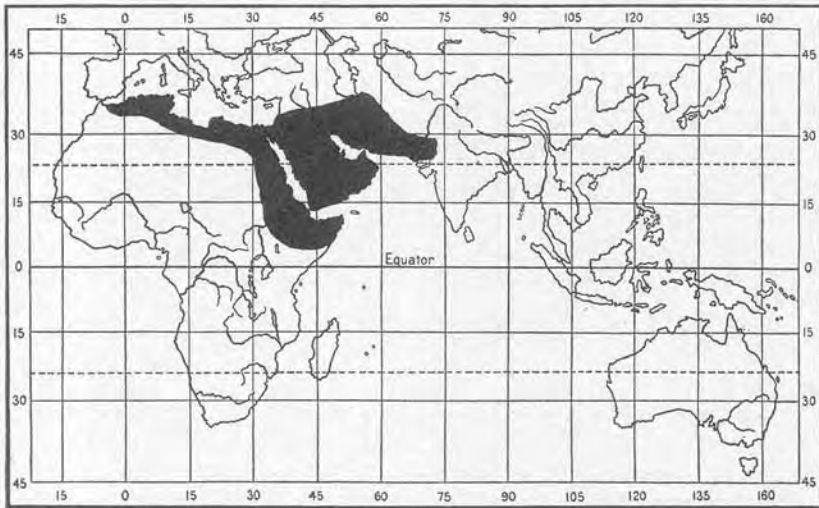


Map 4. Distribution of the genus *Stenodactylus* (Gekkonidæ).

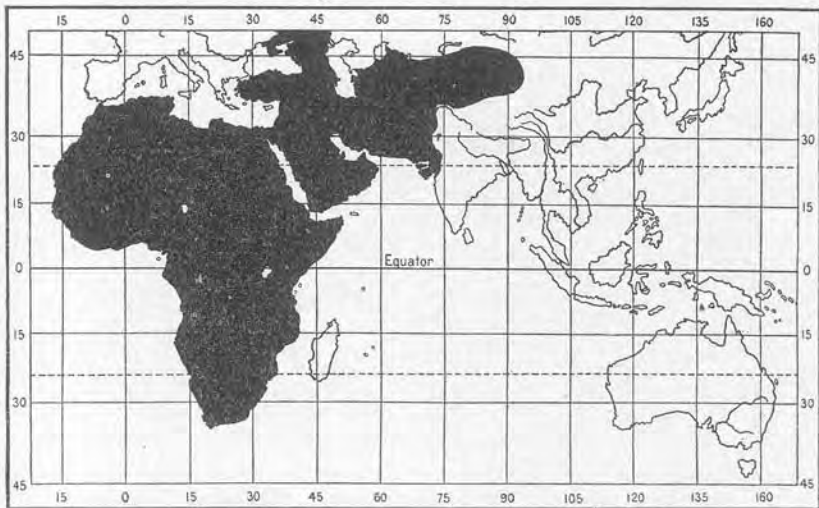


Map 5. Distribution of the genus *Pristurus* (Gekkonidæ).

Map 6. Distribution of the genus *Diplodactylus* (Gekkonidæ).Map 7. Distribution of the genus *Phrynocephalus* (Agamidæ).



Map 8. Distribution of the genera *Uromastix* and *Aporoscelis* (Agamidæ).



Map 9. Distribution of the genus *Agama* (Agamidæ). Maps 7, 8, and 9 illustrate hypothetical stages in the invasion of Africa by the Agamidæ.

ing and unique adaptation for locomotion in loose sand.¹ Among genera with digital lamellæ, *Colopus*, and *Rhoptropus* are confined to South Africa and *Pachydactylus*, with a large number of species, is entogenic in the same area. *Edura* is a genus better developed in Australia, with two species in South Africa. *Ancylodactylus* is restricted to Cameroon. *Bunocnemis*, with two species, ranges through the Sudan and into East Africa. *Bunopus*, *Pristurus*, and *Platypholis* are north-east African, *Bunopus* reaching Arabia, *Pristurus* reaching Sind, and *Platypholis* reaching East Africa. *Paragonatodes*, in East Africa, is probably most nearly allied to the Oriental species of *Gonatodes*.

Of the more widely distributed genera, *Diplodactylus*, found in Cameroon, East Africa, and Madagascar, reaches a much greater development in Australia. The African species of *Phyllodactylus* have an irregular distribution and the absence of the genus in the East Indies is a notable peculiarity. *Hemidactylus*, though nearly world-wide in the tropics, is markedly entogenic in Africa, with two zoöcenters, one in the Rain Forest (nine species), and one in Northeast Africa (twenty species).

The two African genera *Hemitheconyx* and *Holodactylus*, usually referred to the family Eublepharidæ, are here associated with the primitive genera of geckos with undifferentiated digital lamellæ. Noble (1921, Amer. Mus. Nov., No. 4) has shown that some of the supposed characters of the family Eublepharidæ are in fact more widely distributed. While it is possible that the genera *Coleonyx*, *Eublepharis*, *Hemitheconyx*, and *Holodactylus* will be found to form a natural (monophyletic) group among the simpler geckos, in the present state of our knowledge of the group it seems best to avoid that assumption.

The family UROPLATIDÆ, with six species of a single genus, is confined to Madagascar and forms one of the chief distinctions of the Malagasy subregion.

The AGAMIDÆ reach their greatest development in number of genera in the Oriental Region and their highest degree of differentiation in the Australian. The five genera found in Africa are terrestrial, though an occasional species lives in trees, in contrast with a great number of genera specifically adapted for arboreal life in the forests of the Oriental Region. The family and even three genera are ectogenic in Africa, the two genera confined to the Ethiopian Region being obviously derived from more widespread forms.

¹I cannot follow Abel (1911, 'Palæobiologie,' p. 358) in considering the webbed toes of *Palmatogecko* an adaptation for burrowing. Compare also Hitzheimer, 1913, 'Handb. Biol. Wirbeltiere,' p. 312.

Phrynocephalus is a genus highly developed in southwest Asia, adapted to desert life by fringed toes and the hidden tympanum. It reaches the Ethiopian Region only in Arabia, with a single species (Map 7). *Uromastix*, with a zoöcenter in Persia or Mesopotamia, ranges to Barbary, south to northeast Africa, and east to Sind. *Aporoscelis* (Map 8), with a species in northeast Africa and one in southern Arabia, is only slightly differentiated from *Uromastix* and is considered a subgenus by Anderson (1895, 'Contr. Herpetol. Arabia,' p. 34). *Agama*, the least specialized of the African forms and perhaps of the family, has a wide range in northwest India and southwest Asia but extends through the whole of Africa as well, reaching Barbary and Senegal as well as the Cape of Good Hope (Map 9). *Xenagama*, in northeast Africa, parallels *Uromastix* in its short and spinose tail but is otherwise closely related to *Agama*.

The three more widely spread genera may be regarded as illustrating probable successive stages in the invasion of Africa by terrestrial Agamidæ, with a hypothetical origin in central Asia. The time of arrival may be placed as coincident with the relatively recent dessication of North and East Africa, which opened a highway of dispersal for terrestrial and sand-loving species. The generalized *Agama* apparently found few competing forms in Africa and, unhampered by special adaptations for desert life, probably spread very rapidly once the savannahs were reached. The last stage in the spread of this genus is represented by the invasion of the Rain Forest, *Agama atricollis* entering from East Africa and *Agama colonorum* from the Sudan, the latter species everywhere keeping pace with the clearings and plantations of man. The fact that distinct species have not differentiated in the Rain Forest confirms the extreme recentness of its invasion by *Agama*. The close relations of the species grouped around *Agama hispida* in South Africa form an example of a recent development of a new zoöcenter.

The presence of the iguanid genera *Chalarodon* and *Hoplurus* in Madagascar parallels the distribution of *Podocnemis* (see above, p. 9) and that of the Madagascan Boinæ. The parallel with *Podocnemis* is completed by the presence of fossil remains referred to the Iguanidæ in the Eocene of Europe. It seems probable, therefore, that the Madagascan genera arrived from the north and that continental Africa at a former period was inhabited by members of this family. Gadow (1913, 'Wanderings of Animals,' p. 102) regards their extermination in Africa as due to the invasion of the Varanidæ. The Varanidæ, however, are themselves relatively late arrivals in the Ethiopian fauna.

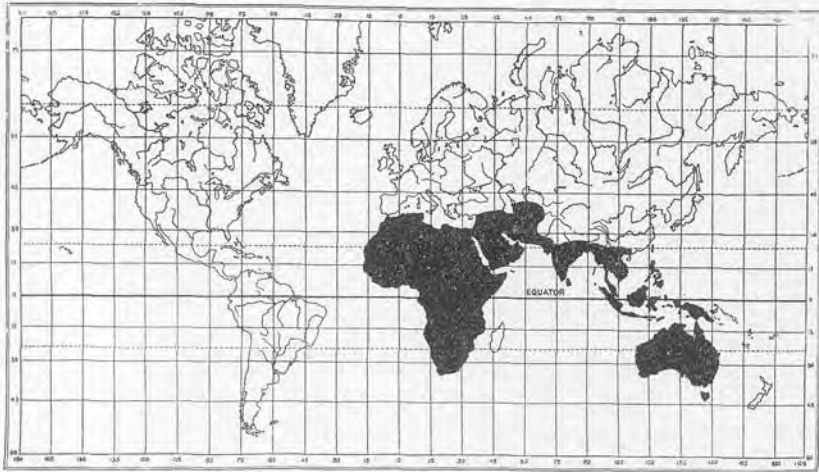
The *Paliguana* described from the South African Triassic by Broom (1903, Rec. Albany Mus., I, p. 1, Pl. I, figs. 1-2) is regarded by him as most closely related to the Iguanidæ (of the living families of lizards). Unfortunately, the gap in time between the Triassic and the Recent is so great that the importance of this species in the discussion of the present problem is much diminished. Boulenger (1918, C. R. Acad. Sci. Paris, CLXVI, p. 596, footnote) regards its relation to the Iguanidæ as very problematic.



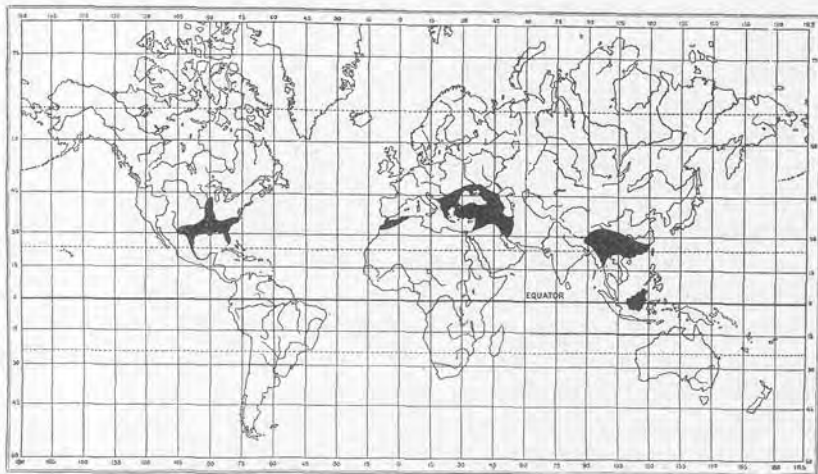
Map 10. Distribution of the Zonuridæ. Roman numerals refer to the number of genera present in the respective areas.

The status of the Oligocene *Proiguana europæa*, though based on fragmentary specimens, is a much better one. The early tertiary distribution of the Iguanidæ was doubtless closely similar to that of the genus *Podocnemis* (p. 9, Map 3).

The ZONURIDÆ form one of the most characteristic components of the Ethiopian fauna. The family is confined to the continent, and is entogenic in South Africa, the great majority of its species being confined



Map 11. Distribution of the Varanidae.



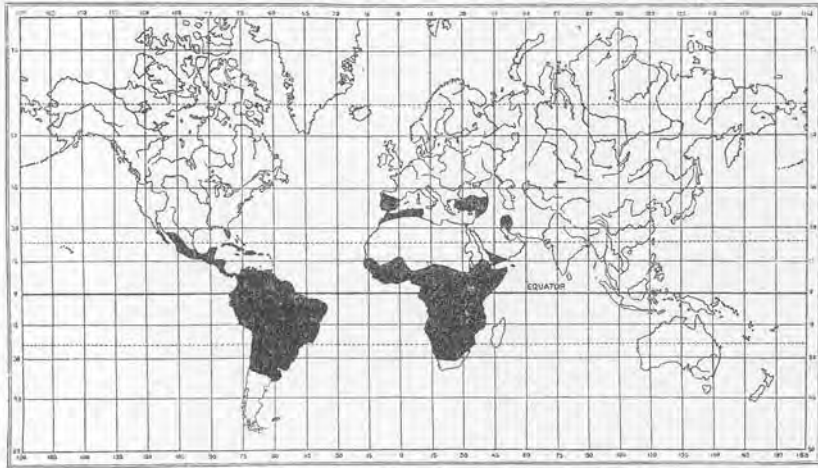
Map 12. Distribution of the genus *Ophisaurus* (Anguinae).

to the area south of the Zambezi. The four genera present an extreme degree of differentiation, from the strong-limbed *Zonurus* to the practically limbless *Chamæsaurosa*. The apparent antiquity of the family makes it surprising that it is not represented in Madagascar. *Zonurus*, with fourteen fairly well developed species, is entogenic in South Africa, only three species ranging north of the Zambezi-Cunene line, *Z. cordylus* reaching Angola, while *Z. tropidosternum* is confined to East Africa and *Z. rivæ* to Somaliland. *Pseudocordylus*, with a single species, and *Platysaurus*, with three or four, are confined to South Africa. *Chamæsaurosa* has three species in South Africa, one ranging north into Angola (? and Rhodesia), and three in East Africa, two of which are confined to the Lake Region.

Zonurus tropidosternum Cope, described from Madagascar, has since been found only in Tanganyika Territory. The Madagascar record was doubtless erroneous, but it has been perpetuated in every subsequent mention of the distribution of the family.

The ANGUIDÆ reach Africa only in Barbary, and *Ophisaurus kcellikeri* is an European element in the Moroccan fauna. The species of the genus inhabit widely separated areas, *O. buttikoferi* in Borneo, *O. gracilis* and *O. harti* in southeast Asia, *O. apus* in southeast Europe and Asia Minor, and *O. ventralis* in the southern United States. It seems probable that the genus was formerly Holarctic and that the scattered surviving species came from a common northern center of dispersal. Map 12 exhibits a typical example of a palæogenic distribution.

The VARANIDÆ are a homogeneous group of lizards represented by a single genus with numerous species, all confined to the Old World. Fifteen species, besides several fossil forms, occur in the Australian Region, some of which have a very wide distribution, reaching the mainland in India. Six additional species are East Indian, and some of these in turn reach India. India has three species that are not found farther east, and one of these reaches central Asia and North Africa. In Africa there are two additional species, *Varanus niloticus* and *V. exanthematicus*, both very widely distributed. The poor development of the genus in Africa, together with its absence from Madagascar, suggests that the family has entered the Ethiopian Region recently. *Varanus griseus*, ranging from northwest India to Barbary and south to Abyssinia, is probably the last species to reach Africa. The older invasion probably consisted of two types, a long-headed ancestral *niloticus*, and a short-headed ancestral *exanthematicus*. The fact that *exanthematicus* has formed fairly well-defined subspecies in each of the three subdivisions of



Map 13. Distribution of the Amphisbænida.



Map 14. Distribution of the section Emphyodontes (Amphisbænida).

the Savannah Province, while *niloticus* with a wider range and a greater diversity of habitat has remained more uniform, is probably to be explained by the great activity and riparian habitat preference of the latter species, leading to rapid dispersal and reabsorption of varieties, while *exanthematicus* is notably sluggish and doubtless little inclined to travel.

The AMPHISBÆNIDÆ have an unusual distribution, being essentially a tropical group at the present day, apparently an ancient one, from their presence in both Africa and America, but wholly absent from the Australian and Oriental Regions. This range, together with the fact that two genera reach the Palearctic and three the Nearctic, suggests a northern and possibly a Nearctic origin for the family. *Euchirotetes*, *Bipes*, and *Hemichirotetes*, in Lower California and Mexico, appear to form the most primitive subdivision of the group, although the writer prefers to consider them at most a subfamily (Bipedinæ). This type of distribution (Map 13) is also found in the Leptotyphlopidae, and, with the distribution of fresh-water fishes, has frequently been the basis for the hypothesis of a Brazil-West African land bridge.

The amphisbænid fauna of Africa is a highly differentiated one, nine of the eleven genera being confined to the continent. *Blanus* is a Mediterranean genus reaching southern Europe. *Amphisbæna* is a generalized genus occurring both in Africa and tropical America. The *Emphyodontes*, one of the chief subdivisions of the family employed by Boulenger, form a rather natural group in distribution. *Trogonophis* is North African, *Agamodon*, Abyssinian, and *Pachycalamus*, Socotran, probably indicating a Mesopotamian origin of the ancestral *Emphyodontes*.¹ Of the remaining genera, *Baikia*, with a single species in Cameroon, is possibly closely related to the South American *Anopsibæna*. *Monopeltis* is the most characteristic African genus of the family, with twenty-two species, the remaining ten genera having only twenty-four species together. Fourteen of these are South African, seven are found in the Rain Forest, and one in East Africa. *Geocalamus* is derived from *Monopeltis* in East Africa. The three genera *Amphisbænula*, *Chirindia*, and *Placogaster* are more or less directly derived from *Amphisbæna* and have an irregular distribution. *Amphisbænula* occurs in Cameroon and East Africa, *Chirindia* in Rhodesia, Cameroon and East Africa, and *Placogaster* in the western Sudan. *Amphisbæna* itself has a wide range in Africa, from Portuguese Guinea to East Africa, and south to Southwest

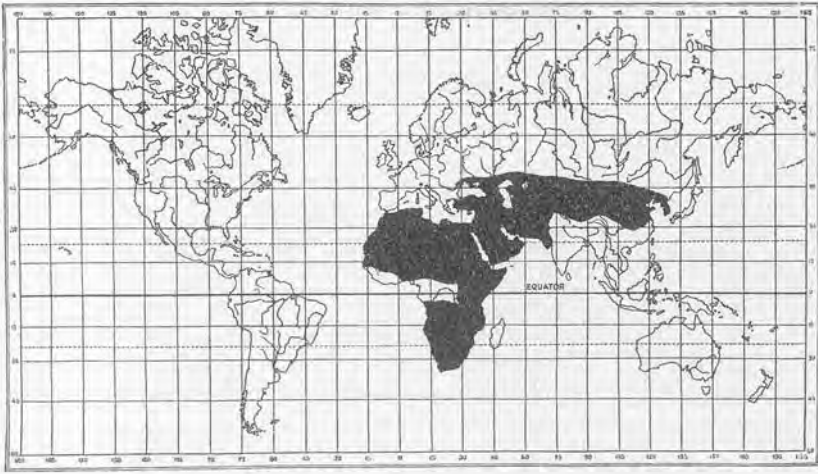
¹The relations of *Diplometopon* Nikolski from southwest Persia may prove to be with the *Emphyodontes*.

Genera of Lacertidæ in Africa

GENUS	CHARACTER OF DISTRIBUTION IN AFRICA	AREA IN WHICH ENTOGENIC	AREA IN AFRICA IN WHICH ECTOGENIC	REMARKS
<i>Poromera</i>	Entogenic	Cameroon	.....	Monotypic
<i>Gastropholis</i>	Entogenic	East Africa	.....	Monotypic
<i>Bedriagaia</i>	Entogenic	Ituri Forest	.....	Monotypic
<i>Lacerta</i>	Ectogenic	Europe	North and Central Africa	..... Mediterranean
<i>Algiroides</i>	Entogenic	East Africa	.....	Mediterranean
<i>Psammodromus</i>	Ectogenic	Mediterranean	North Africa	.....
<i>Tropidosaura</i>	Entogenic	South Africa	.....	Monotypic
<i>Nucras</i>	Entogenic	South Africa	.....	.....
<i>Latastia</i>	Entogenic	East Africa	.....	.....
<i>Philochortus</i>	Entogenic	Northeast Africa	.....	.....
<i>Acanthodactylus</i>	Entogenic	North Africa	.....	.....
<i>Ophiops</i>	Ectogenic	Asia Minor	North Africa	.....
<i>Ichnotropis</i>	Entogenic	South Africa	.....	.....
<i>Eremias</i>	Polyentogenic	.....	.....	.....
<i>Scapteira</i>	Polyentogenic	Central Asia	.....	.....
		South Africa	.....	.....
<i>Aporosaura</i>	Entogenic	Southwest Africa	.....	Monotypic
<i>Holaspis</i>	Entogenic	Central Africa	.....	Monotypic

Africa and Mozambique, with no apparent relation to the extension of the Rain Forest. The entire absence of the family from southwestern Cape Colony is a rather striking feature of its distribution in view of the considerable number of forms which reach South Africa both in Southwest Africa and Natal.

No family of lizards presents more interesting or more complicated distributional relations in Africa than the LACERTIDÆ. Seventeen of the twenty-one genera reach the continent, though two of these, *Psammodromus* and *Ophiops*, reach only the Palearctic area in Barbary. Five of the genera have a very restricted distribution and four of these are monotypic. *Poromera* is confined to Cameroon and Gaboon; *Aporosaura* is found in southwest Angola and northwest Southwest Africa; *Gastropholis* is found in East Africa from Usumbara to the Rovuma; *Bedriagaia* is confined to the northeast part of the Rain Forest; and *Tropidosaura* is restricted to the southern part of Cape Colony, corresponding to the distinct Botanical Region of Engler. *Holaspis*, in many ways the most highly specialized member of the family, ranges through the whole of the Central African Rain Forest and reappears at Usumbara and near Lindi in East Africa. This distribution appears to antedate the present climatic and floral configuration. *Philochortus* and *Latastia* are characteristic of northeast Africa. *Philochortus* is confined to Abyssinia, Somaliland and southern Arabia, while *Latastia* ranges south to Mozambique and Rhodesia and west throughout the Sudan. *Nucras* and *Ichnotropis* are entogenic in South Africa, ranging north into East Africa. *Acanthodactylus* has a distribution almost exactly like that of the gecko *Stenodactylus* (Map 4); it is adapted to desert life and has kept pace with the desert conditions. *Eremias* (Map 15) has an extraordinarily wide range, from Korea to the Cape of Good Hope. It is a genus adapted to savannah or arid conditions and, in the absence of barriers other than deserts, has found its way wherever the conditions became suitable. No better illustration of the climate control of distribution could be found. Since it ranges continuously from the North Temperate to the South Temperate Zone, it is evident that rainfall and vegetation, and not temperature, have been the determining factors. The genus *Scapteira*, with a group of species in southwest Africa and another in central Asia, is doubtless diphylletic (Boulenger, 1918, Journ. Zool. Res., III, p. 3); fringed toes, a direct adaptation to desert life, have been acquired by two stocks of *Eremias*, one under the influence of the Kalahari, the other under that of the central Asian deserts. Possibly the absence of *Scapteira* (or its failure to develop) in the Sahara



Map 15. Distribution of the genus *Eremias* (Lacertidae).



Map 16. Genera of Lacertidae in Africa with restricted distribution: I, *Tropidosauro*; II, *Aporosaura*; III, *Poromera*; IV, *Bedriagaia*; V, *Gastropholis*.

and Mesopotamia is due to the presence of *Acanthodactylus* with the same adaptation. *Algiroides*, with a group of Mediterranean species, is represented in Africa by two very distinct species, *A. africanus* in the Ituri forest, co-existent with *Bedriagaia*, and *A. alleni* from Mount Kenia. *Lacerta*, which is the dominant lizard genus of the Palearctic, has a number of species in Barbary, and in the Madeira, Canary and Cape Verde Islands. Two species are found in central Africa, in the Lake Region, in the same area with *Algiroides africanus*. *Lacerta echinata* occupies the Rain Forest¹ and forms a distinct subdivision (*Centromastix*) of the genus, while the two species from the Lake Region are closely allied to the European groups *Zootoca* and *Podarcis*. Boulenger (1918, C. R. Acad. Sci. Paris, CLXVI, p. 594) reaches the conclusion that the Lacertidæ are of northern origin. The writer agrees with this conclusion in the main, but the evidence examined in detail is somewhat contradictory. Matthew (1915, Ann. New York Acad. Sci., XXIV, p. 180) has advanced the hypothesis that the most advanced types of a group are to be found at or near the center of dispersal of the group, while the more primitive are to be looked for at the periphery of the distribution. Examining the present family in the light of this rule, we find what Boulenger regards as the most primitive genus (*Nucras*), now confined to South and East Africa, represented by a fossil lizard in the Oligocene Baltic Amber. On the other hand, the most primitive living species of *Nucras* is the northernmost and the more advanced species are found in South Africa. This indicates a northern origin of the genus but a southern origin of existing species from a secondary center of dispersal in South Africa. The genus *Lacerta* offers more difficulty. The most primitive living species, *L. agilis* and *L. vivipara*, are the northernmost in distribution, inhabiting the north of Europe and Asia. The genus reaches its highest development in number of species in the Mediterranean area (*L. muralis*), and its greatest degree of differentiation in the African Rain Forest (Sections *Centromastix*, *Zootoca*, and *Podarcis*).

The lacertid genera fall into two distributional groups, of forest and savannah genera:

FOREST GENERA

Poromera
Bedriagaia
Gastropholis
Algiroides

SAVANNAH GENERA

Ichnotropis
Tropidosaura
Nucras
Eremias

¹Dr. Boulenger has informed the writer that the absence of the interparietal is a common feature in *L. echinata*, and it is therefore probable that *L. langi* is a synonym of *echinata*.

FOREST GENERA

*Psammodromus**Lacerta**Holaspis*

SAVANNAH GENERA

*Latastia**Philochortus**Scapteira**Aporosaura**Acanthodactylus**Ophiops*

The forest genera exhibit a high degree of differentiation and appear to have been long established. The discontinuous distribution of *Lacerta* and *Algiroides* might be explained on the hypothesis that they were driven southward during the last glacial period, the central African species (with the exception of *Centromastix*) being subsequently cut off from their Mediterranean relatives by the invasion of the desert. *Algiroides alleni*, confined to timberline on Mount Kenia, suggests this more forcibly than *Lacerta vauereselli*, *L. jacksoni*, and *Algiroides africanus*, which have adapted themselves to the tropical climate.

The distribution of the savannah genera is a wholly logical one, the range of *Eremias* embracing that of all the others. These have almost certainly entered Africa from the north—*Nucras*, *Tropidosaura*, and *Ichnotropis* first; *Acanthodactylus* last; the remaining genera at intermediate periods.

In recapitulation, the Lacertidæ appear to be one of the more recent families of lizards, and their absence from Australia and Madagascar and poor development in the Oriental Region indicates a Palearctic origin. The African Rain Forest has played an important part in their development and dispersal, being the present headquarters of a group of genera which are totally absent from the African and Asian savannahs and deserts, while the latter have afforded the chief means of dispersal for the remaining genera. The genus *Lacerta*, finally, exhibits an adaptation to temperate climates which has enabled it to occupy the northern portion of the Palearctic, so far as it is habitable for reptiles, the most northern species being the most widespread.

The GERRHOSAURIDÆ is one of the most highly characteristic groups of lizards in Africa and the only family except the Gekkonidæ and Scincidæ common to Africa and Madagascar, sufficient evidence of their ancient character.

The genus *Gerrhosaurus* is widespread with five distinct species and one or two additional, less differentiated forms. Of the five, four are essentially South African, *G. flavigularis*, however, reaching the Sudan. *G. major*, with a distinct subspecies in the western Sudan and possibly another in Eritrea, ranges farthest from the geographical center. *Cordy-*

Genera of Scincidae in Africa and Madagascar

GENUS	CHARACTER OF DISTRIBUTION IN AFRICA	AREA IN WHICH ENTOGENIC	AREA IN AFRICA IN WHICH ECTOGENIC	REMARKS
1. <i>Macrosцинus</i>	Entogenic	Cape Verde Islands	.....	Monotypic
2. <i>Mabuяa</i>	Entogenic	South and East Africa	.....	.....
3. <i>Lygosoma</i>	Ectogenic	Australia	North and Central Africa	Polyphyletic
4. <i>Ablepharus</i>	Ectogenic?	Australia?	South and East Africa	Accidental
5. <i>Plestiodon</i>	Ectogenic	Southwest Asia	North Africa	.....
6. <i>Scincopus</i>	Entogenic	North Africa	.....	.....
7. <i>Scincus</i>	Ectogenic	Southwest Asia	North Africa	.....
8. <i>Chalcides</i>	Entogenic	North Africa	.....	Reaches Sind
9. <i>Parachalcides</i>	Entogenic	Northeast Africa	.....	Socotra
10. <i>Scelotes</i>	Palæogenic	South Africa Madagascar	.....	.....
11. <i>Herpetosaura</i>	Entogenic	South Africa	.....	.....
12. <i>Sepsina</i>	Palæogenic	South Africa Madagascar	.....	.....
13. <i>Melanoseps</i>	Entogenic	Central Africa	.....	.....
14. <i>Acontias</i>	Palæogenic	South Africa Ceylon	.....	.....
15. <i>Typhlacontias</i>	Entogenic	South Africa	.....	.....
16. <i>Acontophiops</i>	Entogenic	South Africa	.....	.....
17. <i>Feylinia</i>	Entogenic	Central Africa	.....	.....
18. <i>Typhlosaurus</i>	Entogenic	South Africa	.....	.....
19. <i>Pygomeles</i>	Entogenic	Madagascar	.....	.....
20. <i>Grandidierina</i>	Entogenic	Madagascar	.....	.....
21. <i>Paracontias</i>	Entogenic	Madagascar	.....	.....
22. <i>Pseudacontias</i>	Entogenic	Madagascar	.....	.....
23. <i>Voeltzkowia</i>	Entogenic	Madagascar	.....	.....
24. <i>Cryptosцинus</i>	Entogenic	Madagascar	.....	.....

losaurus and *Tetradactylus* are both confined to South Africa. The two Madagascan genera *Zonosaurus* and *Tracheloptychus* are very distinct, indicating that their presence in Madagascar probably dates from a very early period.



Map 17. Distribution of the Gerrhosauridæ. Roman numerals refer to number of genera in the respective areas.

The genera of Gerrhosauridæ, like the South African genera of Zonuridæ and Scincidæ, exhibit extremes of development of limbs, *Gerrhosaurus* being strong-limbed and active while *Tetradactylus* has small pentadactyl limbs in one species, tetradactyl in another, and undivided in a third.

The SCINCIDÆ are nearly as widely distributed a family as the Gekkonidæ and undoubtedly are an ancient group. As in the Gekkonidæ, the greatest number of genera occur in Africa, but in the Scincidæ the highest degree of differentiation and the largest size is reached in the Australian Region.

The North African genera are widely distributed or strictly desert forms, mostly with a Mesopotamian zoöcenter. *Scincus* has almost exactly the same range as *Stenodactylus* and *Acanthodactylus* and, like them, it has fringed digits in adaptation to its sandy habitat. *Plestiodon* has a group of species with a similar range. *Chalcides* has the same range with the addition of southern Europe. *Mabuya*, largely represented in tropical Africa, has a single species in Algeria, and another in the Cape Verde Islands. *Macrosincus* is probably a genus derived from *Mabuya*. *Parachalcides* in Socotra and *Scincopus* in the Sahara appear to be derived from *Chalcides* and *Plestiodon* respectively.

Of the remaining African genera, *Lygosoma*, *Mabuya* and *Ablepharus* have nearly a world-wide distribution. *Lygosoma* is almost certainly a heterogeneous assemblage of species of varying degrees of relationship. It reaches an extraordinary development in the Australian and Oriental Regions, with nearly three hundred species in all, of which only twenty-seven are African. In Africa, it is largely confined to central Africa, and the majority of species are found in the Rain Forest. *Mabuya*, on the contrary, does not reach Australia and is poorly developed in the Oriental Region, while fifty-four species occur in Africa. The distribution of *Ablepharus* is plainly fortuitous. A single species is found throughout the tropics but the greatest number of species is in the Australian Region.

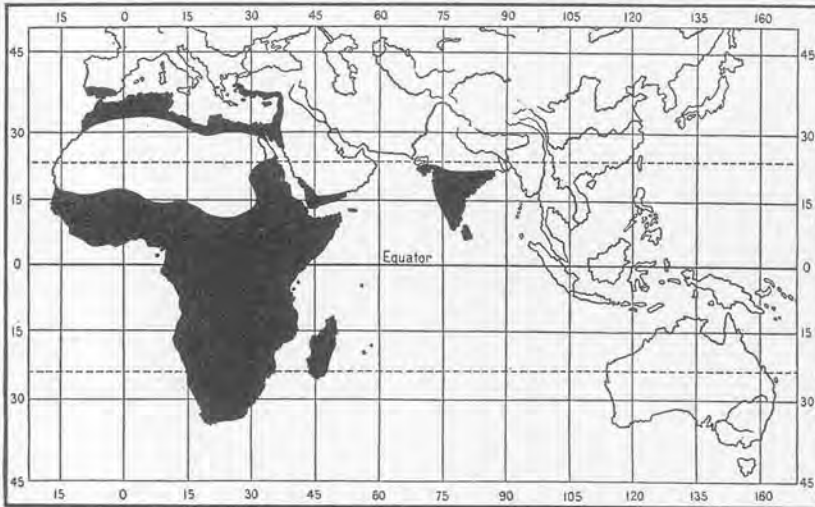
The remaining fifteen African and Malagasy genera exhibit varying degrees of reduction of limbs. Only one of them occurs outside the Ethiopian Region, *Acontias*, which has a number of species in Ceylon. Six are confined to Madagascar. Three, including *Acontias*, are common to Madagascar and South Africa, in addition to *Ablepharus* and *Mabuya*. Four of the remaining six genera are exclusively South African, while *Feylinia* and *Melanoseps* are found in the Rain Forest or in East Africa.

It is impossible to escape the conclusion that these burrowing Scincidæ have developed in South Africa and that their ancestors were present at a time of union of South Africa and Madagascar. The most degenerate forms have been placed in a separate family, with the Central American *Anelytropsis*, but it seems preferable to regard these as instances of convergence and to include the genera with the Scincidæ, from whose degenerate members they are separated only in degree.

The CHAMÆLEONTIDÆ¹ have a highly peculiar distribution. Their occurrence on most of the Malagasy islands, as well as on other African

¹The occurrence of *Chamæleon* in the Eocene of Wyoming (Leidy, 1873, Rept. U. S. Geol. Survey Terr., I, part 1, p. 184, Pl. xxvii, figs. 38-39) is based on the presence of a small fragment of a jaw and requires additional material for confirmation.

islands and in Ceylon, has been considered by Hewitt (1910, *Ann. Transv. Mus.*, II, p. 68) as evidence of fortuitous distribution, and in this opinion the writer concurs. Werner (1902, *Zool. Jahrb. (Syst.)*, XV, p. 312) has given a thorough account of the distribution of this group. Some of his maps fail to give sufficient account of the influence of the Rain Forest in determining the distribution of the species, but his general (negative) conclusion that it is impossible to correlate any well-marked group of species with a distinct type of distribution is well proved. The constancy of the genus in its main characters is nearly equalled by the extraordinary diversity of the species in minor, often sexual, characters.



Map 18. Distribution of the Chamæleontidæ.

The genus *Chamæleon* ranges throughout Africa and Madagascar, with forty-nine continental and thirty Madagascan species. One species is found in Ceylon and southern India, and the North African species reaches southern Spain and Syria. Nearly half of the species found in Africa occur in East Africa, and only two, *Chamæleon gracilis* and *C. dilepis*, are at all widely distributed. Most of the species are closely confined to the zoölogical provinces and subprovinces defined below.

The occurrence of *Paleochameleo* in the Oligocene of Quercy (De Stepheno, 1903, *Atti. Soc. Italiana Sci. Nat. Milano*, XLII, p. 391, Pl. ix, figs. 7, 12) indicates only a slight extension of the present range of the genus. It possibly points to a northern origin of the family. The relatively poor development of chameleons in South Africa contrasts with

the distribution of the remaining groups which are common to Africa and Madagascar.

Chamæleon calcaratus of India and Ceylon belongs to the same group as the North African and Arabian species. The latter are now confined to the oases and the narrow coastal districts where sufficient vegetation exists to afford them resting places, and it appears that this North African group probably had an original (and recent) range which included southwest Asia and the Sahara. The encroachment of the desert has separated the forms of this group. The Indian chameleon has a wide range, and the fact that it is undifferentiated in Ceylon, suggests that it is a very recent arrival in the Oriental Region, coming from Mesopotamia via Sind.

The circumtropical distribution of the TYPHLOPIDÆ is clearly that of an ancient, paleogenic, group. The genus *Typhlops*, with the range of the family, is the only one represented in Africa and Madagascar. With few exceptions its species are confined to the zoögeographical sub-provinces established below, though the distribution in many cases is very imperfectly known, often from only a single record.

Tabulation of the Distribution of African Species of *Typhlops*

SPECIES	FOREST	SUDAN	N. E. AFRICA	EAST AFRICA	SOUTH AFRICA
<i>avakubæ</i>	XXXX				
<i>batesi</i>	XXXX				
<i>buchholtzii</i>	XXXX				
<i>cæcatus</i>	XXXX				
<i>congestus</i>	XXXX				
<i>decorosus</i>	XXXX				
<i>dubius</i>	XXXX				
<i>graueri</i>	XXXX				
<i>hallowellii</i>	XXXX				
<i>intermedius</i>	XXXX				
<i>leucostictus</i>	XXXX				
<i>preocularis</i>	XXXX				
<i>rufescens</i>	XXXX				
<i>steinhausi</i>	XXXX				
<i>vermis</i>	XXXX				
<i>zenkeri</i>	XXXX				
<i>cæcus</i>	XXXX	XXXX			
<i>crossii</i>		XXXX			
<i>punctatus</i>		XXXX			
<i>sudanensis</i>		XXXX			
<i>acutirostris</i>			XXXX		
<i>blanfordii</i>			XXXX		
<i>cuneirostris</i>			XXXX		

the distribution of the remaining groups which are common to Africa and Madagascar.

Chamæleon calcaratus of India and Ceylon belongs to the same group as the North African and Arabian species. The latter are now confined to the oases and the narrow coastal districts where sufficient vegetation exists to afford them resting places, and it appears that this North African group probably had an original (and recent) range which included southwest Asia and the Sahara. The encroachment of the desert has separated the forms of this group. The Indian chameleon has a wide range, and the fact that it is undifferentiated in Ceylon, suggests that it is a very recent arrival in the Oriental Region, coming from Mesopotamia via Sind.

The circumtropical distribution of the TYPHLOPIDÆ is clearly that of an ancient, paleogenic, group. The genus *Typhlops*, with the range of the family, is the only one represented in Africa and Madagascar. With few exceptions its species are confined to the zoögeographical sub-provinces established below, though the distribution in many cases is very imperfectly known, often from only a single record.

Tabulation of the Distribution of African Species of *Typhlops*

SPECIES	FOREST	SUDAN	N. E. AFRICA	EAST AFRICA	SOUTH AFRICA
<i>avakubæ</i>	XXXX				
<i>batesi</i>	XXXX				
<i>buchholtzii</i>	XXXX				
<i>cæcatus</i>	XXXX				
<i>congestus</i>	XXXX				
<i>decorosus</i>	XXXX				
<i>dubius</i>	XXXX				
<i>graueri</i>	XXXX				
<i>hallowellii</i>	XXXX				
<i>intermedius</i>	XXXX				
<i>leucostictus</i>	XXXX				
<i>preocularis</i>	XXXX				
<i>rufescens</i>	XXXX				
<i>steinhausi</i>	XXXX				
<i>vermis</i>	XXXX				
<i>zenkeri</i>	XXXX				
<i>cæcus</i>	XXXX	XXXX			
<i>crossii</i>		XXXX			
<i>punctatus</i>		XXXX			
<i>sudanensis</i>		XXXX			
<i>acutirostris</i>			XXXX		
<i>blanfordii</i>			XXXX		
<i>cuneirostris</i>			XXXX		

Tabulation of the Distribution of African Species of *Typhlops* (con.)

SPECIES	FOREST	SUDAN	N. E. AFRICA	EAST AFRICA	SOUTH AFRICA
<i>somsalicu</i>			XXXX		
<i>unitæniatus</i>			XXXX	XXXX	
<i>guirræ</i>				XXXX	
<i>gracilis</i>				XXXX	
<i>lumbriciformis</i>				XXXX	
<i>platyrhynchus</i>				XXXX	
<i>tornieri</i>	XXXX			XXXX	
<i>schlegelii</i>				XXXX	XXXX
<i>mucroso</i>				XXXX	XXXX
<i>albanalis</i>					XXXX
<i>bibronii</i>					XXXX
<i>braminus</i>					XXXX
<i>capensis</i>					XXXX
<i>delalandii</i>					XXXX
<i>dinga</i>					XXXX
<i>fornasini</i>					XXXX
<i>mossambicus</i>					XXXX
<i>obtusus</i>					XXXX
<i>schinzi</i>					XXXX
<i>tettensis</i>					XXXX
<i>verticalis</i>					XXXX
<i>viridiflavus</i>					XXXX
<i>anchietæ</i>					XXXX
<i>anomalus</i>					XXXX
<i>boulengeri</i>					XXXX

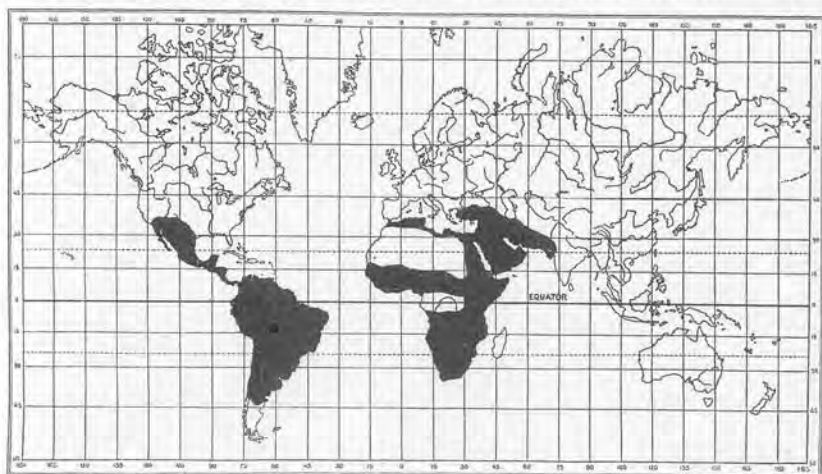
Seven species in addition to the above list are confined to islands in the Gulf of Guinea and along the east coast, and eight inhabit Madagascar.

The LEPTOTYPHLOPIDÆ have a distribution essentially like that of the Amphisbænidæ. In Africa the species are confined to the savannah or semi-arid areas, and to some extent this is also the case in the western hemisphere. The Amphisbænidæ are also somewhat better developed in the savannah districts (though nowhere confined to them) and the similarity of distribution is probably to be explained by the similarity of habitat relations and a similar period and origin of dispersal. The complete absence of the family from Madagascar indicates that this family, like most of the others absent from that island, entered Africa from the north and at a period subsequent to the separation of Madagascar from Africa.

The BOIDÆ have a highly peculiar distribution in Africa, the subfamily Pythoninæ being represented in the tropical parts of the continent, while the Boinæ are represented in North Africa and southwest Asia by

Eryx, and in the Malagasy Subregion by four (or five) genera more or less closely related to American forms.

Eryx has the typical distribution of a North African, sand-loving group, slightly extended into southwest Europe and peninsular India. *Eryx jaculus* ranges from Barbary to Persia and Turkestan; *Eryx thebaicus* is an Abyssinian form reaching lower Egypt and British East Africa; *Eryx jayakari* is confined to Arabia; and *Eryx muelleri* to the Sudan. The remaining Boinæ, in the Malagasy Islands, have been referred to American genera, with the exception of the well-defined *Boliera* and *Casarea*, known from Round Island, near Mauritius. The



Map 19. Distribution of the Leptotyphlopidae.

anatomical investigations of Beddard (1908, Proc. Zoöl. Soc. London, I, p. 135; and 1909, II, p. 918) appear to warrant generic distinction of the Madagascan species. *Xiphosoma* Duméril and Bibron appears to be available for the Madagascan species commonly referred to the American *Boa* (usually called *Corallus*) and *Acrantophis* Jan for the two Madagascan species referred to the American *Constrictor* (usually called *Boa*). *Pelophila* (type, *P. madagascariensis*) is preoccupied and unavailable, but without further examination of the distinctions between *Acrantophis dumerilii* and *A. madagascariensis*, the writer prefers to leave them in the same genus. This procedure, however, should not be allowed to disguise the fact that the Boinæ, with the exception of the genus *Eryx*, have a distribution almost exactly parallel to that of the Iguanidæ, one genus even occurring in Fiji, though it ranges more widely (to New Guinea) than the iguanid *Brachylophus*.

The genus *Python* has the range of *Varanus*, though it is absent in the desert areas of the range. Only three species are found in Africa, one very widely distributed, one Sudanese, and one Angolan.

The monotypic genus *Calabaria* is confined to the Rain Forest.

The single American genus of Pythoninæ, *Loxocemus*, is quite as exceptional in its range as the Madagascan Boinæ. If the division into subfamilies is not entirely artificial, the Boinæ have palæogenic distribution, while the Pythoninæ (with the exception of the Mexican genus) have a distribution like that of the Agamidæ or Varanidæ, most differentiated in Australia, ranging through the Oriental Region, and with a rather small and apparently recent intrusion into Africa.

The great assemblage of genera grouped as the family COLUBRIDÆ offers a stumbling block to the study of the distribution of snakes. Many of these genera are almost certainly heterogeneous, and even the subfamilies Colubrinæ and Boiginæ are more or less artificial groups. The two aquatic subfamilies Acrochordinæ and Homalopsinæ are not represented in Africa, and of the equally aquatic Hydrophiinæ only the extremely widespread *Pelamydrus platurus* occurs on the coasts of South Africa, and with *Enhydrus* on those of Madagascar. The opisthoglyph Elachistodontinæ, consisting of a single monotypic Indian genus, parallels the aglyph Dasyveltinæ which are purely African. The Elapinæ appear to be a more natural group, highly developed in Australia, where they form the greater part of the snake fauna, their differentiation being apparently due to a sudden expansion of the group into the varied habitat conditions of an unoccupied region. This subfamily is well represented in Africa with nine genera, of which only one ranges outside the continent. (The genus *Melanelaps* Wall, from southern Arabia, appears to be based on a specimen of *Atractaspis andersoni* Boulenger.) The Madagascan snake fauna is a highly peculiar one, seventeen of the twenty-one colubrine genera being confined to the Malagasy Subregion. It is furthermore a highly primitive one, the Elapinæ and Viperidæ being unrepresented, while of the twenty-one colubrine genera (thirteen *Aglypha*, eight *Opisthoglypha*), all but one agree in the primitive character of the possession of well-developed hypapophyses on the posterior vertebræ. The exception, *Mimophis*, is a genus related to the African and Indian *Psammophis*. Aglyphous genera with the posterior hypapophyses are widely distributed in Africa, as well as in Asia and America, and the derivation of the Madagascan genera from them offers no difficulties. Of opisthoglyphous genera, with the posterior hypapophyses, only four are found in Africa, one of which (*Pythonodipsas*) is South

African, another (*Dityophis*) Socotran, and the third (*Rouleophis*) West African. *Geodipsas* is found in East Africa and Cameroon, as well as in Madagascar. Without overemphasizing the value of the character in question, it appears entirely probable that the Madagascan opisthoglyph snakes had a Madagascan origin distinct from that of the majority of the Boiginæ. Hewitt (1911, Rept. S. African Soc. Adv. Sci., VII, p. 313) advances the same opinion.

The relations of the African snake fauna with the American rest on the occurrence of species of the American genera, *Natrix*, *Helicops*, *Leptodeira*, and *Apostolepis*. Of these, *Natrix* and *Helicops* occur also in the Oriental Region, and are highly primitive genera, possibly not natural groups. *Leptodeira* appears to be an unnatural assemblage, even in Africa, where it includes strictly arboreal and strictly terrestrial forms. The separation of the African *Leptodeira* from the American cannot be based on the single anal plate (Barbour, 1914, Proc. New England Zool. Club, IV, p. 95) as specimens with a divided anal have been recorded among the arboreal African species. Boulenger, in describing *Apostolepis gerardi* from the Katanga (1913, Rev. Zool. Africaine, III, p. 104), states that it is unquestionably congeneric with the American species. This, however, is so isolated an example that it is impossible to give it weight as an evidence of South American faunal relations. More important is the fact that the three elapine genera *Elaps* (*Homorelaps* of Boulenger) in South Africa, *Micrurus* in South America, and *Furina* in Australia, are a more or less natural group within the subfamily, suggesting very strongly a divergent southward spread from a common Holarctic center, and not, in view of the absence from Madagascar of the Elapinæ, a dispersal via an Antarctic continent.

The relations of the African colubrine fauna with the Indian rest on the evidence of nine genera, of which *Natrix* and *Helicops* have already been mentioned. *Oligodon*, with an outlying species in Syria and Egypt, is an Indo-Malayan genus. *Coronella* is European and Mauritanian, with three species in central Africa; it does not appear to be a natural genus and certainly has not a natural distribution, unless the central African species correspond to the "Mediterranean element" of Lacertidæ. *Lytorhynchus*, *Zamenis*, *Psammophis*, and *Naja* are terrestrial, more or less sand-loving genera with a natural distribution, their origin being apparently central Asian. With the exception of *Lytorhynchus*, they range beyond the normal "Mesopotamian" type of lizard distribution, reaching South Africa (*Psammophis*, *Naja*) and peninsular India (*Zamenis*, *Psammophis*, and *Naja*). The boa *Eryx* and

the viperine genera *Echis* and *Vipera* have a similar distribution. *Boiga*, with a number of species in the East Indies, eight in India, and three in Africa has a less natural distribution and is possibly an unnatural group.

Of the eighty genera of the Colubridæ found in Africa, four are purely North African or reach the continent only in North Africa. Of the eighty, only seventeen are found outside the continent, of which one (*Boædon*) is confined to the Seychelles and Africa, the other (*Geodipsas*) to Madagascar and Africa. The genera are to a considerable degree restricted to the provinces and subprovinces in Africa, as will be shown below under the discussion of these faunal subdivisions.

The seven genera of VIPERIDÆ in Africa belong to the subfamily Viperinæ. The only other genera in the subfamily are *Azemiops* in Burma and *Pseudocerastes* in Persia. Boulenger (1918, C. R. Acad. Sci. Paris, CLXVI, p. 597) has commented on the similarity in distribution between the Lacertidæ and the Viperinæ. The distribution, in fact, accords excellently with the hypothesis of a Palearctic and relatively recent origin, the two primitive genera *Azemiops* and *Causus* inhabiting southeast Asia and South Africa respectively as the result of divergent migration. The scarcely less primitive *Atractaspis* ranges through the whole of continental Africa and southern Arabia and reaches Persia. *Echis* and *Cerastes* are desert genera confined to North Africa and southwest Asia. *Vipera* compares in range with *Lacerta*, with one species, however, in India and Siam. *Atheris* is a forest genus ranging into East Africa, the Sudan, and northern Angola. It parallels the prehensile-tailed *Lachesis* of Central America to an astonishing degree. *Bitis* has the same range as *Atractaspis*, with a greater concentration of species in South Africa, whence it has apparently spread northward, developing two highly distinct species in the Rain Forest.

Faunal Areas

The close correspondence of the faunal areas with the botanical subdivisions of Africa recognized by Engler and illustrated in the botanical map of Africa (Schmidt, 1919, Bull. Amer. Mus. Nat. Hist., XXXIX, p. 399, Map 2) has been dealt with in Part I of the present paper. The maps of the distribution of individual species illustrate for the most part the correspondence of specific ranges with the larger or smaller subdivisions of the continent. The most practical modifications of the botanical map to conform to the distribution of African reptiles are illustrated in Map 1 and the resulting divisions may be tabulated as follows:

- A.—PALEARCTIC REGION
 - I.—Mediterranean Subregion
 - a.—Mauretanian Province
 - II.—Saharan Subregion
- B.—ETHIOPIAN REGION
 - I.—Ethiopian Subregion
 - a.—West African Forest Province
 - 1.—Gaboon Subprovince
 - 2.—Iturian Subprovince
 - b.—Savannah Province
 - 1.—South African Subprovince
 - 2.—East African Subprovince
 - 3.—Sudanese Subprovince
 - 4.—Abyssinian Subprovince
 - II.—Malagasy Subregion
 - a.—Seychellian Province
 - b.—Madagascan Province
 - c.—Mascarene Province

The chief reptilian characteristics of the faunal subdivisions may be briefly reviewed.

The Mediterranean Subregion is sharply distinguished from the remainder of the continent by the presence of Anguidæ and of many species and genera found in Europe but not in the remainder of Africa. *Emys orbicularis*, *Clemmys leprosa*, *Psammmodromus*, and *Natrix natrix*, may be mentioned as examples of the European element in this fauna. There is, however, a strong admixture of the desert fauna next to be considered, making it quite impossible to draw a rigid boundary between this area and the next by means of the reptile fauna.

The Saharan Subregion corresponds to an extremely well-marked fauna composed, however, almost exclusively of forms definitely adapted to desert life and not characterized by any families of reptiles. This fauna has an enormous extension from east to west, from the Rio de Oro to Sind. Many species and genera have a range corresponding very exactly with this subregion; for example, *Stenodactylus*, *Acanthodactylus*, *Lytorhynchus*, and *Echis*. The complete absence of forms which have a zoöcenter south of the Sahara, together with the fact that the zoöcenters of nearly all the Saharan genera are outside the continent, in south-western Asia, leads me to exclude this subregion from the Ethiopian Region, and add it to the Palearctic. The special conditions of the desert habitat have excluded both central African and Mediterranean species, and the desert accordingly acts as a barrier from south to north (or vice versa) quite as much as it has served as a highway of dispersal from east to west. Where the Nile cuts across it, a number of central African

species have reached the Mediterranean coast (*Dasypeltis scaber*, *Mabuia quinquetæniata*, *Varanus niloticus* and various amphibians). A magnificent monograph of a part of this fauna exists in Volume I of Anderson's 'Zoölogy of Egypt.' The Egyptian fauna differs slightly from the strictly Saharan in the presence of the genuinely African element above mentioned, and also in having a slight admixture of Mauretanian or European forms. Quite evidently, the Mauretanian fauna has recently been encroached upon by the spread of the desert. The fauna of the Cape Verde Islands is largely a Mauretanian one and also suggests a former southward extension of the Mediterranean fauna.

The remaining subdivisions of the continent, together with the continental island of Madagascar and a number of adjacent islands, compose what is correctly termed the Ethiopian Region.

The Ethiopian Region is sharply divided into the Ethiopian and Malagasy Subregions. The latter, in whose fauna the absence of many of the African families of reptiles is nearly as striking a character as the presence of Uroplatidæ, Iguanidæ, Boinæ, and *Podocnemis*, is still to be subordinated to the Ethiopian Region for the sake of its fundamental relations. In addition to the widespread Gekkonidæ and Scincidæ, the essentially African Chamæleontidæ and Gerrhosauridæ are common to the two subregions. Still, the unmistakably primitive character of the Malagasy fauna, together with the absence of all the groups which appear to have reached Africa from the north or northeast, indicates a very ancient separation.

The Ethiopian Subregion falls into two rather closely related subdivisions, the West African Forest and Savannah Provinces, sharply separated by the distinct habitat conditions afforded on one hand by the moist and tropical Rain Forest, and on the other hand by the semiarid or arid open plains. There is, to be sure, a considerable interdigitation of these two provinces, especially in the outward extension of the Rain Forest along rivers, or in the forest "islands" which are entirely separated from the continuous Rain Forest itself. So far as the families of reptiles are concerned, the West African Forest Province is only negatively characterized by the absence of the Zonuridæ and Gerrhosauridæ, and a number of genera (and even species) are common to both the primary subdivisions of the subregion. The more important of these (excluding genera occurring outside the continent) are:

TURTLES

Kinixys

Pelusios

LIZARDS

Monopeltis

SNAKES

Boædon
Lycophidion
Mehelya
Chlorophis
Philothamnus

Dasypeltis
Aparallactus
Dendraspis
Causus
Atractaspis
Bitis

The West African Forest Province is characterized by a considerable number of genera confined or nearly confined to it:

CROCODILES

*Osteolæmus**Osteoblepharon*

LIZARDS

Ancylodactylus
Diplodactylus
Baikia
Amphisbænula

Poromera
Bedriagaia
Algiroides
Holaspis
Feylinia

SNAKES

Calabaria
Hydræthiops
Gonionotophis
Bothrophthalmus
Bothrolycus
Holuropholis
Hormonotus
Gastropyxis
Hapsidophrys
Thrasops

Rhamnophis
Pæcilopholis
Grayia
Geodipsas
Boiga
Dipsadoboa
Elapocalamus
Polemon
Elapops
Boulengerina

Two characteristics of the fauna of the Rain Forest arrest attention. The first is the localization of the genera and species in the Gaboon and Ituri regions, of which some of the more important examples follow:

GABOON

Osteolæmus
Ancylodactylus
Baikia
Poromera
Gonionotophis
Pæcilopholis
Elapocalamus
Polemon
Chamæleon cristatus

ITURI

Osteoblepharon
Gonatodes
Bedriagaia
Lacerta (*Zootoca* and *Podarcis*)
Chamælycus
Chamæleon adolfi-friderici
Chamæleon johnstoni

The apparent absence of cœcilians in the Ituri may be due to the chance nature of collecting, and this difference in the two faunas should not be emphasized without the corroboration of much future collecting. Future collections from the Ituri will doubtless add further Gaboon types to its fauna.

In this case the topography, or rather the history of the topography, offers an explanation. The two centers of development correspond to distinct watersheds, the Gaboon-Cameroon area being cut off from the Congo Basin, while the Iturian area represents the headwaters of the Congo. These two areas are separated at the present time by great swamps and periodically flooded areas in the Central Congo, and it seems certain that, previous to the cutting of the gorge of the Lower Congo, this flooded and swampy area must have had a much greater extension, possibly as a vast inland lake. If, as Schwartz speculates (1918, *S. African Journ. Sci.*, p. 104, Fig. 1), the Congo flowed northward to the Mediterranean, its present course being due to "stream capture," this central basin would have still been subject to inundation, which would be equally effective in isolating the Gaboon from the Ituri fauna. This separation by swamps or lakes, therefore, is held to account for the distinction of the two faunas.

The contradictory view that the fauna of the Rain Forest is essentially homogeneous throughout its extent has been emphasized by Boulenger (1919, *Rev. Zool. Africaine*, VII, p. 2). It is certainly a striking characteristic of the African fauna that so many species should have the enormous range from Liberia to the East African lakes without apparent differentiation. Thus the Gaboon and Ituri faunas are linked together by *Kinixys erosa*, *Crocodylus cataphractus*, *Hemidactylus fasciatus*, *Holaspis guentheri*, *Lygosoma fernandi*, *Feylinia currori*, *Chamæleon oweni*, and *Bitis gabonica* and *B. nasicornis* among a great number of snakes. This fact is explainable as due to the rapid spread of the species concerned through the uniform Rain Forest habitat produced by the partial draining of the Congo Basin. A means of dispersal, somewhat more indirect, existed continuously, however, about the borders of the supposed swamps or lakes, for the Rain Forest must have had a greater extent at that time due to the increased humid area on which the existence of a "Rain Forest" depends.

The hypothesis that this greater Rain Forest extended to the coast of East Africa is favored by the considerable element of forest forms remaining in the forest islands of East Africa. The genera, *Cycloderma*, *Diplodactylus*, *Holaspis*, *Melanoseps*, *Thrasops*, *Geodipsas*, *Chamæstortus*,

and *Atheris* exhibit this relation, with an additional list of typically forest species, such as *Lygodactylus fischeri* and *Bitis gabonica*, which extend to Usumbara. Sternfeld (1915, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 198) has advanced this explanation of the composition of the East African fauna.

The fact that the Savannah Province is much richer in genera, in addition to the presence of the two families Zonuridæ and Gerrhosauridæ which are confined to it, than the Rain Forest, indicates that its fauna is a much older one. In fact, the South African savannahs must have been a center of evolution for reptiles during the late Mesozoic and the Tertiary, much as it probably was for the earlier reptiles of the Karoo formations. The Gerrhosauridæ, the Zonuridæ, the large group of degenerate skinks, and the numerous peculiar geckos must have reached their present degree of differentiation on the spot. The writer has avoided the attempt to define a distinct South African Subregion, in the sense of Sclater and Hewitt, on account of the difficulty in finding a definite boundary for it south of the Sahara. The extension of *Gerrhosaurus* and other typically South African genera into the Sudan and northward to Eritrea forbids the acceptance of the boundary proposed by Hewitt (1910, Ann. Transvaal Mus., II, p. 67) which would classify the Sudanese and Abyssinian Subprovinces with the Rain Forest, instead of with the much more closely related East and South African Subprovinces. The southward extension of the tropical fauna in eastern South Africa, consisting largely of genera common to the Rain Forest and East Africa, obscures the problem, as Hewitt has clearly recognized (*loc. cit.*). The Savannah Province of the present discussion is an extension of Hewitt's South African subregion. But the writer does not believe in a South African and a Forest subregion because the "tropical" element (Agamidæ, Varanidæ, Amphisbænidæ, and (?) Lacertidæ), which Hewitt rightly regards as an invading fauna in South Africa, is quite as much an invasion in the Rain Forest. These groups which have arrived in Africa from the north in successive stages distinguish the continental from the Malagasy fauna. The relations of the Madagascan fauna are by no means exclusively with the primitive South African forms, the genera *Geodipsas* and *Diplodactylus*, for example, though absent in South Africa are present in both the Rain Forest and Madagascar, and in the poor development of chamæleons South Africa is rather less allied to Madagascar than East Africa.

Turning to the subdivision of the Savannah Province, the problem is much simplified. The Rain Forest has acted as a barrier cutting off the Sudanese Subprovince from South Africa, so that purely savannah

species have entered it from the east only. The Ethiopian fauna here becomes attenuated, often with only one or two species (confined to the Sudan) of a genus highly developed elsewhere, as, for example, *Testudo*, *Lygodactylus*, *Ichnotropis*, *Gerrhosaurus*, *Prosymna*, *Psammophis*, *Aparalactus*, *Elapsoidea*, and *Atractaspis*. The genera confined to the Sudan are few, one turtle (*Cyclanorbis*), three lizards (*Hemitheconyx*, *Placogaster*, and (?) *Scincopus*), and two snakes (*Rouleophis* and *Chilorhinophis*). On the other hand the number of species confined to the Sudan is large but, with the exception of the above six genera, all the Sudanese species belong to genera whose zoöcenter is outside the province. There is a large Saharan element consisting of species of *Stenodactylus*, *Gymnodactylus*, *Tarentola*, *Agama*, *Acanthodactylus*, *Scincus*, and *Chalcides*. A small element in the fauna is distinctively Abyssinian or East African consisting of the genera *Bunocnemis*, *Latastia*, *Zamenis*, and *Scaphiophis*. The South African element has been mentioned above. Finally, a large number of forest reptiles range more or less widely into the Sudan. The Sudanese fauna, therefore, is the most composite of any of the subdivisions of the Savannah Province. Werner (1919, Denkschr. Akad. Wiss. Wien, XLVI, pp. 456-69) has given an excellent account of the fauna of the Eastern Sudan and fixed its northern boundary very accurately in this area.

The Abyssinian Subprovince, including Abyssinia, Somaliland, Eritrea, and southwest Arabia, exhibits a much greater degree of individuality. A number of southwest Asian genera reach Africa only in this area, *Pristurus* and *Contia* being excellent examples. *Pachycalamus*, *Parachalcides*, and *Dityophis* are confined to the island of Socotra, whose fauna, while highly distinct in peculiar species, is closely related to the Abyssinian. Southwestern Arabia must be included with the Abyssinian Subprovince on account of the presence of the purely Abyssinian genera *Agamodon*, *Aporoscelis*, and *Philochortus*, together with other widespread but essentially African forms such as *Chamæleon*, *Atractaspis* and *Bitis*. The genera confined to this subprovince are the following:

LIZARDS

<i>Holodactylus</i>	<i>Pachycalamus</i>
<i>Xenagama</i>	<i>Philochortus</i>
<i>Agamura</i>	<i>Parachalcides</i>

SNAKES

<i>Pseudoboodon</i>	<i>Dityophis</i>
<i>Eluroglena</i>	<i>Hemirhagerrhis</i>
<i>Asthenophis</i>	<i>Brachyophis</i>

Additional entogenic genera are *Pristurus*, *Hemidactylus*, *Latastia*, *Zamenis*, and *Micrelaps*. The ectogenic fauna is a composite one, a number of widespread Saharan species entering from the north, while an essentially Ethiopian element consisting of species of *Zonurus*, *Gerrhosaurus*, *Causus*, *Atractaspis*, and *Bitis* unite the area with the Savannah Province. It is noteworthy, however, that the entogenic fauna is only slightly related to the South and East African.

The East African Subprovince is poorly defined, and in the Botanical Map is united with the South African Subprovince, which corresponds with the line adopted by Hewitt (*loc. cit.*). Although characterized by only a few peculiar genera, of which the amphisbænian *Geocalamus* and the lacertid *Gastropholis* are the most important, the overlapping of the forest genera and the extraordinary development of the genus *Chamaeleon* combine to give the East African fauna a moderately distinctive character.

The reptilian fauna of the South African Subprovince, of which the previous three are really appendages, has been thoroughly examined by Hewitt (*loc. cit.* and 1911, Rept. S. African Assoc. Adv. Sci., VII, p. 306). It is quite possible that some of the subdivisions of the huge area south of the Rain Forest and west of Lake Nyassa may prove to be fully equivalent in importance to the more northern subdivisions of the Savannah Province. A large number of genera are confined to this area:

TURTLES

Homopus

LIZARDS

<i>Chondrodactylus</i>	<i>Tropidosaura</i>
<i>Ptenopus</i>	<i>Scapteira</i>
<i>Palmatogecko</i>	<i>Aporosaura</i>
<i>Narudasia</i>	<i>Tetradactylus</i>
<i>Edura</i>	<i>Cordylosaurus</i>
<i>Homopholis</i>	<i>Scelotes</i>
<i>Colopus</i>	<i>Herpetosaura</i>
<i>Rhoptropus</i>	<i>Typhlacontias</i>
<i>Pseudocordylus</i>	<i>Acontophiops</i>
<i>Platysaurus</i>	<i>Typhlosaurus</i>

SNAKES

<i>Glyphohycus</i>	<i>Xenocalamus</i>
<i>Ablabophis</i>	<i>Macrelaps</i>
<i>Lamprophis</i>	<i>Hypoptophis</i>
<i>Micæla</i>	<i>Limnonaja</i>
<i>Pythonodipsas</i>	<i>Aspidelaps</i>
<i>Apostolepis</i>	<i>Elaps</i>

Below is a list of genera which overlap the East African or even the Sudanese and Abyssinian Subprovinces and which are entogenic in South Africa and highly characteristic of its fauna, the previous list being composed largely of genera of restricted distribution, while those of the following are "expanding" groups, apparently pushing northward, or groups which have entered from the north and undergone renewed differentiation in South Africa.

	LIZARDS	
<i>Pachydactylus</i>		<i>Nucras</i>
<i>Zonurus</i>		<i>Ichnotropis</i>
<i>Chamæsauro</i>		<i>Gerrhosaurus</i>
		<i>Sepsina</i>
	SNAKES	
<i>Pseudaspis</i>		<i>Amblyodipsas</i>
<i>Prosymna</i>		<i>Calamelaps</i>
<i>Homalosoma</i>		<i>Aparallactus</i>
<i>Amplorhinus</i>		<i>Elapsoidea</i>
<i>Trimerorhinus</i>		<i>Naja</i>
<i>Psammophis</i>		<i>Causus</i>
		<i>Bitis</i>

The faunal subdivisions of the South African area proposed by Hewitt (*loc. cit.*) require much additional local work for their final delimitation. It is singular that the extremely distinct Cape flora, characterized as a separate region by the botanists, does not carry with it a more distinct fauna. A large number of widely distributed species appear to be absent from this area. The deserts of the Kalahari have given rise to a distinctive fauna adapted to the desert habitat. The more tropical conditions of Natal admit a greater number of the widely spread central African forms (*Chirindia*, *Rhampholeon*) while still characterized by such essentially South African types as *Gerrhosaurus*, *Zonurus*, and the burrowing skinks. The most interesting area remaining for thorough exploration, which will contribute a decisive advance to our knowledge of African distribution, is the Katanga.

SQUAMATA

OPHIDIA

Typhlopidae

TYPHLOPS Schneider

Typhlops punctatus (Leach)

Plate I, Figure 1

Acontias punctatus Leach, 1819, in Bowdich, 'Miss. Ashantee,' p. 493.

Typhlops punctatus (part) BOULENGER, 1893, 'Cat. Snakes,' I, p. 42; 1896, III, p. 587; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 209. WERNER, 1907, Sitzber.

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<i>Chamæsauro</i>		<i>Gerrhosaurus</i>
		<i>Sepsina</i>
	SNAKES	
<i>Pseudaspis</i>		<i>Amblyodipsas</i>
<i>Prosymna</i>		<i>Calamelaps</i>
<i>Homalosoma</i>		<i>Aparallactus</i>
<i>Amplorhinus</i>		<i>Elapsoidea</i>
<i>Trimerorhinus</i>		<i>Naja</i>
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Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1863. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 365; 1917, XXIII, p. 8. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 18; 1920, Proc. Zool. Soc. London, p. 271. CHABANAUD, 1921, Bull. Com. Etudes Hist. Scient. Afrique Occ. Française, p. 466.

It is impossible to disentangle the further bibliography of this species as understood in the present paper from the records of *punctatus* in the wider sense of Boulenger.

The collection contains fifteen specimens from the Sudan and the forest border: A. M. N. H. Nos. 11609-10 (April 1911), 11611, 11618-20 (January and October 1912), Faradje; 11612-13, 11614-17 (May and June 1912), Garamba; 11621-23 (August 1913), Poko.

There is no record of a *Typhlops punctatus* which is uniformly colored above and below from the Rain Forest; Boulenger's records of this form from the Lado, "Monbuttu," and French Guinea indicate that it ranges throughout the Sudanese Subprovince.

The characters regarded as distinguishing this species in the present restricted sense are: (1) color, dark gray above and below, with a light yellowish spot corresponding to each scale, producing a lineolate appearance; (2) scales about the body 26-30, mode 28; scales normally without reduction in number from a point 10 scales behind the rostral to the mid-body; scales about body at a point 10 scales in front of the anus, 22-28, 2-6 fewer rows than at mid-body; (3) size, small or moderate, maximum observed 433 mm.; length/diameter, 25-33; (4) edge of snout slightly more obtuse than in *congestus*, slightly sharper than in *intermedius*; (5) eye more distinct than in *intermedius*, at the point of the preocular; (6) distribution, Sudanese.

The reduction in number of scale rows from the count 10 scales behind the rostral (*a*) to the count at mid-body (*b*), and again between the mid-body and a point 10 scales before the anus (*c*) has been found a fairly constant and useful character. Thus in the present series there is no reduction in thirteen specimens between *a* and *b*, with a reduction of 2 rows in two specimens; the reduction between *b* and *c* is 2 in six specimens, 4 in seven, and 6 in two.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	Length	Diameter	L./D.	Scales			Reduction	
				<i>a</i>	<i>b</i>	<i>c</i>	<i>a-b</i>	<i>b-c</i>
11609	433 mm.	13 mm.	33	30	30	26	0	4
11610	306	12	25	30	30	26	0	4
11611	297	10	30	30	30	28	0	2
11612	198	7	28	28	28	24	0	4

A. M. N. H.				Scales			Reduction	
No.	Length	Diameter	L./D.	<i>a</i>	<i>b</i>	<i>c</i>	<i>a-b</i>	<i>b-c</i>
11613	195 mm.	7 mm.	28	28	28	22	0	6
11614	218	7	31	32	30	24	2	6
11615	112	4	28	28	28	26	0	2
11616	130	4	32	28	28	26	0	2
11617	239	9	27	28	26	24	2	2
11618	300	10	30	28	28	26	0	4
11619	280	9	31	28	28	26	0	2
11620	186	6	31	30	30	26	0	4
11621	308	10	31	28	28	24	0	4
11622	139	5	28	28	28	26	0	2
11623	288	10	29	26	26	22	0	4

Typhlops intermedius Jan

Typhlops liberiensis var. *intermedius* JAN, 1861, 'Icon. Gén. Ophid.,' I, No. 5, Pl. v, fig. 2, vi, fig. 2.

Typhlops punctatus (part) BOULENGER, 1893, 'Cat. Snakes,' I, p. 42. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 595.

The correlation of the name *intermedius* of Jan with the present specimens is more doubtful than the identification of *punctatus* above, for there is little appearance of any relation with *congestus* (*liberiensis*), as is implied in the original description. The specimens placed under this heading by Boulenger, however, are from the Cameroon region; and this would give a logical forest distribution to the species.

There are twenty-two specimens in the collection with an additional one from the forest west of Fort Beni, presented to the expedition by Dr. Bequaert: A. M. N. H. No. 11632 (September 1913), Akenge; 11645 (1914), Fort Beni; 11626, 11627-29 (May and September 1910), 11636, 11637-39, 11640-44 (March, April and June 1914), Medje; 11630-31 (November 1910), Niangara; 11633-34, 11635 (November and December 1913), Niapu; 11624-25 (August 1909), Stanleyville.

Apparently very closely related to the preceding form, this species was not collected outside the limits of the Rain Forest; and, as the series is perfectly uniform, there seems to be no reason even for the subspecific classification. The writer regards it as the forest representative of *punctatus*; but lack of Gaboon and Cameroon material for comparison prevents any decision as to the relation of the western representatives.

The distinguishing characters are: (1) dark gray above, with a yellowish spot, corresponding to each scale (as in *punctatus*, *s. s.*), venter uniform yellow, pink in life; (2) scales at mid-body, 24-30, mode 26; reduction from *a* to *b* normally 0 (rarely 2), from *b* to *c*, 4 (2-6); (3) size

moderate, maximum length 536 mm., length/diameter 28-43, i.e., more slender than *punctatus* and *congestus*; (4) form of snout as defined above, (hardly a useful character); (5) eye visible, much fainter than in *punctatus*, situated distinctly BELOW the upper point of the preocular; (6) distribution (probably) confined to the forest.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H.					Scales			Reduction	
No.	Length	Diameter	L./D.	a	b	c	a-b	b-c	
11624	253 mm.	8 mm.	32	24	24	20	0	4	
11625	170	5.5	31	24	24	18	0	6	
11626	315	10	31	28	28	24	0	4	
11627	372	12	31	28	26	22	2	4	
11628	275	9	31	28	26	22	2	4	
11629	395	13	30	26	27	24	+1	3	
11630	413	10	41	26	26	24	0	2	
11631	348	8	43	26	26	24	0	2	
11632	292	9	32	28	26	21	2	5	
11633	536	18	30	28	28	24	0	4	
11634	384	13	29	26	26	22	0	4	
11635	517	18	29	28	26	22	2	4	
11636	402	13	31	26	28	23	+2	5	
11637	398	11	36	26	26	22	0	4	
11638	286	9	32	28	28	24	0	4	
11639	316	9	35	26	26	22	0	4	
11640	426	13	33	26	26	23	0	3	
11641	317	11	28	26	26	22	0	4	
11642	406	14	29	28	26	24	2	2	
11643	460	14	33	28	28	24	0	4	
11644	206	6	34	26	26	22	0	4	
11645	472	17	28	30	30	26	0	4	

Typhlops congestus (Duméril and Bibron)

Onychocephalus congestus DUMÉRIL AND BIBRON, 1844, 'Erpétol. Gén.,' IV, p. 334.

Typhlops punctatus (part) BOULENGER, 1893, 'Cat. Snakes,' I, p. 42. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 22. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 209. WERNER, 1909, Mitt. Naturh. Mus. Hamburg, XXVI, p. 208. STERNFELD, 1910, 'Fauna Deutschen Kol.,' Reihe 3, Heft 2, p. 11. WERNER, 1913, Denkschr. Akad. Wiss. (math.-natur.), Wien, LXXXVIII, p. 717.

There are twenty-seven specimens referred to this form: A. M. N. H. Nos. 11648-51, 11652-63 (September and October 1913), Akenge; 11646-47 (September 1910), Medje; 11669-70 (May-June 1913), Niangara; 11664-67, 11668 (November and December 1913), Niapu; 11671-72 (August 1913), Poko.

Typhlops congestus may be regarded as the characteristic *Typhlops* of the Rain Forest, probably occurring throughout the botanical Forest Province in the forest islands along the streams. The East African records of Sternfeld (1910, p. 11) seem to refer in part to *congestus*.

As understood in the present paper, *congestus* may be characterized as (1) with a uniform brownish-yellow venter, dorsum dark brown, more or less invaded by the transverse flecks of the ventral color, or vice versa, the dorsal color may extend laterally onto the venter; there is never a sharp horizontal dividing line between the dorsal and ventral colors; (2) scales 24-32, mode 28, normal reduction from *a* to *b* 2 scale rows, 3 in 4 cases and 4 in 7; (3) size large, maximum observed 626 mm., length/diameter 20-32, average 23, accordingly much stouter than the two preceding forms; (4) angle of snout sharply defined, not rounded, though not produced into a cutting edge; (5) eye distinct, situated below the apex of the preocular; (6) confined (probably) to the forest province and to forest islands in East Africa.

Two specimens from Niangara (A. M. N. H. Nos. 11669 and 11670) differ from the normal *congestus* in being nearly uniformly mottled, the yellow slightly predominant below, the darker color above. Two from Poko (A. M. N. H. Nos. 11671 and 11672) are still more distinct in coloration, the yellow being reduced in one to a few yellow spots along the mid-ventral line, in the other to a single spot beneath the tail. These four specimens are somewhat more slender than the average and have a slightly different scale count. They differ radically from *T. punctatus*, however, and in the majority of characters are most satisfactorily located with *congestus*. They are probably hybrids of *congestus* with either *intermedius* or *lineatus*.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H.				Scales			Reduction	
No.	Length	Diameter	L./D.	<i>a</i>	<i>b</i>	<i>c</i>	<i>a-b</i>	<i>b-c</i>
11646	215 mm.	10 mm.	21	28	24	20	4	4
11647	302	13	23	30	28	22	2	6
11648	538	26	20	30	26	20	4	6
11649	578	23	25	30	28	22	2	6
11650	209	10	21	30	27	20	3	7
11651	225	11	20	32	28	22	4	6
11652	474	23	21	30	28	22	2	6
11653	464	23	20	30	28	22	2	6
11654	481	22	22	30	28	22	2	6
11655	466	22	21	30	28	22	2	6
11656	506	22	23	30	28	21	2	7
11657	452	18	25	28	26	19	2	7

MEASUREMENTS AND SCALE CHARACTERS (Continued)

A. M. N. H.				Scales			Reduction	
No.	Length	Diameter	L./D.	a	b	c	a-b	b-c
11658	256	11	23	30	28	22	2	6
11659	547	23	24	30	26	22	4	4
11660	626	27	23	32	28	24	4	4
11661	367	15	24	31	28	22	3	6
11662	512	26	20	32	28	22	4	6
11663	528	21	25	30	28	22	2	6
11664	614	30	20	30	27	22	3	5
11665	258	12	21	30	28	22	2	6
11666	536	23	23	30	26	20	4	6
11667	448	22	20	32	28	22	4	6
11668	347	17	20	30	27	22	3	5
11669	536	20	27	34	32	26	2	6
11670	350	11	32	32	30	24	2	6
11671	605	23	26	34	32	26	2	6
11672	549	19	29	32	32	26	0	6

Typhlops tornieri Sternfeld

Typhlops tornieri STERNFELD, 1911, Mitt. Zool. Mus., Berlin, V, p. 69. BOULENGER, 1915, Proc. Zool. Soc. London, p. 615.

A single small specimen, A. M. N. H. No. 11673 (August 1909) from Stanleyville, is referable to this species.

This species has been recorded only from the Kilimandjaro. Its occurrence in the Ituri region therefore indicates a somewhat unusual range, but not without parallel (cf., for example, the distribution of *Gonatodes* or *Algiroides* among the lizards).

The specimen agrees well with the original description. The snout is rounded, prominent, without horizontal keel. Tail as broad as long, ending in a spine. Nostrils inferior. Inferior portion of the rostral narrower than the adjacent nasal, one-half the width of the head at its widest point above. Four upper labials, fourth largest. Nasal semi-divided, the cleft proceeding from the first labial, its posterior edge farther back than that of the rostral. Preocular about half as wide as the ocular. Ocular in contact with the third and fourth labials. The eye invisible, except at certain magnification and lighting, when it is seen to be below the apex of the preocular. Seven enlarged superior head shields, the prefrontal largest. Supraocular two-thirds as long as high. Scales 26-26-20. Length 198 mm., diameter 7 mm., contained into the length 28 times.

Coloration in life, pale greenish gray above, chin and throat pinkish, venter yellowish white. The darker color above is due to the progressive darkening of the borders of the scales, so that the dorsum is faintly lineolate, as in *Typhlops punctatus*.

***Typhlops avakubæ*, new species**

Typhlops cæcus appears to give off a related form in the Ituri forest, of which three specimens were collected: A. M. N. H. No. 11674 (April 1914), Avakubi; 11675 (June 1914), Medje; 11676 (tag corroded), Belgian Congo.

This may be one of the forms confined to the forest; the distribution of the related *cæcus* is not characteristic (Sierra Leone to Gaboon) although the record of Tornier for East Africa has been dropped by Sternfeld. In any case, the species in the Sudanese area reached by the Congo expedition is a very distinct one.

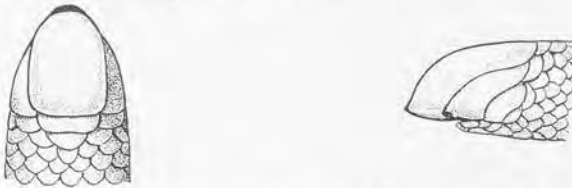


Fig. 1. Dorsal and lateral views of head of *Typhlops avakubæ*, new species, (11674, type, $\times 4$).

DIAGNOSTIC CHARACTERS

Habitus of *Typhlops cæcus*; 24 scales about the body; rostral and nasal much more elongate, produced posteriorly; preocular emarginate behind; ocular and subocular small. Eye invisible.

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 11674.

Body elongate, diameter contained into length 74 times. Head slightly depressed, set off from body. Snout with a sharp cutting edge, which is produced into a horny translucent ridge, rounded in outline from above. Tail as long as broad. Inferior portion of the rostral broader than long; upper part produced backwards, nearly the full width of the head. Nasal semidivided, the cleft proceeding from the first labial, leaving a narrow strip parallel with the edge of the rostral; nostril adjacent to rostral; nasal produced backwards as far as the rostral, narrow above. Preocular emarginate behind, followed by a very small ocular; eye invisible. Prefrontal transverse; other upper head shields not enlarged. Scales about body 24. Length 370 mm., diameter 5 mm.

COMPARISON OF PARATYPES

The two paratypes exhibit the same arrangement of the head shields, and have 24 scales about the body. The body is much stouter, however, the proportions being 320 mm. with a diameter of 6 in No. 11675, 380 mm. with a diameter of 7 mm. in 11676.

***Typhlops sudanensis*, new species**

Six specimens from the Sudan represent a very distinct species. A. M. N. H. Nos. 11677–81 (November 1911), Faradjé; 11682 (June

1912), Garamba. Probably a species of the Sudanese Subprovince, related to *crossii* in Nigeria and *somalacus* in northeast Africa.

DIAGNOSTIC CHARACTERS

Body very slender, diameter contained in length 54 to 81 times. Rostral very large with a sharp cutting edge. A very large nasal covering most of the side of the head, nostrils interior; nasal cleft proceeding from the second labial, not extending beyond nostril, the anterior lobe wide. Ocular, preocular, and subocular small.

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 11677.

Body elongate, length/diameter 59, tail as long as broad. Scales about the body 26-24-24. Rostral very large, more than half the width of the head above, extending well backwards, with a sharp cutting anterior edge. Nasal very large, nostrils inferior; nasal semidivided, the cleft proceeding from the second labial,

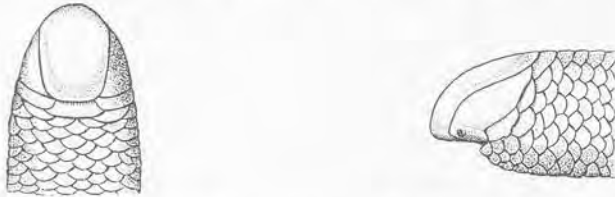


Fig. 2. Dorsal and lateral views of head of *Typhlops sudanensis*, new species, (11677, type, $\times 4$).

the anterior lobe being narrower. Following the nasal is a small plate which may be called the preocular, in contact below with the second and third labials. The upper corner of the preocular overlaps the slightly smaller ocular, which is separated from the prefrontal by a small supraocular and from the labials by a small subocular, the latter in contact with the fourth labial, narrowly separated from the third. Prefrontal transversely elongate, narrow, other head shields not enlarged. Length 469 mm., diameter 8 mm.

The entire body is uniform light yellowish brown, pink in life.

COMPARISON OF PARATYPES

The paratypes exhibit slight variations. The position of the nasal cleft may be more posterior so that the two lower lobes of the nasal are nearly equally wide. The scales about the body are 24 at the middle in all. The measurements are tabulated below.

A. M. N. H. No.	MEASUREMENTS		
	Length	Diameter	Length/Diameter
11677 (type)	469 mm.	8 mm.	59
11678	406	5	81
11679	443	7.5	59
11680	451	7	64
11681	277	3.5	79
11682	172	3	57

“These blindworms have been dug by workmen from under a hillock, about 5 feet below the surface of the ground. They are pinkish in color, the smaller specimens superficially resembling earthworms” (H. Lang).

Leptotyphlopidae

LEPTOTYPHLOPS Fitzinger

Leptotyphlops nigricans (Schlegel)

Typhlops nigricans SCHLEGEL, 1844, 'Abbild. Amphib.,' p. 38, Pl. xxxii, figs. 21-24. *Glauconia nigricans* BOULENGER, 1893, 'Cat. Snakes,' I, p. 67; 1902, Proc. Zool. Soc. London, II, p. 17. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 733. GOUGH, 1908, Ann. Transvaal Mus., I, p. 20. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 246. BOULENGER, 1910, Ann. S. African Mus., V, p. 499; 1915, Proc. Zool. Soc. London, p. 198. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 367; 1917, XXIII, p. 10.

A single specimen from Beni, A. M. N. H. No. 11683 (August 1914), of this species, has been presented to the collection by Dr. J. Bequaert.

This record is a northward extension of the range of the species in East Africa. It has previously been known from South Africa, reaching northern Rhodesia. Chabanaud (1916, p. 367), however, records it from Dahomey, indicating a possible extension throughout the Savannah Province.

The specimen is coiled and preserved in strong alcohol and, while readily identified with this species, is not measurable.

Boidae

Pythoninæ

PYTHON Daudin

Python sebæ (Gmelin)

Plate I, Figure 2

Coluber sabæ GMELIN, 1788, 'Syst. Nat.,' I, p. 1118.

Python sabæ BOULENGER, 1893, 'Cat. Snakes,' I, p. 86; 1896, III, p. 592. MOCQUARD, 1896, Bull. Mus. Hist. Nat., Paris, II, p. 59. BOULENGER, 1897, Proc. Zool. Soc. London, p. 800; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. JOHNSTON, 1897, 'British Central Africa,' p. 361a. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 23. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 67. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 134. FLOWER, 1900, Proc. Zool. Soc. London, p. 968. BOULENGER, 1902, in Johnson, 'Uganda Protectorate,' p. 446. JOHNSTON, 1902, 'Uganda Protectorate,' pp. 94, 409. LAMPE, 1902, Jahrb. Nassau. Ver. Naturk., LV, p. 9. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 343. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 42. BOULENGER, 1907, Proc. Zool. Soc. London, p. 255; Ann. Mus. Stor. Nat. Genova, (3) II, p. 211; Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 10. JOHNSTON, 1906, 'Liberia,' II, p. 813. WERNER,

1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1865. GOUGH, 1908, Ann. Transvaal Mus., I, p. 20. JOHNSTON, 1908, 'George Grenfell and the Congo,' p. 950. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 403; IV, pp. 239, 243, 246. CHUBB, 1909, Proc. Zool. Soc. London, p. 595. STERNFELD, 1909, 'Fauna Deutschen Kol.,' (1), Heft 1, p. 9; (2), Heft 1, p. 9; (3), Heft 2, p. 13; (4), Heft 1, p. 14. BOULENGER, 1910, Ann. S. African Mus., V, p. 500. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 14. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 3. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 164. LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 21. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 4. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 161. MÜLLER, 1913, Zool. Anz., XLI, p. 234. BOULENGER, 1915, Proc. Zool. Soc. London, pp. 199, 617, 644. BRELIER, 1915, Ann. Transvaal Mus., V, p. 113. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 368. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 334. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zool. Soc. London, p. 274. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 467.

Eighteen specimens of *Python sebæ* were collected: A. M. N. H. No. 11697 (September 1912), 11698 (December 1914), Avakubi; 11689-90 (February 1911), 10087, 11691-95 (March 1911), 11696 (September 1912), Faradje; 11686 (January 1910), Gamangui; 11687-88 (March and July 1910), 10088, Medje; 11684-85 (August 1909), Stanleyville.

Python sebæ is one of the most widely distributed of African snakes. Its range is to a certain extent independent of the Rain Forest, forest specimens from Medje being indistinguishable from the Sudanese. The species also enters the forest in Liberia and Cameroon, but is more frequently recorded from the Savannah Province.

No important variation is observable in the present series. The greatest length is reached in a specimen of 4880 mm., and there appears to be no distinction in size between forest and Sudanese specimens. The tail length approximates a tenth of the total.

There is, of course, much instability in the form and number of the head shields, especially the prefrontals and parietals, but these are usually symmetrically arranged. The number of scales in the loreal region varies from 8 to 16, and the scales in the ocular ring, exclusive of the supraoculars, are 5 to 9. Upper labials are 11 to 15, lower 19 to 24. The ventrals vary from 270 to 284, the subcaudals from 65 to 69. The dorsal scale formula varies from 66-89-43 to 77-95-54.

The color pattern of the back is highly variable, while that of the head seems to be perfectly constant. The top of the head is dark, with a straight light stripe from the supranasal over the nostril and eye on each

side to the temporal region. The labial border, except posteriorly, is light, connected with the supraocular stripe on the neck, and anteriorly by a broad light area below the nostril and on the anterior labials and rostral. This area encloses a dark spot on the first and second labials. There are two distinct subocular light lines, one from the posterior lower corner to the ninth to twelfth labial, one from the lower anterior corner across the sixth labial. There is a median light mark behind the parietals.

The light supraocular line continues dorsolaterally as the boundary between the lighter coloration of the sides and the darker median part of the back. This dark color is crossed (usually) by transverse light bands, connecting the ground color of the sides for the anterior sixth of the length. Behind this the dark spots become confluent at their corners, enclosing more or less transverse light areas which are narrower (longitudinally) than the dark, forming the line \bar{O} of Zenneck. The transverse dark markings tend to widen on the vertebral line, and this may be carried to the extent of forming, for short distances, a third longitudinal dark line, \bar{R} of Zenneck. Posteriorly the light interspaces may increase longitudinally toward the tail, and the tail itself has always a sharply defined median light band. There may be subsidiary small light spots enclosed by the dark crossbars at their (lateral) ends, especially posteriorly. The general color of the sides is lighter with irregular, more or less vertical, dark spots which anteriorly form semicircles, and further back 3 shaped markings, the open side cephalad. On the posterior sixth of the body these marks become straighter, and join the dark color of the back above. The lateral dark spots are sharply defined behind, but merge gradually into the ground color in front. Venter mottled, the light color predominant on the median line.

"Stomach contents of No. 11686, a rat. No. 11688 had swallowed a female antelope measuring 1040 mm. in length and 480 mm. high at the shoulder. Pythons are eaten extensively by the natives. They are often caught by means of traps set at their holes. The pythons hereabouts have the habit of taking refuge in holes, often large excavations, in former termite hills, simply to sleep. During the rainy season the natives follow their tracks, and if they find the retreat a noose is at once set in front of the hole. The snake is usually caught behind the neck. The natives also spear them" (H. Lang).

Python regius (Shaw)

Boa regia SHAW, 1802, Zoölogy, III, p. 347, Pl. xcvi.

Python regius BOULENGER, 1893, 'Cat. Snakes,' I, p. 88. MOCQUARD, 1896, Bull. Mus.

Hist. Nat., Paris, II, p. 59. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX,

p. 145; 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1865. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 403; 1909, 'Fauna Deutschen Kol.,' (1), Heft 1, p. 9; (2), Heft 1, p. 9. BOULENGER, 1915, Proc. Zool. Soc. London, p. 644. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-natur. Kl., XLVI, p. 502. BOULENGER, 1920, Proc. Zool. Soc. London, p. 274.

A single specimen, A. M. N. H. No. 11699, of *Python regius* was taken by the expedition at Aba, in July 1911.

This species, smaller and less aggressive than *Python sebæ*, appears to be restricted to the Sudanese Subprovince. *Python anchietæ* Bocage is too little known to lend itself to discussion of range, but it may well be found to reach the Katanga district when this is better explored. In fact, one of the chief zoögeographic problems of Africa depends on the study of the eastern area south of the forest. The region from Angola to Tanganyika may constitute a subprovince more nearly equivalent to the Sudanese than is at present evident, though there is a considerable element in the Angolan fauna which is independent of the South African fauna proper.

The specimen in hand measures 401 mm., the tail, 27 mm., constituting .07 of the total. The scales are 56-55-40, the ventrals 205, the subcaudals 28. The labials 11-16, the plates in the loreal region 11-12, in the ocular ring (excluding the single supraocular) 8-9. Labial pits 4 on each side + 1 on each side of the rostral.

In color pattern *regius* is widely distinct from both *sebæ* and *anchietæ*. The head is marked above very similarly but laterally it lacks the anterior light subocular stripe, and also the dark spot on the first and second labials of *sebæ*. The dark mark of the top of the head gives off from each of its posterior corners a sharply defined black band, 2-6 scale rows wide, these longitudinal bands separated by from 3 to 10 scale rows, and confluent at irregular intervals by crossbands which vary in width (longitudinally) from 3 to 10 scale rows, equalling or exceeding the light spaces in some cases, but usually less. Laterally the dorsolateral dark line gives off vertical crossbars, which frequently fork and sometimes reunite. These are irregularly spaced, much narrower than the light spaces of ground color between them, and in the latter, at the level of the 15th scale row, there is a row of small dark spots. Zenneck's homology between the longitudinal dark lines of *regius* and those of *sebæ* is of interest; but a single specimen does not offer a valid basis for discussion. It is true in any case that the posterior parts of the body are most similar in color pattern.

CALABARIA Gray

Calabaria reinhardtii (Schlegel)

PLATE II

Eryx reinhardtii SCHLEGEL, 1848, Bijdr. tot de Dierk., I, p. 2, Pl.
Calabaria reinhardtii BOULENGER, 1893, 'Cat. Snakes,' I, p. 92. BOCAGE, 1895, 'Herpétol. Angola,' p. 74. BOULENGER, 1896, 'Cat. Snakes,' III, p. 592. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 134. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 451. TORNIER, 1901, Zool. Anz., XXIV, p. 63. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 42. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 211. JOHNSTON, 1906, 'Liberia,' II, p. 812; 1908, 'George Grenfell and the Congo,' p. 950. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 403; 1909, 'Fauna Deutschen Kol.,' (1), Heft 1, p. 9. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 595. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 199; 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zoöl. Soc. London, p. 274.

Twenty-five specimens of *Calabaria* were collected: A. M. N. H. No. 11708 (February 1910), Gamangui; 11700-01 (September 1910), 11702-03, 11709 (March 1910), 11704 (May 1910), 11705 (August 1910), 11706-07 (September and October 1910), 11717 (April 1914), 11718-19 (June 1914), 11720-22 (July 1914); Medje; 11710-13 (November 1913), 10090, 11714-16 (December 1913), Niapu; 11723 (tag corroded), Belgian Congo.

The distribution of *Calabaria* coincides with the Forest province, and it appears to be confined to the continuously forested area, occurring in both the eastern and western divisions and unrecorded from Togo. It is therefore one of the genera most useful in the characterization of the zoögeographical subdivisions of the Ethiopian Region.

The maximum length is reached by a specimen of 916 mm. The tail length averages .08 of the total. The sexes are not readily distinguished by the form of the tail, but the claws at each corner of the base are externally visible only in the males. There are normally 3 pairs of shields between the frontal and large rostral. On eight specimens an azygous prefrontal is added, and in one specimen there are two azygous shields. There is uniformly a single preocular and two supraoculars. The postoculars are normally 2 on each side, 2-3 in three specimens, 3-3 in one. The temporals are 3 or 4 in the first row, 4 or 5 in the second. Upper labials 8, third and fourth entering the eye, or frequently the fourth only, third and fourth fused in one specimen, lower labials 9-11.

The scale formula lies between 28-35-28 and 25-32-25. The normal scale count appears to be 28-33-27. The ventrals number from 221 to 234, and the subcaudals from 19 to 27.

"The general color is dark brown with irregular lighter markings. These become yellowish pink on the sides, and the venter is brown, marked with pink. Tip of head and tail nearly black. Some specimens have a milky white band around the tail about 20 mm. from its tip, still further increasing its superficial resemblance to the head. Iris brown, pupil vertically elongate. No. 11709 had swallowed a mouse, which was disgorged before injection. Specimens were taken crawling about in the forest among the moist dead leaves. This snake nearly always holds its head vertically downward, as if trying to burrow; the tip of the tail is often held away from the ground, and, in contrast to the immovable head, is slightly moved to and fro. When seriously annoyed it rolls itself into a compact ball, the head in the center, which it is very difficult to straighten out. It never tries to bite. The natives believe that it has two heads, and are much afraid of it" (H. Lang).

Colubridæ

Colubrinæ

NATRIX Laurenti

Natrix olivacea (Peters)

Coronella olivacea PETERS, 1854, Monatsber. Akad. Wiss. Berlin, p. 622.

Tropidonotus olivaceous BOULENGER, 1893, 'Cat. Snakes,' I, p. 227; 1896, III, p. 604; Proc. Zoöl. Soc. London, p. 216. PERACCA, 1896, Boll. Mus. Torino, XI, No. 255, p. 2. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278; Proc. Zoöl. Soc. London, p. 801. JOHNSTON, 1897, 'British Central Africa,' p. 361a. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 67. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 451. FLOWER, 1900, Proc. Zoöl. Soc. London, p. 968. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 446; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112; 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 10. ROUX, 1907, Rev. Suisse Zool., XV, p. 76. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1866. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 404; IV, pp. 211, 243. WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 170. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303; 1910, Ann. S. African Mus., V, p. 503. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 3. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 98. STERNFELD AND NIEDEN, 1911, Mitt. Zool. Mus. Berlin, V, p. 385. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 265. BOETTGER, 1913, 'Wiss. Ergeb. Reise in Ostafrika, Voeltzkow,' III, p. 347, 353. WERNER, 1913, Denkschr. Akad. Wiss. (math.-natur.), Wien, LXXXVIII, p. 717. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 210, 619, 645. LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 77. CHABANAUD, 1916, Bull. Mus. Hist. Nist., Paris, XXII, p. 368; 1917, XXIII, p. 10. LOVERIDGE, 1918, Journ. E. Africa

Uganda Nat. Hist. Soc., No. 13, p. 334. CHABANAUD, 1919, Bull. Mus. Hat. Nat., Paris, p. 567. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zool. Soc. London, p. 276.

Twelve specimens, of two color phases, were collected as follows: A. M. N. H. Nos. 11913-15, 11916 (April and June 1914), Medje; 11912 (June 1913), Niangara; 11911 (August 1913), Poko; 11903-05 (August 1909), 11906-08 (April 1915), Stanleyville.

The occurrence of this widely distributed savannah species in the forest is paralleled by the distribution of a few other forms, such as *Causus rhombeatus*, but in general the penetration of the forest by savannah species is much less frequent than the spreading of forest species out into the savannah. *Natrix olivaceous* has not been taken from the Cameroon forest, and the present records appear to represent recent invasions along the rivers, the specimens taken at Medje resembling those from Poko and Niangara north of the forest, while the specimens from Stanleyville are very distinct and at first sight appear to represent a distinct form. These have probably entered the forest from the south. The few records from Gaboon probably represent specimens which have spread north—from the Lower Congo, where it is well known.

The six specimens from Stanleyville are brownish above, with a dark brown vertebral band four scales in width, more or less distinctly outlined with light dots, and faint traces of a lateral band on the third scale row, also outlined with a row of small white dots. This coloration has been described in specimens from Kissenje by Sternfeld (1912, p. 265) "Querbinden" being evidently a *lapsus*. The venter is entirely yellowish white. In two specimens the ground color is a distinctly reddish brown. Upper labials white or white with narrow black borders.

In the remaining six specimens, the dorsum is a uniform bluish black, extending onto the lateral ends of the ventrals, leaving only the middle half of the venter light. The posterior borders of the ventral shields are more or less edged with black in addition. The upper labials are white, heavily edged with black, and the sutures of the lower labials are narrowly marked with black.

These two colorations are correlated with the extremes in the variation of ventral plates and subcaudals, and the comparison of larger series would be of interest. Unfortunately the tail has been injured in seven of the twelve specimens under examination. The relations may be set forth as follows, both sexes being represented in each color phase:

COLORATION	{	Venter immaculate	Ventrals with black tips
		Dorsum banded, brownish or reddish	Dorsum uniform bluish black

VENTRAL PLATES	133-137	142-149
SUBCAUDALS	61- 70	85
LOCALITY	{ Stanleyville Kissenje	Medje Poko Niagara

HYDRÆTHIOPS Günther

Hydræthiops melanogaster Günther

Plate III, Figure 1

Hydræthiops melanogaster GÜNTHER, 1872, Ann. Mag. Nat. Hist., (4) IX, p. 28, Pl. III, fig. G. BOULENGER, 1893, 'Cat. Snakes,' I, p. 281; 1896, III, p. 610. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XIX, p. 264. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 12. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 211. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 404. GENDRE, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cvi. BOULENGER, 1915, Proc. Zool. Soc. London, p. 201; 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zool. Soc. London, p. 276.

Fifty-two specimens of *Hydræthiops melanogaster* were collected: A. M. N. H. No. 11923 (October 1909), 11964 (March 1911), Avakubi; 11922, 11960 (April 1914), 11961-63 (June 1914), Medje; 11918-19, 11924-32 (November 1910), Niagara; 11920, 11933-35, 11937-47 (November 1913), 11921, 11948-54, 11956, 11965, 12021 (December 1913), 11955, 11957-59 (January 1914), Niapu; 11917, 11936, 12314 (tags corroded), Belgian Congo.

This species is confined to the Rain Forest and its environs.

The large series proves very uniform in scale characters. The largest male measures 546 mm., the largest female 712 mm. The proportionate tail length is .18-.21, mean .20 in males, .15-.21, mean .18 in females. The ventrals range from 146-156 in males, mean 152, 148-155 in females, mean 151. Subcaudals 51-57, mean 55 in males, 47-55, mean 50 in females. The dorsal scales vary from 23-23-21 to 27-27-23, the higher counts in females, the lower in males, 25 the most frequent number at mid-body in both sexes. One preocular, and two postoculars (rarely one). Temporals one anteriorly, occasionally two; two to four in the second row. Upper labials 9-12, lower 10-13.

The dorsum is grayish brown, lighter on the sides, the skin between the scales lighter. The venter and the first part of the second scale rows are black. An ill-defined light line extends from the angle of the mouth along the sides for a short distance in juvenile specimens. Upper labials black. Obscure dark markings are observable on the back in a few specimens, which are arranged regularly in five longitudinal rows.

VENTRAL PLATES	133-137	142-149
SUBCAUDALS	61- 70	85
LOCALITY	{ Stanleyville Kissenje	Medje Poko Niagara

HYDRÆTHIOPS Günther

Hydræthiops melanogaster Günther

Plate III, Figure 1

Hydræthiops melanogaster GÜNTHER, 1872, Ann. Mag. Nat. Hist., (4) IX, p. 28, Pl. III, fig. G. BOULENGER, 1893, 'Cat. Snakes,' I, p. 281; 1896, III, p. 610. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XIX, p. 264. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 12. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 211. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 404. GENDRE, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cvi. BOULENGER, 1915, Proc. Zool. Soc. London, p. 201; 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zool. Soc. London, p. 276.

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The stomach contents of three specimens consist of fish remains, one recognizable as a catfish. One stomach contained a tadpole, and another a mass of mud, with a little vegetable matter, probably the stomach contents of the snake's victim.

A specimen taken in December 1913, contains 6+7 eggs, measuring 20×28 mm.

BOTHROPHTHALMUS Peters

Bothrophthalmus lineatus Peters

Elaphis (Bothrophthalmus) lineatus PETERS, 1863, Monatsber. Akad. Wiss. Berlin, p. 287.

Bothrophthalmus lineatus BOULENGER, 1893, 'Cat. Snakes,' I, p. 324. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, p. 83. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 135. TORNIER, 1901, Zool. Anz., XXIV, p. 64. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 446. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 343. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 42. JOHNSTON, 1906, 'Liberia,' II, p. 832. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 596. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 164. DESPAX, 1911, in Cottés, 'Mission Cottés au Sud Cameroun,' p. 239. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 201, 619; 1919, Rev. Zool. Africaine, VII, p. 19; 1920, Proc. Zoöl. Soc. London, p. 276. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 467.

Bothrophthalmus lineatus olivaceus MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., p. 597.

Thirty-seven specimens of *Bothrophthalmus lineatus* were collected by the Congo Expedition: A. M. N. H. Nos. 12540, 12547 (September 1913), 12548 (October 1913), Akenge; 12529 (October 1909), 12530 (December 1913), 12569 (March 1914), Avakubi; 12531 (February 1910), Gamangui; 12532-33, 12534, 12535 (April, August and September 1910), 12554-59, 12560-64, 12565-68 (April, June and July 1914), Medje; 12536, 12537 (November and December 1910), 12538 (March 1913), Niangara; 12549, 12550-53 (November and December 1910), Niapu; 12539 (August 1913), Poko; 12397-98 (August 1909), Stanleyville.

Bothrophthalmus lineatus is widely distributed throughout the Rain Forest, reaching Uganda, Nyangwe and the Kassai on its borders.

The series is very uniform, and none of the variations in color pattern described in West African specimens appear. The largest male measures 945 mm., the largest female 1135 mm. The proportionate tail length in males is .19-.24, mean .21, in females .17-.20, mean .18. Ventrals number from 181-198, mean 191, in males; 186-207, mean 197, in females; subcaudals in males 75-85, mean 80, in females 70-81, mean 74.

The dorsal scale rows are extremely constant, 23-23-21, only four specimens deviating from this count, 3 with 19 posteriorly, and one with 21 anteriorly. Two pre- and two postoculars in every specimen, three postoculars on one side in a single instance. Temporals 2-3, 3-3 in one specimen. Seven upper and seven lower labials, rarely 6 or 8 below.

The coloration is extremely distinctive. The venter is light yellowish red, often vermilion in life, darker on the throat, and extending onto the first scale row. The dorsum is a glistening black, with five bright red longitudinal lines (yellow in alcoholic specimens): a narrow vertebral line on the middle of the median scale row, a slightly wider one on each side on the upper half of the sixth and lower half of the seventh rows, and a still broader one on the second and third rows. Below this the remaining black consists of a narrow line on the upper part of the first and lower part of the second scale rows. The median red line disappears half-way down the tail; the outer lateral lines join the ventral color on the base of the tail; and the dorsolateral lines continue to the end of the tail, though faint. The top of the head is light brown, somewhat darker in adult specimens, sharply distinct from the black dorsum, extending back about two scales behind the parietals. The median and lateral red lines join this light head color, while the dorsolateral lines end abruptly in the black, though occasionally they also merge with the head color. The head is marked with a black V, the apex anterior, with small black spots on the parietals, and a black line on the canthus rostralis through the eye, with considerable variation in the details of the pattern.

The form found in Fernando Po and Cameroon, which lacks the dorsal lines of the more widely distributed typical form, may be distinguishable as a subspecies, *Bothrophthalmus lineatus brunneus* Günther.

Four specimens contained young rats, and others had evidently disgorged similar prey, from the hair found in their mouths.

Two specimens, taken in July 1914, contained five large eggs, 2+3, 19×37 mm., and 20×45 mm., respectively.

BOTHROLYCUS Günther

Bothrolycus ater Günther

Plate IV, Figure 1

Bothrolycus ater GÜNTHER, 1874, Proc. Zool. Soc. London, p. 444, Pl. LVII, fig. B. BOULENGER, 1893, 'Cat. Snakes,' I, p. 326; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 597. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 19; C. R. Acad. Sci. France, CLXVIII, p. 666; 1920, Proc. Zool. Soc. London, p. 277.

Pseudoboodon albopunctatus ANDERSSON, 1901, Bihang Svenska Vetensk.-Akad. Handl., XXVII, part 4, No. 5, p. 6, Pl. I, figs. 2-4.

Bothrolycus albopunctatus STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405.

Twelve specimens of this interesting species were collected as follows: A. M. N. H. No. 11968 (October 1913), Akenge; 11966-67 (January 1913), Faradje; 11969-72, 11973-77 (November and December 1913), Niapu.

Müller (1910, p. 597) has satisfactorily explained the synonymy of this species as based on its sexual dimorphism, and the present series confirms his conclusions. The distribution appears to be closely confined to the forest.

In the six males the largest measures 440 mm., and the largest of six females measures 702 mm. The tail length in males ranges from .13-.18 of the total; in females it is .08 of the total. The ventrals range from 139-144 in males, and from 148-152 in females; subcaudals 30-33 in males, 18-21 in females. The dorsal scales are 17-17-15 in males, 19-19-15 in females. One preocular, two postoculars, and temporals 1-2 in all specimens. Eight upper labials, the third, fourth, and fifth entering the eye; eight lower labials, the first four in contact with the anterior chin shields.

The difference between the sexes is unusually pronounced, the difference in size being quite exceptional. The maximum length recorded for a male is 461 mm., (Müller, 1910, p. 598), the maximum for females 702 mm.; the mean length of six males being 378 mm., of six females, 631 mm.

The coloration is dark gray, with brownish venter; white spots on the ends of the ventral plates, and often a "dusted" appearance on the dorsal scales. Two of the males have the top of the head white with dark spots. Further variation has been described by Müller (1910, p. 598).

BOÆDON Duméril and Bibron

Boædon lineatus Duméril and Bibron

Boædon lineatum DUMÉRIL AND BIBRON, 1854, 'Erpétol. Gén.', VII, p. 363.

Boædon lineatus MOCQUARD, 1896, Bull. Mus. Hist. Nat., Paris, II, p. 59.

Boodon lineatus BOULENGER, 1893, 'Cat. Snakes,' I, p. 332; 1896, III, p. 616.

BOCAGE, 1896, Journ. Sci. Lisboa, (2) VI, pp. 77, 91. BOULENGER, 1896, Proc. Zool. Soc. London, p. 216; Ann. Mus. Stor. Nat. Genova, (2) XV, p. 13; (2) XVI, p. 553; (2) XVII, p. 20; 1897, Proc. Zool. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 278. JOHNSTON, 1897, 'British Central Africa,' p. 361a. PERACCA, 1897, Boll. Mus. Torino, XII, Nos. 273, 304. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 68. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 398. BOULENGER, 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 720. FERREIRA, 1898, Journ. Sci. Lisboa, (2) V, p. 244. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 147. BOULENGER, 1902, in Johnston, 'Uganda

- Protectorate,' p. 446; Proc. Zoöl. Soc. London, II, p. 17. LAMPE, 1902, Jahrb. Nassau Ver. Naturk., LV, p. 17. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 334, 339, 343. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 54. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 10. PERACCA, 1904, Boll. Mus. Torino, XIX, No. 467. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, pp. 112, 180; Ann. Mus. Stor. Nat. Genova, (3) II, p. 211. FERREIRA, 1905, Journ. Sci. Lisboa, (2) VII, p. 114; 1906, p. 167. BOULENGER, 1907, Proc. Zoöl. Soc. London, p. 486. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 734; Rev. Suisse Zool., XV, p. 76. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1867; 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 170. BOULENGER, 1908, Ann. Natal Mus., I, p. 228. GOUGH, 1908, Ann. Transvaal Mus., I, p. 22. OHDNER, 1908, Ark. Zool., Stockholm, IV, No. 18, p. 5. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405; IV, pp. 212, 243. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, pp. 303, 309, 311. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 595. BOULENGER, 1910, Ann. S. African Mus., V, p. 505. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 14. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 3. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, pp. 54, 63. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 355. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 164. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 250. STERNFELD AND NIEDEN, 1911, Mitt. Zool. Mus. Berlin, V, p. 385. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 5. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 266. BOETTGER, 1913, 'Wiss. Ergeb. Reise in Ostafrika, Voeltzkow,' III, pp. 348, 355, 363, 367. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 161. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool., Stockholm, VIII, No. 20, p. 2. NIEDEN, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 450. WERNER, 1913, Denkschr. Akad. Wiss. (math.-natur.), Wien, LXXXVIII, p. 717. BOULENGER, 1915, Proc. Soc. Zoöl. Soc. London, pp. 202, 619, 646; LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 77; 1918, No. 13, p. 333. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 20. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-naturw. Kl., XLVI, p. 502. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 277. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 467.
- Boaodon lineatus* CHABANAUD, 1916, Bull. Mus. Nat. Hist., Paris, XXII, p. 368; 1917, XXIII, pp. 10, 139.

Four specimens were collected: A. M. N. H. No. 12313 (August 1915), Banana; 12312 (July 1915), Malela; 12310-11 (July 1915), Zambi; all three localities in the Lower Congo. Two specimens from Rhodesia with a third from the Natal Museum were available for comparison.

This species occurs throughout the Savannah Province, but was not taken in the Uelle District by the Congo Expedition.

The specimens from the Lower Congo are juvenile, the largest measuring 435 mm. The tail length in the single male is .18 of the total,

.13-.14 in the three females. Ventrals 202 in the male, 220-222 in the females, subcaudals respectively 67 and 52-53. Dorsal scale rows 23-27-19. One preocular and two postoculars; temporals 1-2 or 1-3, upper labials 8, lower 9.

In the South African specimens at hand there are two preoculars, and the scale rows are 27-31 at mid-body. Reference to the series described by Boulenger (1893, p. 333) proves that there is no geographic variation in the number of dorsal scale rows.

All four specimens are grayish brown above, with the two sharply defined white lines on each side of the head characteristic of this species. No trace of lateral lines. Venter uniform light gray.

The lateral light line figured by Andrew Smith (1849, 'Illustr. Zoöl. S. Africa, Reptiles,' Pl. xxii) is faintly visible in the adult specimen from Natal. It is significant that the variegation of the young shown in the same plate does not appear in the Lower Congo specimens, and a study of the variation in respect to juvenile and adult coloration might warrant the distinction of subspecies in this widely distributed form.

***Boædon fuliginosus* (Boie)**

Plate V

Lycodon fuliginosus, BOIE, 1827, 'Isis,' p. 551.

Boodon fuliginosus BOULENGER, 1891, Ann. Mus. Stor. Nat. Genova, (2) XII, p. 15; 1893, 'Cat. Snakes,' I, p. 334. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 147. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405; IV, p. 212. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 285. WERNER, 1913, Mitt. Naturh. Mus. Hamburg, XXX, p. 21. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 646; 1920, p. 277.

Boaodon fuliginosus CHABANAUD, 1917, Bull. Mus. Hist. Nat., Paris, XXIII, p. 10.

Boodon lineatus plutonis WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 334; 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1867.

Boædon fuliginosus is represented by fifteen specimens: A. M. N. H. Nos. 11988, 11989, 11990 (February, April and July 1911), 11991 (October 1912), Faradje; 12007 (April 1914), Medje; 11994 (July 1913), Nala; 11982-86 (November 1910), 11993, 12309 (June 1913), Niangara; 11995-96 (August 1913), Poko.

Boædon fuliginosus is a species characteristic of the Sudanese Sub-province. Its occurrence at Medje and Nala within the borders of the Rain Forest is anomalous, since usually species found both in the forest and savannah are more widely distributed. These localities, however, are not far from the forest border. In Cameroon it is also recorded from the forest, but it is evidently abundant only in the open country, as noted by Sternfeld (1908, p. 212).

Only two specimens are males. The larger measures 636 mm., tail length .17 of the total in both specimens. The largest female measures 972 mm. and the tail length in females varies only from .12-.13 of the total. Ventral plates in males 205-210, in females 220-235; subcaudals 59-64 and 48-52 respectively. A single preocular in all except two specimens, which have two. Two postoculars. Temporals 1-2. 1-3 in a single specimen. Upper labials 8, lower labials 9.

Uniform very dark gray above, light gray or white beneath.

The characters used by Boulenger (1893, p. 334) to distinguish *Bœædon fuliginosus* from *B. lineatus* are the shorter parietals and the absence of the characteristic head markings. In the present series the proportionate length of the parietals varies from exactly the distance from the frontal to the end of the snout to once and a third that distance; only two specimens agreeing well with *B. fuliginosus* in this respect. The series, however, is very uniform in coloration and habitus, and appears to warrant distinction on these characters from *lineatus*. *Boodon lineatus plutonis* Werner, distinguished by the absence of the head markings, however, is undistinguishable from *B. fuliginosus* if the variability in length of parietals is taken into account, and it is this form which Werner records from the Lado at Mongalla (1907, p. 1867).

HOLUROPHOLIS Duméril

Holuropholis olivaceus Duméril

Plate IV, Figure 2

Holuropholis olivaceus A. DUMÉRIL, 1856, Rev. Mag. Zool., p. 466.

Boodon olivaceus BOULENGER, 1891, Ann. Mus. Stor. Nat. Genova, (2) XII, p. 15; 1893, 'Cat. Snakes,' I, p. 335; 1896, III, p. 616. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 24. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 403; 1899, XLIX, p. 136. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 452. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 42. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 405; IV, p. 213. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 599. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 266. MÜLLER, 1913, Zool. Anz., XLI, p. 234. NIEDEN, 1914, Sitzber. Ges. Naturf. Freunde Berlin, p. 366. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 202, 620; 1920, p. 277. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 468.

Boodon olivaccus (misprint) BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 21.

Twenty-seven specimens of *Holuropholis olivaceus* were collected: A. M. N. H. Nos. 11997-98 (September and October 1913), Akenge; 11981, 12017-18, 12019 (October and November 1909), Avakubi; 11978 (August 1909), Leopoldville; 12020 (September 1910), 12004-06, 12008 (April 1914), 12009-12 (June 1914), 12013 (July 1914), Medje; 11999-12001 (November 1913), 12002-03 (December 1913), Niapu; 11979-80, 12014-16 (August 1909), Stanleyville.

The distribution of this species is a consistent one, for it is confined to the forest in West Africa as well as in the Ituri. It was recorded from Gô, Upper Congo, by Müller (1913, p. 234).

The twenty-seven specimens exhibit only slight variation, but the range in scale count by Boulenger (1893, p. 335) is somewhat increased. The largest male measures 751 mm., the largest female 895 mm. The tail length in males is .15-.18 of the total, mean .17, .12-.13 in females. The ventrals in males range from 185-205, mean 193, the subcaudals from 49-57, mean 54. In females the range is 204-220, mean 209, and 41-46, mean 44. The dorsal scale count varies from 23-25-19 to 29-31-23, the higher counts occurring in females, the lower in males, with 27 the most frequent number at mid-body in both sexes. Three specimens have two preoculars, the others one. Two postoculars in all. Temporals 1-2 or 1-3, two in the first row in two specimens. Upper labials 8, lower 9.

The dorsum is uniform dark grayish brown, the dark color extending to the ends of the ventrals. Venter yellowish white, sometimes with black spots irregularly arranged, frequently invaded by the pigment from the sides, leaving only a narrow median line. Under surface of the tail dark in all specimens.

The stomachs of four specimens contained young or half-grown rats.

LYCOPHIDIUM Duméril and Bibron

Lycophidium laterale Hallowell

Plate IV, Figure 2

Lycophidium laterale HALLOWELL, 1857, Proc. Acad. Nat. Sci. Phila., p. 58.

Lycophidium laterale BOULENGER, 1893, 'Cat. Snakes,' I, p. 338; 1896, III, p. 616.

MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 209; 1899, XLIX, p. 136. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 452. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 343. FERREIRA, 1903, Jorn. Sci. Lisboa, (2) VII, p. 10. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406; IV, p. 213. WERNER, 1909, Mitt. Naturh. Mus. Hamburg, XXVI, p. 247. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., p. 599. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 202; 1920, p. 278.

Lycophidium laterale ocellata STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406.

Six specimens of this species were collected as follows: A. M. N. H. No. 12029 (October 1913), Akenge; 12030-32 (June 1914), Medje; 12033-34 (tags corroded), Belgian Congo.

The distribution is essentially confined to the Rain Forest, extending beyond its borders in northern Angola and Togo.

Lycophidium laterale reaches a relatively large size for the genus, the largest female in the present series measuring 454 mm. The largest male measures 449 mm. The sexes are well distinguished. The tail

length in males is .13-.14 of the total, .10 in females. Ventral plates 187-192 in males, 197-203 in females; subcaudals 43-45 in males, 34-35 in females. The dorsal scales are 17-17-17 in every case, differing in this respect from the other species of *Lycophidion* examined.

The coloration is highly characteristic. Dorsum light brown, with a dorsolateral row of dark brown, light-edged spots about the size of a scale on the sixth or seventh scale row. Sometimes a vertebral row of similar spots. Venter black, including the lower scale rows. Head dark brown with two broad light stripes on each side, uniting anteriorly.

***Lycophidion irroratum* (Leach)**

Coluber irroratum LEACH, 1819, in Bowdich, 'Miss. Ashantee,' App., p. 494.

Lycophidium irroratum GÜNTHER, 1868, Ann. Mag. Nat. Hist., (4) I, p. 426.

BOULENGER, 1893, 'Cat. Snakes,' I, p. 340; 1896, III, p. 617. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 264. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 398; 1902, LII, p. 338. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406; IV, p. 213. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 356. BOULENGER, 1920, Proc. Zool. Soc. London, p. 278. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 468.

Two specimens have been referred to this species: A. M. N. H. No. 12041 (October 1910) Dungu; 12035 (June 1912), Garamba.

The distribution of this species is unsatisfactorily defined. Its absence from Angola and reappearance in Southwest Africa is anomalous. It is well known in the western Sudan, and its occurrence in the Uele District is consequently a normal extension of its range.

The two specimens are entirely blackish brown above and below, the smaller one somewhat lighter, without trace of spots. In scale characters they agree exactly with the description of Boulenger (1893, p. 340).

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12035	12041
Sex	♀	♀
Length	206	393 mm.
Tail	27	42 mm.
Tail/Length	0.13	0.11
Ventral Plates	175	183
Subcaudals	38	33
Dorsal Scales	17-17-15	17-17-15
Preoculars	1	1
Postoculars	2	2
Temporals	1-2	1-2
Upper Labials	8	8
Lower Labials	8	8

Lycophidion fasciatum (Günther)

Alopecion fasciatum GÜNTHER, 1858, 'Cat. Col. Snakes,' p. 196.

Lycophidium fasciatum BOULENGER, 1893, 'Cat. Snakes,' I, p. 342. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 209; 1899, XLIX, p. 136. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 452. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 344. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406; IV, p. 213. WERNER, 1909, Mitt. Naturh. Mus. Hamburg, XXVI, p. 217. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 599. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 202; 1919, Rev. Zool. Africaine, VII, p. 21; 1920, Proc. Zoöl. Soc. London, p. 278. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 468.

Six specimens in the collection: A. M. N. H. Nos. 12024-25 (April 1914), 12026-28 (June 1914), Medje; 12023 (January 1914), Niapu.

Boulenger (1915, p. 202) has recorded this species as occurring in the Ituri Forest, and it ranges west to Sierra Leone, evidently distributed throughout the entire Rain Forest.

The largest male measures 325 mm., the largest female 339 mm. The tail length is not different in the sexes, ranging from .12-.15 of the total. Ventral plates 175-184; subcaudals 41-47; dorsal scale rows 17-17-15. One preocular, two postoculars; temporals 1-2; upper labials 7, the third, fourth and fifth entering the eye. Lower labials 8, the first five in contact with the anterior chin-shields.

The narrow dark crossbands, frequently interrupted on the dorsal line, are very distinct in juvenile specimens, almost invisible in the largest. There are thirty-one crossbars (on one side) on the body, ten on the tail. The venter is uniformly dark gray, the head entirely without markings.

Lycophidion elapoides Günther

Lycophidium elapoides GÜNTHER, 1874, Proc. Zoöl. Soc. London, p. 444. BOULENGER, 1893, 'Cat. Snakes,' I, p. 343, Pl. xxii, fig. 3; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 279.

A single specimen, A. M. N. H. No. 12022 (May 1914), was collected at Medje.

Lycophidion elapoides is a rare snake, hitherto known only from the Cameroon forest. Its occurrence at Medje proves that it is a widely distributed forest species.

The specimen agrees with Boulenger's description and figure with the exception of having interspaces between the dark crossbands much wider than the bands. Boulenger states that the temporals are 2-3, but the figures show temporals 1-2. The number of ventral plates, 244, is

much higher than the 225 of the type, but specimens recorded by Sternfeld (1908, p. 406) are intermediate between these two extremes. The loreal of one side enters the eye, on the other side it is excluded.

The color above is a light reddish brown, with twenty-one black crossbands, not extending on the venter, three or four scales in length. Four of these are interrupted on the vertebral line, others are diagonal. Nine black bands on the tail. Top of the head black, joining the first crossband, and outlined on the sides with lighter punctate lines as in *Lycophidion laterale*. Venter pink, uniformly and profusely spotted with black.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12022
Sex	♂
Length	490 mm.
Tail	95 mm.
Tail/Length	0.19
Ventral Plates	244
Subcaudals	78
Dorsal Scales	17-17-15
Preoculars	1
Postoculars	2
Temporals	1-2
Upper Labials	8
Lower Labials	8

HORMONOTUS Hallowell

Hormonotus modestus (Duméril and Bibron)

Lamprophis modestus DUMÉRIL AND BIBRON, 1854, 'Erpétol. Gén.,' VII, p. 429.

Hormonotus modestus GÜNTHER, 1862, Ann. Mag. Nat. Hist., (3) IX, p. 53. BOULENGER, 1893, 'Cat. Snakes,' I, p. 343; 1896, III, p. 617. BOCAGE, 1895, Journ. Sci. Lisboa, (2) IV, p. 13. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 209; 1899, XLIX, p. 137. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 452. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406; IV, p. 213. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 599. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 164. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 204. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 369; 1917, XXIII, p. 10. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 279.

Five specimens of *Hormonotus* were collected: A. M. N. H. No. 12037 (May 1910), 12039, 12040 (April and June 1914), Medje; 12038 (December 1913), Niapu; 12036 (August 1909), Stanleyville.

Hormonotus has a characteristic forest distribution, reaching the forest islands in Uganda and Togo.

The largest of the three males measures 743 mm., the larger female 687 mm. The tail length in males measures .21-.23 of the total, in females .19-.20. Ventral plates 220-228; subcaudals 96-103 in males, 77-86 in females. Dorsal scales 15-15-13. One preocular; three postoculars; temporals 2-3; 2-2 on one side in one specimen. Upper labials 8, the third, fourth and fifth entering the eye; lower labials 9, four in contact with the anterior chin shields.

The coloration is uniform grayish brown, lighter beneath. The head shields are narrowly but sharply margined with white, producing a very characteristic reticulate appearance; each of the lower labials has a dark spot.

MEHELIA Csiki

Mehelya lamani Lönnberg

Mehelya lamani LÖNNBERG, 1911, Ark. Zool., Stockholm, No. 8, p. 1, fig. 1.

Simocephalus lamani BOULENGER, 1915, Proc. Zool. Soc. London, p. 203.

Four specimens of this species, which has previously been known from a single specimen from the Lower Congo, were collected: A. M. N. H. No. 12054 (June 1914), Medje; 12043 (December 1910), Niagara; 12042, 12044 (tags corroded), Belgian Congo.

The genus *Mehelya* ranges over the whole of Africa south of the Sahara, with the exception of Southwest Africa. The distribution of the individual species cannot be satisfactorily determined until the genus is revised, no less than eight of the sixteen species being known from only a single record. It seems very likely that the number of species can be materially reduced by comparative study. The reference of *M. phyllopholis* of Cameroon to *M. chanleri* of Kenya Colony (Sternfeld, 1908, Mitt. Zool. Mus. Berlin, III, p. 407) does not, however, seem geographically probable. Sternfeld (1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.', IV, p. 268) records *M. baumanni* from Avakubi, which adds a third species for the Ituri. *Simocephalus* (*Cephalosimus*) *insignis* Chabanaud (1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 369, Figs. 10-11) seems to be referable to *Gonionotophis brussauxi* Mocquard, with which it agrees in essential characters.

The four specimens under consideration differ from Lönnberg's description in having a slightly larger frontal, and the vertebral scale row does not extend to the parietals; nor does Lönnberg describe the extremely compressed dorsum, the body having a distinctly triangular cross-section.

The larger of the two males (tail slightly damaged) measures 1290 mm., the type measuring 1450 mm. The larger female measures 1120 mm. The tail length is .13 of the total in all of the specimens, .12 in the type. The ventrals range from 227-236, the subcaudals from 53-60. Dorsal scales 17-15-15. One preocular and two postoculars, three postoculars on one side in one specimen. Temporals 1-2 or 1-3. Upper labials 7, the third and fourth entering the eye. Lower labials 8 or 9, five in contact with the anterior chin shields. The scales are rather widely separated in all specimens, with the exception of the three vertebral and the lateral rows. The development of lateral keels, the diagonal striation on the dorsal scales and the rugose head shields distinguish this species at once from *M. poensis* and *M. baumanni*.

The color is a uniform brown, the skin between the scales somewhat lighter.

Mehelya poensis (Smith)

Plate VI

Heterolcpis poensis SMITH, 1849, 'Ill. Zoöl. S. Africa, Rept.,' (under *H. capensis*, Pl. LV).

Simocephalus poensis BOULENGER, 1899, 'Cat. Snakes,' I, p. 346. MATSCHIE, 1893, Mitt. Deutsch. Schutzgeb., VI, p. 211. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 24. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 69. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 137; 1902, LII, p. 344. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 212. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 406; IV, p. 213. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 600. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 164; 1915, Proc. Zoöl. Soc. London, pp. 203, 621. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 369. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 22; 1920, Proc. Zoöl. Soc. London, p. 280. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 468.

Mehelya poensis LÖNNBERG, 1911, Ark. Zool., Stockholm, VII, No. 8, p. 3. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199.

Eleven specimens have been referred to this species: A. M. N. H. No. 12056 (December 1913), Avakubi; 12048 (February 1910), Gamangui; 12049-50 (September 1910), 12052-53, 12055 (June 1914), Medje; 12051 (July 1913), Nala; 12045-47 (August 1909), Stanleyville.

The distribution of *Mehelya poensis* is that of a forest species reaching East Africa.

The species is readily distinguished from the preceding by the uncarinate scales, otherwise smooth, the longer tail, and the extremely depressed, broad and elongate snout. The snout appears to be slightly longer in females than in males.

The largest male measures 844 mm., the largest female 1145 mm. The tail length in six females is .20-.21 of the total, in four males .24 of the total. The ventral plates range from 245-254 in females, and from 242-246 in males; subcaudals 105-111 in males, 93-103 in females. Dorsal scales 17-15-15, 19 on the neck in one specimen. A single preocular, two postoculars, three on one side in two specimens, temporals invariably 1-2. Seven upper labials, third and fourth entering the eye; eight lower labials, first five in contact with the anterior chin shields.

Color uniform grayish brown above, the exposed skin between the scales lighter.

One specimen, from Stanleyville, was taken in the grass; one from Gamangui in the plantations.

CHLOROPHIS Hallowell

SYNOPSIS OF THE SPECIES

- A.—Anal entire, ventrals keeled.
 B.—Dorsal scales in 13 rows (Rain Forest).....*carinatus*.
 BB.—Dorsal scales in 15 rows.
 C.—One anterior temporal; VP. 164-170, SC. 123 (Eastern Sudan)
bequaerti.
 CC.—Two anterior temporals; VP. 148-162, SC. 78-92 (Rain Forest)
heterodermis.
- AA.—Anal divided.
 B.—Ventrals without trace of keel.
 C.—Scales in 13 rows; VP. 148, SC. 75 (Tanganyika Territory;
 Ituri).....*macrops*.
 CC.—Scales in 15 rows.
 D.—Two upper labials entering the eye; VP. 150-169, SC. 82-
 105 (Southeast and East Africa).....*hoplogaster*.
 DD.—Three upper labials entering the eye.
 E.—Seven upper labials; VP. 182, SC. 114 (Lake
 Region).....*schubotzi*.
 EE.—Eight upper labials; VP. 152-166, SC. 85-99
 (Angola; Portuguese Guinea?).....*ornatus*.
 EEE.—Nine upper labials; VP. 155-190, SC. 103-123
 (Lake Region, Eastern Sudan).....*emini*.
- BB.—Ventrals with a lateral keel.
 C.—Two upper labials entering the eye.
 D.—Two anterior temporals; VP. 151-169, SC. 114-124
 (Southeast Africa; Togo ?).....*natalensis*.
 DD.—One anterior temporal.
 E.—Loreal nearly as deep as long; VP. 150-160, SC.
 90-100 (Angola).....*angolensis*.
 EE.—Loreal twice as long as deep; VP. 149-166, SC.
 77-144 (East and Northeast Africa; Rhodesia;
 Cameroon ?).....*neglectus*

CC.—Three upper labials entering the eye.

D.—Seven upper labials; VP. 185, SC. 129; body very slender (Cameroon; Hinterland)..... *gracilis*.

DD.—Eight or nine upper labials; VP. 175–190, SC. 115–190; body very slender (Borders of Rain Forest),

heterolepidotus.

DDD.—Nine upper labials; temporals 1 (2) – 2 (1); VP. 150–182, SC. 90–133; body somewhat stouter (Savannah Province, except Southwest Africa; occasional in the Forest),

irregularis.

Chlorophis carinatus Andersson

Chlorophis carinatus ANDERSSON, 1901, Bihang Svenska Vetensk.-Akad. Handl., XXVII, part 4, No. 5, p. 9. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 407. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 601. BOULENGER, 1915, Proc. Zool. Soc. London, p. 205; 1919, Rev. Zool. Africaine VII, p. 23; 1920, Proc. Zool. Soc. London, p. 282.

Twenty-one specimens of *Chlorophis carinatus* were collected: A. M. N. H. No. 12076 (November 1909), Avakubi; 12077 (July 1913), Babonde, south of Medje; 12075 (September 1909), Batama; 12057 (April 1910), 12058 (May 1910), 12064–66, 12067–72 (April and June 1914), Medje; 12060 (July 1913), Nala; 12061–62, 12063 (November and December 1913), Niapu; 12074 (August 1909), 12078–79 (April 1915), Stanleyville.

Chlorophis carinatus appears to be much more abundant in the Ituri Forest than in the Cameroon-Gaboon area. It is closely confined to the Rain Forest, and is apparently the only species of the genus that can be regarded as essentially a forest form.

The largest male measures 705 mm., the largest female 695 mm. The tail length varies from .25–.28, mean .27 in males, and from .22–.25, mean .24 in females. Ventral plates 148–158 in males, mean 152, 159–165 in females, mean 161. Subcaudals 80–91, mean 87, in males, 74–86, mean 79, in females. Dorsal scales invariably 13–13–11. One pre- and two postoculars in all. Temporals 2–2 or 2–2–2, rarely 2–3; in one specimen 3–2–2. Upper labials 9, lower labials 10 or 11.

Dark bluish green above and below, chin whitish, in formalin specimens. Juvenile alcoholic specimens are bronzy green, more or less distinctly crossbarred.

A specimen fell from the thatch onto the table in the collector's room at Avakubi.

***Chlorophis bequaerti*, new species**

Two specimens from Niangara, A. M. N. H. Nos. 12073, 12080 (November 1910), represent a new form, confined, probably, to the eastern Sudan, where apparently it replaces *Chlorophis heterodermus*, which ranges from Portuguese Guinea to Cameroon.

DIAGNOSTIC CHARACTERS

Habitus very slender, tail one-third the total length; ventral plates distinctly keeled; anal entire; three labials entering the eye; one anterior temporal; dorsal scales in fifteen rows; ventrals 164-170, subcaudals, 123.

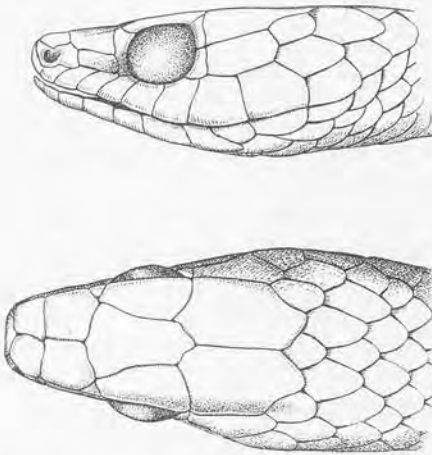


Fig. 3. Dorsal and lateral views of head of *Chlorophis bequaerti*, new species, (12073, paratype, $\times 2$).

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 12080, ♂.

Habitus slender, slight compressed, tail length .33 of the total, eye large, canthus rostralis distinct.

Rostral slightly wider than high, visible from above. Internasals considerably smaller than the prefrontals. Frontal bell-shaped, longer than its distance from the end of the snout, shorter than the parietals. Nasal divided, in contact with the first and second labials. Loreal rectangular, twice as long as high. A single preocular barely in contact with the frontal; two postoculars. Temporals, 1-1. Nine upper labials, fourth, fifth and sixth entering the eye. Eleven lower labials, first five in contact with the anterior chin shields. Posterior chin shields longer, with a long median suture.

Dorsal scales, 15-15-11, very oblique anteriorly. Ventral plates 164, with a distinct keel. Subcaudals, 123. Total length 652 mm., tail 212 mm. (.33).

Color dark bluish gray above and below. Posterior chin shields and gulars light.

The single paratype, a female, has a slightly incomplete tail. Ventral plates 170, subcaudals 98. Temporals 1-2. Somewhat stouter habitus, probably a sex character.

Chlorophis bequaerti is distinguished from *C. carinatus* by the fifteen dorsal scales and the single anterior temporal. From *C. heterodermus*, its closest ally, it is distinguishable by the single anterior temporal, the longer tail and higher number of subcaudals, and by a higher number of ventral plates.

Chlorophis heterolepidotus (Günther)

Ahaetulla heterolepidota GÜNTHER, 1863, Ann. Mag. Nat. Hist., (3) XI, p. 286.

Chlorophis heterolepidotus BOULENGER, 1894, 'Cat. Snakes,' II, p. 95, Pl. v, fig. 3; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 69. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 344. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 214; 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 270. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 205, 623; 1920, p. 281.

Three specimens of this distinct species: A. M. N. H. No. 12086, 10287, 12092 (April, May and June 1913), Niangara.

This species, far less common than *C. irregularis*, also ranges entirely around the forest border, being known from Eastern Gold Coast, the Sudan, East Africa and the Lake Region, and the Lower Congo and Angola.

The three specimens conform closely to the descriptions. The color is dark green above and beneath, chin lighter.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12086	12087	12092
Sex	♀	♂	♀
Length	764	730	742
Tail	264	250	234
Tail/Length	0.32	0.34	0.31
Ventral Plates	186	193	189
Subcaudals	117	134	117
Dorsal Scales	15-15-11	15-15-11	15-15-11
Preoculars	1	1	1
Postoculars	2	2	2
Temporals	1-1	1-1	1-1
Upper Labials	8-9	8	9
Lower Labials	10	10	10

Chlorophis irregularis (Leach)

Coluber irregularis LEACH, 1819, in Bowdich, 'Miss. Ashantee,' p. 494.

Chlorophis irregularis BOULENGER, 1891, Proc. Zoöl. Soc. London, p. 306; 1894, 'Cat. Snakes,' II, p. 96; 1896, III, p. 631. MOCQUARD, 1896, Bull. Mus. Hist.

The single paratype, a female, has a slightly incomplete tail. Ventral plates 170, subcaudals 98. Temporals 1-2. Somewhat stouter habitus, probably a sex character.

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Nat., Paris, II, p. 59. PERACCA, 1896, Boll. Mus. Torino, XI, No. 255, p. 2. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278; Proc. Zoöl. Soc. London, p. 801. JOHNSTON, 1897, 'British Central Africa,' p. 361a. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 70, fig. D. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 398; 1899, XLIX, p. 147. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 446. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 334, 344. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 10. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112; Ann. Mus. Stor. Nat. Genova, (3) II, p. 213. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 734. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1871, Pl. III, fig. 5. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 407; IV, pp. 214, 243. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 595. GENDRE, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cvi. BOULENGER, 1910, Ann. S. African Mus., V, p. 508. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 64. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' p. 270. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 205, 623. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 371; 1917, XXIII, p. 11; 1919, XXV, p. 567. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 282. CHABANAUD, 1921, Bull. Com Études Hist. Scient. Afrique Occ. Française, p. 468.

Fifteen specimens of *Chlorophis irregularis*: A. M. N. H. Nos. 12059, 12085 (July 1911), Aba; 12083-84 (March 1911), Faradje; 12081-82 (November 1910), 12090-91 (June 1913), Niangara; 12094-97 (August 1909), Stanleyville; 12098-12100 (November 1911), Yakuluku.

It proves impossible to distinguish the four specimens from Stanleyville from those taken in the savannah, and for the present it must be assumed that this wide-ranging savannah species enters the forest in Cameroon as well as in the Ituri. Records from the forest, however, are rare, while it is a very common species in the savannah. It has the distribution typical of a number of savannah species, reaching Natal to the south, but absent from Southwest Africa, although it reaches Angola.

The largest male measures 843 mm., the largest female 1005 mm. The tail length in males varies from .30-.33 of the total, mean .31; and from .27-.30 in females, mean .29. The sexes are not distinguishable by the number of ventral plates, which range from 152-173, mean 161. The subcaudals in males range from 96-113, mean 107, from 93-109, mean 103, in females. Dorsal scale rows usually 15-15-11, rarely 13 or 17 on the neck. One pre- and two postoculars. Temporals 1-1 in eleven specimens, 1-2 in two, and 1-1 + 1-2 in two others, slightly differing in this respect from the normal *C. irregularis*, in which the temporals are most frequently 1-2. Two to five slightly enlarged occipitals. Upper labials 8, rarely 7 or 8; lower labials 10 or 11.

Bright green above, very pale green on the venter, many of the dorsal scales with a white basal spot. The black skin between the

scales is very conspicuous in some specimens, and it appears especially when the specimen is injected.

One specimen from Stanleyville was caught at the base of a tree, beneath a heap of leaves, another, from Niangara, was taken from a pawpaw tree.

One specimen contained a frog; another a lizard.

PHILOTHAMNUS Smith

Philothamnus nitidus (Günther)

Ahætulla nitida GÜNTHER, 1863, Ann. Mag. Nat. Hist., (3) XI, p. 286.

Philothamnus nitidus BOULENGER, 1894, 'Cat. Snakes,' II, p. 100. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 264. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 403; 1899, XLIX, pp. 137, 147. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 408; IV, p. 215. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 601. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 282.

Philothamnus semivariiegatus BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 23.

Fifteen specimens of *Philothamnus nitidus* were secured: A. M. N. H. No. 12113 (September 1913), Akenge; 12101-2 (October 1909), Avakubi; 12110, 12112 (January 1910), Gamangui; 12088-89 (May and August 1910), 12107-9 (April 1914), Medje; 12103 (November 1910), Niangara; 12104-6 (December 1913), Niapu; 12093 (tag corroded), Belgian Congo.

This species evidently replaces *Philothamnus semivariiegatus* in the Rain Forest. Boulenger (1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 213) records the latter species from Victoria, Cameroon, but the specimen should probably be referred to *P. nitidus*, as Sternfeld (1908, p. 408) has since referred other supposed *P. semivariiegatus* from Cameroon.

The largest of the four males measures 895 mm., the largest female 930 mm. The tail length in males varies from .36-.39 of the total length; in females from .35-.36. Ventral plates range from 164-175; the subcaudals from 134-153 in males, and from 129-140 in females. The dorsal scales are uniformly 15-15-11; one pre- and two postoculars. Temporals variable, usually 1-2, or 1-1-2, sometimes 1-2-2, in one case 1-1-1. Nine upper and nine to eleven lower labials.

The coloration is bluish green above, the scales outlined with black, lighter green beneath, the throat nearly white.

Philothamnus dorsalis (Bocage)

Leptophis dorsalis BOCAGE, 1866, Journ. Sci. Lisboa, (1) I, p. 69.

Philothamnus dorsalis PETERS, 1876, Monatsber. Akad. Wiss. Berlin, p. 119. BOULENGER, 1895, 'Cat. Snakes,' II, p. 101; 1896, III, p. 631. BOCAGE, 1897, Journ. Sci. Lisboa, (2) IV, p. 200. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 12. FER-

REIRA, 1898, Journ. Sci. Lisboa, (2) IV, p. 244. BOULENGER, 1900, Proc. Zool. Soc. London, p. 452; 1915, p. 206; 1920, p. 282.

A single specimen of this species, A. M. N. H. No. 12111, was taken at Banana, Lower Congo, August 1915.

Philothamnus dorsalis is a distinctly Angolan species, reaching the border of the forest north of the mouth of the Congo. The record from Tanganyika Territory (Tornier, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 71) has not been confirmed, but it is entirely probable that *dorsalis* reaches at least the western shore of Lake Tanganyika, with a forest-border distinction similar to that of many Sudanese species. It is possible that the East African record of *P. thomensis* (Tornier, *loc. cit.*) should be referred to this species.

The specimen is a female, 741 mm. in length, of which the tail occupies 254 mm., or .34 of the total length. Ventral plates 178, subcaudals 121. Dorsal scale rows 15-15-11. One pre- and two postoculars; temporals 1-1-1; three slightly enlarged occipitals. Upper labials 9, lower labials 11.

General color a bronzy green, most of the scales on the anterior half of the body with a small white spot at the anterolateral corner. Brownish crossbands on the anterior portion of the back, about as wide as the interspaces, merging into a longitudinal line on the three median scale rows posteriorly. Venter greenish gray, with a sharp black line following the keels. Throat, chin, and labials yellow, snout reddish brown.

GASTROPYXIS Cope

Gastropyxis smaragdina (Schlegel)

Plate VII

Dendrophis smaragdina SCHLEGEL, 1837, 'Phys. Serp.,' II, p. 237.

Gastropyxis smaragdina COPE, 1860, Proc. Acad. Nat. Sci. Phila., p. 558. BOULENGER, 1894, 'Cat. Snakes,' II, p. 103; 1896, III, p. 631; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 12. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 24. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 403; 1899, XLIX, p. 137. BOULENGER, 1900, Proc. Zool. Soc. London, p. 452. TORNIER, 1901, Zool. Anz., XXIV, p. 64. LAMPE, 1902, Jahrb. Nasasu. Ver. Naturk., LV, p. 57. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 338, 344. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 10. GOUGH, 1903, Zool. Jahrb. (Syst.), XVII, p. 465. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 213. JOHNSTON, 1906, 'Liberia,' II, p. 832. BOULENGER, 1908, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 5. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 408; IV, p. 215. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 601. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. MÜLLER, 1913, Zool. Anz., XLI, p. 64. BOULENGER, 1915, Proc. Zool. Soc.

London, pp. 206, 623. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 372. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 23; 1920, Proc. Zoöl. Soc. London, p. 283. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 468.

Fifteen specimens of this species were collected: A. M. N. H. No. 12120 (December 1913), Avakubi; 12115, 12116-17, 12118 (May, August and September 1910), 12121-27, 12128 (April and June 1914), Medje; 12119 (June 1913), Niangara; 12114 (August 1909), Stanleyville.

Gastropyxis smaragdina is a wide-ranging forest species, reaching Eastern Gold Coast and northern Angola, and recorded in East Africa from the Sesse Islands in Lake Victoria.

The largest male measures 865 mm., the largest female 1112 mm. The sexes are not distinguished either by tail length or number of ventrals and subcaudals. The tail length varies from .37-.39 of the total. Ventral plates 152-161, subcaudals 141-146. Dorsal scale count uniformly 15-15-11. Invariably one pre- and two postoculars. Temporals 1-2 or 1-1-2. Upper labials 9, lower 9 or 10.

The color is green above, lighter yellowish green beneath, with a black line through the eye. Venter uniform green with a dark line on each side corresponding to the keels.

A female taken in April 1914 (No. 12121) contained three eggs which are remarkably elongate, measuring 56×12 mm.

HAPSIDOPHRYS Fischer

Hapsidophrys lineatus Fischer

Hapsidophrys lineatus FISCHER, 1856, Abh. Naturw. Ver. Hamburg, III, p. 111, Pl. II, fig. 5. BOULENGER, 1894, 'Cat. Snakes,' II, p. 104. BOCAGE, 1895, 'Herpétol. Angola,' p. 97; Journ. Sci. Lisboa, (2) IV, p. 13. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 264. MOCQUARD, 1896, Bull. Mus. Hist. Nat., Paris, II, p. 59. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 12. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 24. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 137. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 453. TORNIER, 1901, Zool. Anz., XXIV, p. 64. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 213. JOHNSTON, 1906, 'Liberia,' II, p. 832. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 408; IV, p. 215. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 602. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303; 1911, (3) IV, p. 165; 1915, Proc. Zoöl. Soc. London, pp. 206, 624; 1919, Rev. Zool. Africaine, VII, p. 23; 1920, Proc. Zoöl. Soc. London, p. 283. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 469.

Eight specimens of *Hapsidophrys lineatus* were collected, frequently in the same lot with *Gastropyxis*: A. M. N. H. Nos. 12131, 12132-33

(August and September 1910), 12134-36, 12129 (April and June 1914), Medje; 12130 (August 1909), Stanleyville.

Hapsidophrys has practically the same distribution as *Gastropyxis*, reaching French Guinea to the west and Uganda to the east, but rather closely confined to the Rain Forest.

The largest male measures 1102 mm., the largest female 1070 mm. The tail length, which does not differ in the sexes, occupies .28-.30 of the total. The ventrals range from 158-166, the subcaudals from 101-110. Dorsal scales uniformly 15-15-11. Invariably one pre- and two postoculars. Temporals 2-2 in all specimens. Upper labials 8 or 9, lower 9 or 10. One specimen lacks the loreal on one side, by fusion with the prefrontal.

Coloration normal. General color above bluish green, all of the scales with dark lateral edges, producing a lineate effect. Venter light green with only a very faint darker line on the keels.

RHAMNOPHIS Günther

SYNOPSIS OF THE SPECIES OF *Rhamnophis* AND *Thrasops*

- A.—Dorsal scales smooth; vertebral row distinctly enlarged; rostral low, subtriangular; large occipitals present. *Rhamnophis*.
 B.—Anal divided, scales in 15-19 rows.
 C.—Dorsal scales in 17 rows (rarely 19); two postoculars; eight upper labials; ventrals 158-179. *æthiopissa*.
 CC.—Dorsal scales in 15 rows (rarely 17); two postoculars; eight upper labials; ventrals 159-172. *ituriensis*.
 BB.—Anal entire, scales in 13 rows; three postoculars; seven upper labials; ventrals 163-177. *batesii*.
 AA.—Dorsal scales keeled or smooth; vertebral row scarcely if at all enlarged; rostral high, square, with vertical sides; postparietals numerous, sometimes a little enlarged. *Thrasops*.
 B.—Dorsal scales in 19 rows; ventrals 192-211; throat in adult faintly gray. *jacksoni*.
 BB.—Dorsal scales in 17 rows; ventrals 173-187; (throat gray?) *rothschildi*.
 BBB.—Dorsal scales in 13-15 rows; ventrals 179-206; throat bright yellow in adult. *flavicularis*.

Rhamnophis ituriensis, new species

Rhamnophis æthiopis BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 23.

Ten specimens of *Rhamnophis* are distinguished from *R. æthiopissa* Günther: A. M. N. H. Nos. 12507-08 (February 1910), Gamangui; 12490-91 (May 1910), Medje; 12492 (November 1910), Niangara; 12500-02 (November 1913), 12505-06 (January 1914), Niapu.

The new form replaces the West African *Rhamnophis æthiopissa* in the Ituri.

DIAGNOSTIC CHARACTERS

Habitus slender, tail more than a third the total length, eye large, its diameter equaling the length of the snout. A pair of very large occipital shields; dorsal scales smooth, very oblique, in fifteen rows, the vertebral row enlarged. Ventral plates 159-172, subcaudals 134-150.

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 12505, ♀.

Habitus of arboreal species, tail .34 of the total length. Eye very large, the diameter equaling the length of the snout, pupil round. Snout flattened, obtusely truncate, canthus rostralis rounded.

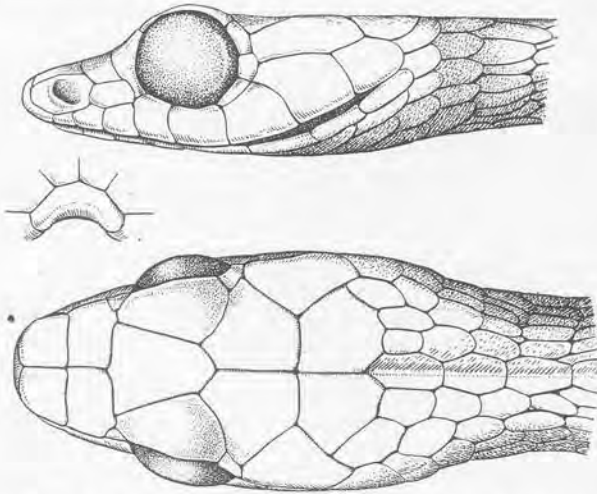


Fig. 4. Dorsal and lateral views of head and front view of rostral of *Rhamnophis ituriensis*, new species, (12505, type, $\times 2$).

Rostral much wider than high, narrowly visible from above. Internasal suture slightly longer than the prefrontal; prefrontals extending on the sides of the snout to the loreal; nasal divided; loreal once and a half as long as high; frontal as long as its distance from the end of the snout, slightly shorter than the parietals, five-sided, the lateral sides straight, converging behind; parietals nearly as wide as long; two very large occipitals, one in contact with the eighth labial, the other narrowly separated from it; one preocular, not reaching the frontal; two postoculars; a single large temporal; eight upper labials, the fourth and fifth entering the eye; nine lower labials, the first five in contact with the anterior chin shields; three pairs of chin shields, the second largest.

Dorsal scales smooth with apical pits, in 15-15-11 rows, very oblique; the vertebral row strongly enlarged, its scales at least twice as wide as the adjacent laterals. Ventrals 166, obtusely angulate, without keel; anal divided; subcaudals divided, 140.

General color above bluish black, the center of each scale with a lighter bluish line, these making four continuous light lines on the tail. Ventrals bluish olive, with a

well-defined, nearly continuous light line on the lateral angle, and with a black spot either adjacent to this line or at the lateral end of the ventral; subcaudals more or less spotted with black, a well-defined median black line posteriorly; chin shields and throat yellowish; labials and head uniform dark bluish gray.

Length 1305 mm., tail 440 mm.

COMPARISON OF PARATYPES

In the series of paratypes, three males and six females, the largest female measures 1290 mm., tail 458 mm. (the type being the largest male). The tail length varies from .34-.38 of the total, with no difference for sex. Ventral plates 164-166 in males, 159-172, mean 170, in females; dorsal scales 15-15-11 in all but two specimens, one of which has 19-15-11, the other 15-17-11.

Two specimens have two preoculars on each side; one has postoculars 2-3, one postoculars 4-4. A single large temporal in every specimen; one specimen has three large occipitals, one being longitudinally divided; two specimens have only seven upper labials, and the lower labials, usually 9, vary from 8-10.

The two specimens from Medje reported by Boulenger agree with the present series in having fifteen scale rows instead of seventeen, as in the *R. æthiopissa* of West Africa. The relationship with the latter species is so close that the two forms will probably be found to represent subspecies.

One of the smaller specimens shows the more vivid juvenile coloration. The light portion of each scale is much larger, the black reduced to a narrow rim, with the alternate black and light lines on the tail sharply defined.

The validity of the genus *Rhamnophis* has been questioned by various authors, beginning with Boulenger (1896, 'Cat. Snakes,' III, p. 632). Part of this uncertainty is due to the emphasis of the wrong characters, which caused Boulenger to place *Thrasops jacksoni* in *Rhamnophis*. Although the writer has been able to examine only four of the six species of the two genera, it seems certain that the correlation of several minor characters, common to a group of species, such as has been indicated in the foregoing synopsis, is basis for generic distinction; but *Rhamnophis* is further distinguished from *Thrasops* by a character of the hemipenis. In *Rhamnophis ituriensis* the hemipenis has four large spines about the base, with the remainder calyculate; in *Thrasops jacksoni* it is heavily spinose on one side for its entire length.

***Rhamnophis batesii* (Boulenger)**

Thrasops batesii BOULENGER, 1908, Ann. Mag. Nat. Hist., (8) II, p. 93; 1920, Proc. Zool. Soc. London, p. 283.

Three specimens of this rare and distinct species: A. M. N. H. No. 12137 (February 1910), Gamangui; 12503-04 (November 1913), Niapu.

Rhamnophis batesii must be continuously distributed throughout at least the eastern division of the Rain Forest from Cameroon to the Ituri. It is known from both the Kribi and Ja river basins in Cameroon.

The largest specimen, a female, tail mutilated, measures 1060 mm., 770 mm. to the vent, the largest specimen of the type series measuring 1800 mm. In the original description, the enlarged vertebral scales are not mentioned, but the agreement in every other respect is so close that there can be no question of the identity of the present specimens with the Cameroon species. The two pairs of occipitals and the large seventh labial, bordering the temporal for its entire length, distinguish *Rham-*

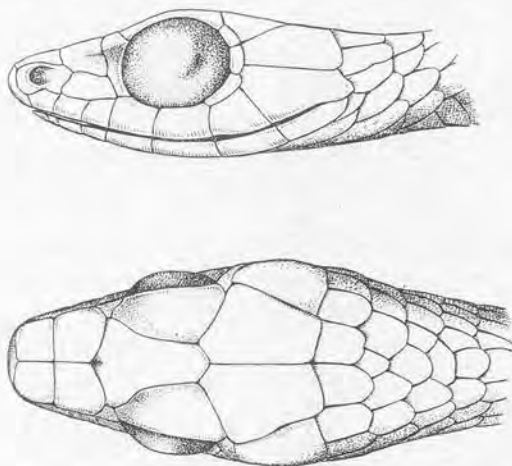


Fig. 5. Dorsal and lateral views of head of *Rhamnophis batesii* (Boulenger), (12173, $\times 2$).

nophis batesii from *R. æthiopissa* and *R. ituriensis*. *R. batesii* is also distinguished from the other two species of *Rhamnophis* by the single anal and the larger number of maxillary teeth, but the relationship is nevertheless close, and the affinities would be disguised by the use of a generic or subgeneric name.

The coloration is very distinctive, but still similar in plan to that of *R. ituriensis*, the light color predominating instead of the black. Scales (in alcohol) light gray, with a violet tinge, narrowly edged with black; all of the head shields distinctly violet. Upper and lower labials, temporals and occipitals outlined with black; venter light gray with violet tinge, and scattered black spots, which are more numerous posteriorly, but most sharply defined anteriorly; light line on the lateral

angle of the ventrals very faint. Tail with the scales very narrowly edged with black, very different from the heavy black lines of *R. ituriensis*.

In the full-grown specimen (1060 mm.) the coloration is the same as in the young, with no evidence of the darkening of all the scales from the edges as in *R. ituriensis*. The violet ground color is darker throughout in this specimen. The violet venter is strikingly different from the dark bluish olive of *R. ituriensis*.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12137	12503	12504
Sex	♀	♂	♂
Length	1060	640	825 mm.
Tail	.....	183	210 mm.
Tail/Length	....	0.29	0.25
Ventral Plates	177	172	176
Subcaudals	....	108	91
Dorsal Scales	13-13-11	13-13-11	13-13-11
Preoculars	1	1	1
Postoculars	3	3	3
Occipitals	4	4	4
Upper Labials	7	7	7
Lower Labials	8	8	8-9

THRASOPS Hallowell

Thrasops jacksoni Günther

Thrasops jacksoni GÜNTHER, 1895, Ann. Mag. Nat. Hist., (6) XV, p. 528. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 215, figs. 2-3; 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199.

Rhamnophis jacksoni BOULENGER, 1896, 'Cat. Snakes,' III, p. 632; 1902, in Johnston, 'Uganda Protectorate,' p. 446; 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165; 1915, Proc. Zoöl. Soc. London, p. 624; 1919, Rev. Zool. Africaine, VII, p. 23; 1920, Proc. Zoöl. Soc. London, p. 284.

Eighteen specimens of *Thrasops* are referred to this species: A. M. N. H. Nos. 12138, 12287, 12288-89 (October and November 1909), 12293, 12295 (September 1913), 12296 (November 1913), 12141-42 (January and May 1914), Avakubi; 12290 (June 1910), 12139-40, 12291 (September 1910), 12297-98 (June 1914), Medje; 12252, 12292 (November and December 1910), Niangara; 12143 (tag corroded), Belgian Congo.

The distribution of *Thrasops jacksoni* is puzzling, for it is absent in the Cameroon-Gaboon Forest, abundant in the Ituri Forest, and reappears in the Liberian Forest Area (French Guinea to Togo) and to the south of the Rain Forest proper along the Kasai. *Thrasops flavigularis* appears to replace it in the Gaboon region, but the two species occur together in the Liberian Forest Area.

The largest male measures 1900 mm., the largest female 2160 mm. The tail length varies from .28-.31 of the total in both sexes, mean .29 in twelve females, .30 in six males. The ventrals range from 192-205, mean 199 in males, and from 206-211, mean 208 in females. The subcaudals range from 144-152, mean 147 in males, from 135-155, mean 143 in females. In one specimen the dorsal scale rows are 19-17-13, and in one 21-21-13, all others 19-19-13. The large preocular frequently is semi-divided, and is entirely divided in three specimens, on one of which there are three preoculars on each side. Postoculars uniformly 3, one

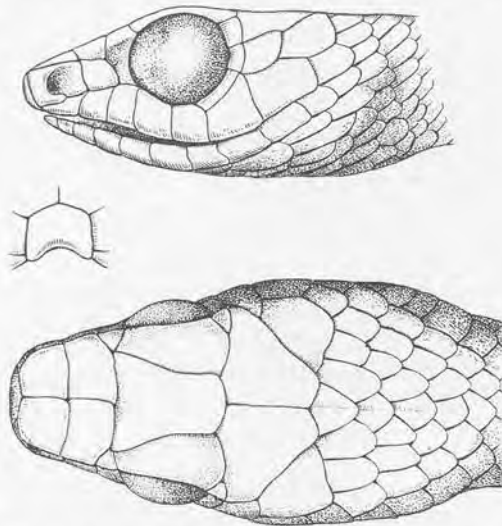


Fig. 6. Dorsal and lateral views of head and front view of rostral of *Thrasops jacksoni* Gunther, (12144, $\times 2$).

specimen having 4 on one side. Temporals 1-1 in every specimen. Upper labials invariably 8, lower 10-12. Parietals as long as the frontal or longer.

Twelve specimens, ranging from 1235 mm. to the largest, are black, with a grayish throat. In the smallest of these, faint marbling of the ventrals and lighter spots on the dorsal scales are distinguishable under alcohol. In six specimens from 643-1313 mm. a spotted coloration, as in juvenile *Thrasops flavigularis*, is exhibited. In No. 12141 the throat is bright yellow, extending to about the fifteenth ventral. Posterior to this the ventrals are marked with black and yellow, alternately disposed, a ventral which is black-yellow-black-yellow-black, from side to side, being

followed by one which is yellow-black-yellow-black-yellow, though not with perfect regularity. Each subcaudal has a round yellow spot alternately on the inner and outer part of the scale. The top of the head is olive, the neck yellow with black-tipped scales, its sides orange. On the body the black predominates with groups of yellow or partly yellow scales arranged alternately, producing a more or less vertically barred appearance.

The relationship of the present species with *Thrasops rothschildi* Mocquard, from Kenya Colony (possibly Uganda?) and Mt. Kenia is close. In the specimens of that species so far described there are 17 rows of scales, and 173-178 ventral plates. Mocquard's description (1905, Bull. Mus. Hist. Nat., Paris, XI, p. 287) states that the rostral is wider than high and that the frontal is longer than the parietals. This latter character is well shown in Lönnberg's figure (1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 22, Fig. 4), in which the parietals are considerably shorter than in the present species. The tail in *T. rothschildi* measures .32-.33 of the total, slightly longer than in *T. jacksoni*. The absence of the yellow throat of *T. flavigularis* also relates *T. rothschildi* to *T. jacksoni*. The difference in scale rows is the most important distinction, but one of the present series has only 17. Should the type of *T. rothschildi* have come from Uganda, it is practically certain that it is synonymous with *T. jacksoni*; in which case the two specimens recorded from Mt. Kenia by Lönnberg (*loc. cit.*) probably represent a distinct, though closely allied, form.

CORONELLA Laurenti

Coronella coronata (Schlegel)

Calamaria coronata SCHLEGEL, 1834, 'Phys. Serp.', II, p. 46.

Coronella coronata JAN, 1863, Arch. Zool. Anat. Phys., II, p. 254. BOULENGER, 1894, 'Cat. Snakes,' II, p. 196. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 399. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, p. 415. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 215. BOULENGER, 1920, Proc. Zool. Soc. London, p. 284. CHABANAUD, 1921, Bull. Com. Etudes Hist. Scient. Afrique Occ. Française, p. 469.

Three specimens were collected in the Sudan: A. M. N. H. No. 11910 (April 1913), Bafuka; 12299 (February 1911), Faradje; 11909 (November 1910), Niangara.

The species *coronata* is characteristic of the Sudanese Subprovince ranging from Senegal nearly to the Nile. It has previously been recorded from Togo, so that the present records represent an enormous extension of its range. *Coronella regularis* has been recorded from Uganda

(Boulenger, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165), and evidently also ranges throughout the Sudan. *C. semiornata* is East African, ranging south to Mozambique and north into Kenya Colony, where it gives off an allied species, *C. scheffleri* Sternfeld.

The three specimens agree closely in scale characters, but offer some difficulty in identification, agreeing best with *C. coronata* in scale characters and with *C. regularis* in coloration, especially in having a dark venter. It seems very probable that *C. regularis* is referable to *C. coronata*, the differences in coloration being rather less than in many other African species. There are four lower labials in contact with the anterior chin shields, and the narrow temporal and long frontal distinguish it also as *C. coronata*.

The dorsal color is black, the scales narrowly light-edged; the venter is dark gray, the throat light yellow. In the smallest specimen the dorsal scales are brown, the ventrals lighter in the middle, the throat white. The head pattern is the same in two specimens, but more sharply defined in the smaller. The black ground color is crossed by a narrow light line on the posterior border of the prefrontals and the preoculars; by a similar line on the anterior border of the parietals and the postoculars; by a third narrow line just behind the parietals, broadening on the side of the neck; a nuchal white band, about twice as wide as the anterior crosslines, on the neck about seven scales distant from the parietals; and a final ill-defined light band separates the second nuchal black area from the dorsal brown. These lines all join the light throat color, which extends onto the upper labials. The eye is very narrowly rimmed with black. The largest specimen has lost the head pattern entirely, and is uniform brownish black above and below, with the exception of the throat and chin shields, which are gray.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12299	11909	11910
Sex	♀	♂	♂
Length	640	378	205 mm.
Tail	121	80	44 mm.
Tail/Length	0.19	0.21	0.21
Ventral Plates	195	182	181
Subcaudals	74	70	64
Dorsal Scales	19-19-17	21-19-17	19-19-17
Preoculars	1	1	1
Postoculars	2	2	2
Temporals	1-2	1-2	1-2
Upper Labials	8	8	8
Lower Labials	9	9	9

PROSYMNA Gray***Prosymna ambigua*** Bocage

Prosymna ambigua BOCAGE, 1874, Journ. Sci. Lisboa, (1) IV, p. 218.

Prosymna ambigua BOULENGER, 1894, 'Cat. Snakes,' II, p. 248; 1896, III, p. 641.

BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, p. 93. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 71. BOULENGER, 1902, Proc. Zoöl. Soc. London, II, p. 17; 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, part 3, No. 12, p. 11; 1908, Ann. Natal Mus., I, p. 229; 1910, Ann. S. African Mus., V, p. 509. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 208, 625. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, pp. 372, 439. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 285.

Prosymna ambigua (misprint) BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 25.



Fig. 7. Dorsal and lateral views of head of *Prosymna ambigua* Bocage, (12145 $\times 2$), showing modification of rostral and frontal shields for burrowing.

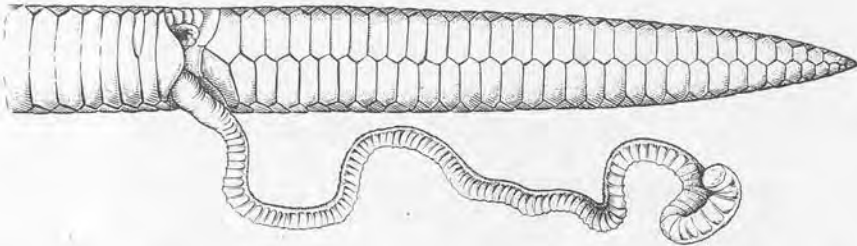


Fig. 8. Ventral view of tail of *Prosymna ambigua* Bocage, (12145, $\times 2$), showing extended hemipenis.

Two specimens of *Prosymna ambigua* were secured at Garamba, A. M. N. H. Nos. 12144-45 (June and July 1912). It appears to be a species of the South and East African Subprovince, ranging into the eastern Sudan. It has not been reported from the savannah of Cameroon and Togo. The record of a single specimen from the Rain Forest at Avakubi, in the Christy collection (Boulenger, 1919, p. 25), requires verification.

This species has the typical habitus of burrowing forms, with the shovel-shaped rostral, small eyes, cylindrical body, and short tail. One specimen has a small anterior supplementary loreal, cut off from the nasal.

The extended hemipenis is remarkable in being unforked, and longer than the tail by at least ten millimeters. It is obviously "telescoped" when withdrawn, as is indicated by the transverse folds. Its great relative length may be due to a reduction in tail length undergone by this form with the adoption of burrowing habits.

The coloration is bluish gray above and below, each of the dorsal scales with a lighter gray spot.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12144	12145
Sex	♀	♂
Length	252	298 mm.
Tail	36	48 mm.
Tail/Length	0.14	0.16
Ventral Plates	148	139
Subcaudals	30	32
Dorsal Scales	19-15-15	20-15-15
Preoculars	1	1
Postoculars	2	2
Temporals	1-2	1-2
Upper Labials	6	6
Lower Labials	8	8

SCAPHIOPHIS Peters

Scaphiophis albopunctatus Peters

Plate VIII

Scaphiophis albopunctatus PETERS, 1870, Monatsber. Akad. Wiss. Berlin, p. 645, Pl. I, fig. 4. BOULENGER, 1894, 'Cat. Snakes,' II, p. 254; 1896, III, p. 641. BOCAGE, 1895, 'Herpétol. Angola,' p. 102. GÜNTHER, 1895, Ann. Mag. Nat. Hist., (6) XV, p. 526. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, p. 83. BOULENGER, 1896, Ann. Mus. Stor. Nat. Genova, (2) XVI, p. 553; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 279. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 71. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 446. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1873. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 243. PELLEGRIN, 1909, Bull. Soc. Zool. France, XXXIV, p. 204. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165; 1915, Proc. Zool. Soc. London, pp. 209, 626, 649. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 372; 1917, XXIII, p. 11. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 25; 1920, Proc. Zool. Soc. London, p. 285.

Seven specimens of *Scaphiophis* were collected as follows: A. M. N. H. No. 12151 (March 1911), Faradje; 12146-49, 12150 (November and December 1910), Niangara; 12152 (November 1911), Yakuluku.

The distribution of this form is interesting. It ranges entirely around the borders of the forest from the Lower Congo and the Kasai to Tanganyika Territory, and from Dahomey to Eritrea. Most of the forms with a forest-border distribution do not reach the Abyssinian Sub-province. Boulenger's records from Stanleyville and Avakubi do not seem logical and require verification.

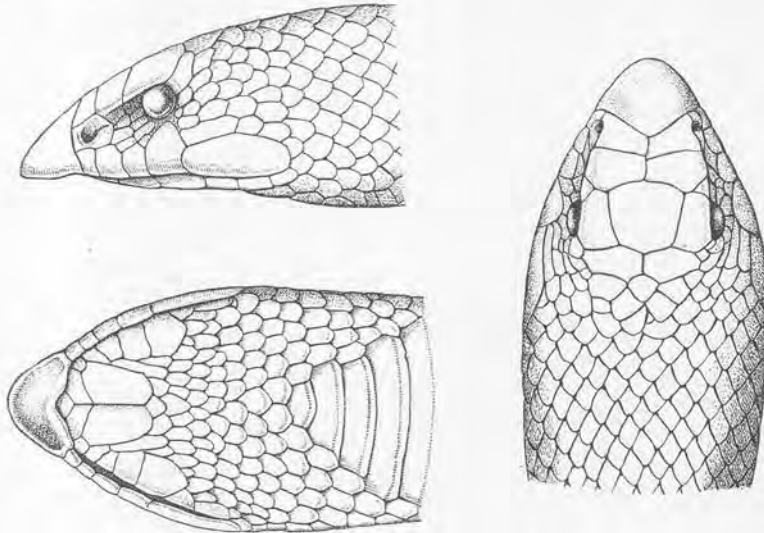


Fig. 9. Dorsal, lateral, and ventral views of head of *Scaphiopus albopunctatus* Peters, (12147, $\times 1$). Modifications for burrowing are seen in the spade-like rostral and the valve-like closure of the jaws.

The development of the rostral for burrowing reaches an extreme in this species. The lower jaw closes with a valve-like precision, and the mental has a projection, with a horn-like tip, which fits into a corresponding emargination of the rostral. The upper labials are reverted and project well below the labial border.

The largest male measures 984 mm., the largest female 1367 mm. (an exceptional size). The tail length in three males ranges from .18-.19 of the total, in three females from .14-.16 of the total. The sexes are very distinct in number of ventral plates, 185-189 in males, 216-224 in females, both figures rather low in comparison with the range 212-240 given by Boulenger (1894, p. 254). The subcaudals in males are 64-69, in females 58-66. The dorsal scale count ranges from 23-21-17 to 25-23-19. The scales about the eye, exclusive of the supraocular, are somewhat

irregular in arrangement, numbering from three to eight, usually two preoculars, two suboculars and two postoculars. The temporal scales are small, four or five in the first row. Two superposed loreals. The parietals are very short, followed by small scales in two specimens, by 1-3 occipitals in five. Upper labials 5, lower 8-9.

The two smaller specimens are nearly uniform brown above, lighter beneath, with scattered light spots above. The adults are grayish brown with numerous black scales above. The head shields are brown, spotted with black.

GRAYIA Günther

SYNOPSIS OF THE SPECIES

- A.—Dorsal scales in 15 rows; habitus slender, tail more than .4 of the total length.
 B.—Subcaudals 100-128; a black bar on the temporals, continuous with the black edge between the last two labials. Lake Region, Sudan, *tholloni*.
 BB.—Subcaudals 142-161; a white line from the angle of the mouth to the corner of the parietals. Rain Forest. *cæsar*.
 AA.—Dorsal scales in 17-20 rows; habitus stout, tail less than .4 of the total length.
 B.—Lower anterior temporal longer than its distance from the loreal; seven upper labials; venter light, tail light beneath, with longitudinal dark lines on the borders of the subcaudals. Rain Forest, Sudan, Uganda. *smythii*.
 BB.—Lower anterior temporal shorter than its distance from the loreal; eight or nine upper labials; venter darkening posteriorly, tail entirely dark beneath. Rain Forest, Sudan, and northern Angola, *ornata*.

Grayia ornata (Bocage)

Plate IX, Figure 1

- Macrophis ornatus* BOCAGE, 1869, Journ. Sci. Lisboa, (1) I, p. 67.
Grayia ornata BOCAGE, 1895, 'Héropétol. Angola,' p. 104; 1897, Journ. Sci. Lisboa, (2) IV, p. 200. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. BOULENGER, 1910, Proc. Zool. Soc. London, 1909, p. 944, figs. 295, 296; 1915, p. 207; 1919, Rev. Zool. Africaine, VII, p. 24; 1920, Proc. Zool. Soc. London, p. 284.
Grayia smythii (part) BOULENGER, 1894, 'Cat. Snakes,' II, p. 286. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 138. BOULENGER, 1900, Proc. Zool. Soc. London, p. 453. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, pp. 409, 426; IV, pp. 216, 231.
Grayia smythii (non Leach) WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 344. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 213.
Grayia furcata BOULENGER, 1894, 'Cat. Snakes,' II, p. 287.
Grayia striata STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 69.

Twenty-one specimens of this species, representing both color forms, were collected: A. M. N. H. No. 12164 (December 1913), 12177 (December 1915), Avakubi; 12163, 12167 (February 1911), 12168 (March

irregular in arrangement, numbering from three to eight, usually two preoculars, two suboculars and two postoculars. The temporal scales are small, four or five in the first row. Two superposed loreals. The parietals are very short, followed by small scales in two specimens, by 1-3 occipitals in five. Upper labials 5, lower 8-9.

The two smaller specimens are nearly uniform brown above, lighter beneath, with scattered light spots above. The adults are grayish brown with numerous black scales above. The head shields are brown, spotted with black.

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- A.—Dorsal scales in 15 rows; habitus slender, tail more than .4 of the total length.
 B.—Subcaudals 100-128; a black bar on the temporals, continuous with the black edge between the last two labials. Lake Region, Sudan, *tholloni*.
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 AA.—Dorsal scales in 17-20 rows; habitus stout, tail less than .4 of the total length.
 B.—Lower anterior temporal longer than its distance from the loreal; seven upper labials; venter light, tail light beneath, with longitudinal dark lines on the borders of the subcaudals. Rain Forest, Sudan, Uganda. *smythii*.
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Grayia ornata BOCAGE, 1895, 'Héropétol. Angola,' p. 104; 1897, Journ. Sci. Lisboa, (2) IV, p. 200. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. BOULENGER, 1910, Proc. Zool. Soc. London, 1909, p. 944, figs. 295, 296; 1915, p. 207; 1919, Rev. Zool. Africaine, VII, p. 24; 1920, Proc. Zool. Soc. London, p. 284.
Grayia smythii (part) BOULENGER, 1894, 'Cat. Snakes,' II, p. 286. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 138. BOULENGER, 1900, Proc. Zool. Soc. London, p. 453. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, pp. 409, 426; IV, pp. 216, 231.
Grayia smythii (non Leach) WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 344. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 213.
Grayia furcata BOULENGER, 1894, 'Cat. Snakes,' II, p. 287.
Grayia striata STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 69.

Twenty-one specimens of this species, representing both color forms, were collected: A. M. N. H. No. 12164 (December 1913), 12177 (December 1915), Avakubi; 12163, 12167 (February 1911), 12168 (March

1912), 12169, 12571 (January 1913), Faradje; 12160 (July 1910), Medje; 12161-62, 12165-66 (November 1910), Niangara; 12170-73, 12174 (November and December 1913), 12175-76 (January 1914), Niapu; 12178, 12570 (tags corroded), Belgian Congo.

Grayia ornata occurs in longitudinally striped and crossbarred color phases which are indistinguishable on any scale character, and occur throughout the same range. The species is known from the Cameroon-Gaboon Rain Forest, and reaches northern Angola. The present records give it a wide distribution throughout the Rain Forest, and five specimens from Faradje prove that it ranges far out into the Sudan along the streams which it inhabits. This is in marked contrast to the distribution of some of the other water reptiles, which are as closely confined to the continuous Rain Forest as any of the land forms (Schmidt, 1919, Bull. Amer. Mus. Nat. Hist., XXXIX, p. 401).

The twenty-one specimens of *Grayia ornata* agree closely with the description by Boulenger (1910, p. 944) except in having uniformly seventeen dorsal scale rows instead of 17-20-17, 17 in only five out of fifteen specimens examined by him. In adaption to its habitat, the tail is markedly compressed.

The largest male measures 1240 mm., the largest female 1385 mm. The tail length varies from .25-.32 in males, mean .28, and from .24-.26 in females, mean .25. The ventral plates range from 148 to 155, mean 153, in males, and from 153-160, mean 156, in females; subcaudals 69-87, mean 82, in males, 69-78, mean 74, in females. One preocular, two postoculars, and temporals 2-3 in every specimen. The lower anterior temporal is frequently separated from the postoculars. Five specimens have both loreals fused with the prefrontals, three have the loreal of one side fused. The upper labials number 8-10, the lower 10 or 11.

The longitudinally striped form is represented by three specimens, from Medje and Niangara. No. 12160 represents the extreme development, in the present series, of the longitudinal lines. The light ventral color extends on the sides to the middle of the third scale row. Two interrupted black lines are distinct on this ground color, one on the ends of the ventrals and the first scale row, a second between the first and second scale rows. These lines consist of streaks six or seven scales in length, with interspaces of two or three scales. The upper half of the third scale row, the fourth, and the lower half of the fifth are occupied by a black band extending from the last upper labial. Between the seventh and eighth scale rows on each side is a fourth black line, with several

cross-connections on the neck. All of these lines are more or less indistinct behind the anterior third of the body, the broad lateral band alone continuing, as a row of spots, to the tail. A black nuchal bar connects the two lateral bands. The venter darkens posteriorly, and the tail is entirely dark gray beneath.

In No. 12161 the pattern is the same except for the entire absence of the narrow black line between the first and second scale rows.

In No. 12162 both lateral lines are very faintly marked, and the dorsal entirely indistinct, but the broad black lateral band is as distinct as in the other two specimens.

In No. 12163 the dorsum is entirely brown, each scale mottled with black.

In all of these specimens the throat is gray with longitudinal light streaks, the lower labials with round light spots, and a light spot on the fourth or fifth upper labial.

The throat coloration, the nuchal crossbar, and the coloration of the venter are identical with the coloration of the crossbarred form, which has been excellently described by Boulenger (1910, p. 944, Figs. 295-296). The number of crossbars in the present series ranges from 24-30, the range in the series examined by Boulenger being 21-25. In some specimens the posterior bars are entirely obscured by the general darkening of the ground color, but usually the inverted Y-shaped ends of the bars can be traced to the tail. Half-grown specimens show the intermediate condition figured by Boulenger (*loc. cit.*) in the development of the adult pattern.

Grayia smythii (Leach)

Coluber smythii LEACH, 1818, in Tuckey's, 'Expl. River Zaire,' App., p. 409.

Grayia smythii (part) BOULENGER, 1894, 'Cat. Snakes,' II, p. 286, Pl. XIII, fig. 3; 1896, III, p. 643. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 138.

BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 453. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, pp. 409, 426; IV, pp. 216, 231.

Grayia smythii GÜNTHER, 1895, Ann. Mag. Nat. Hist., (6) XV, p. 525; 1896, (6) XVII, p. 264. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 279. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 25. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 78. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 446. SCHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 163. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 334. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. JOHNSTON, 1906, 'Liberia,' II, p. 832. BOULENGER, 1910, Proc. Zoöl. Soc. London, (1909), p. 948, figs. 297, 298. KLAFTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 286. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 207, 625. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 372. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 24; 1920, Proc. Zoöl. Soc. London, p. 285.

Grayia smithi CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 469.

Eight specimens of this species were collected: A. M. N. H. Nos. 12153-54 (October 1909), 12155, 12156-57 (September and December 1913), Avakubi; 12159 (February 1911), Faradje; 12158 (January 1910), Gamangui; 12179 (June 1913), Niangara.

Grayia smithii is a forest species extending into East Africa in Uganda and following the rivers in which it lives into the savannah.

Grayia smithii reaches a considerably larger size than *G. ornata*. The largest male measures 1535 mm., the largest female 1350 mm. (tail incomplete). The tail length in three males varies from .29-.33 of the total; in the single female with a complete tail it is .29. Ventral plates range from 149-160 in males, from 157-162 in females; subcaudals 90-96 in males, 92 in the female. Dorsal scales 17-17-15, 19 on the neck on one specimen. One preocular, two postoculars, and temporals 2-3 in all specimens. Three or four slightly enlarged occipitals. Upper labials 7, the last very large, lower 10 or 11.

In the present series the single juvenile specimen is colored exactly as in the figure by Boulenger (1910, p. 947, Fig. 298); there are twenty-three of the narrow light crossbands, with the indications on the sides of eleven more. In the adults the crossbars are black, always with a row of light spots on the black scales, more or less in the middle of the bar. In two specimens more than thirty such bars are visible, the posterior ones merely indicated dorsally. In other specimens the color becomes entirely uniform on the posterior two-thirds of the body, with ten or twelve crossbars anteriorly. The scales of the tail are outlined with black, giving it a longitudinally lined effect, and a similar line edges the venter. The throat is white, the lower labials black-edged. The parietal shields are gray, with black borders.

***Grayia tholloni* Mocquard**

Grayia tholloni MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 11. BOULENGER, 1901, Ann. Mus. Congo, (1) II, p. 17; 1902, in Johnston, 'Uganda Protectorate,' p. 446. WERNER, 1908, 'Rept. Wellcome Res. Lab.,' III, p. 170. BOULENGER, 1910, Proc. Zoöl. Soc. London, (1909), p. 951, fig. 299; 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165; 1915, Proc. Zoöl. Soc. London, pp. 625, 649; 1920, p. 285.

Grayia fasciata BOULENGER, 1901, Ann. Mus. Congo, (1) II, p. 9, Pl. III, fig. 2.

Two specimens of *Grayia tholloni* come from localities in the Sudan: A. M. N. H. No. 12180 (February 1911), Faradje; 12181 (March 1912), Garamba.

This species appears to be confined to the eastern Sudan, where it replaces *G. cæsar* of the Rain Forest.

In both specimens the tail is incomplete, and they were first identified with *G. cæsar*, from which, however, the head pattern at once distinguishes them, as well as the fact that the fifth labial instead of broadly entering the eye is separated from it by the lower postocular or enters the eye opening at a POINT, as on one side in one of the present specimens. *Grayia cæsar* and *tholloni* agree in having much narrower postoculars than *G. smythii* and *ornata*, as well as in the larger eye.

Color grayish brown above, with very indistinct light crossbars. Venter and under side of tail immaculate light yellow, outlined with black at the juncture with the dorsal color. Upper and lower labials black-edged, the black between the last two upper labials continued upward as a bar across the temporals (exactly as figured by Boulenger, 1910, p. 951, Fig. 299).

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12180	12181
Sex	♀	♂
Length	410+	670+ mm.
Ventral Plates	145	138
Dorsal Scales	15-15-15	15-15-15
Preoculars	1	1
Postoculars	2	2
Temporals	2-3	2-3
Upper Labials	8	8
Lower Labials	9	9

***Grayia cæsar* (Günther)**

Plate IX, Figure 2

Xenurophis cæsar GÜNTHER, 1863, Ann. Mag. Nat. Hist., (3) XII, p. 357, Pl. vi, fig. C. BOULENGER, 1894, 'Cat. Snakes,' II, p. 288. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 139. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 409.

Grayia cæsar BOULENGER, 1910, Proc. Zool. Soc. London, (1909), p. 944; 1915, p. 208; 1919, Rev. Zool. Africaine, VII, p. 24; 1920, Proc. Zool. Soc. London, p. 285.

A single specimen of this remarkable species, A. M. N. H. No. 12182 (November 1913), was taken at Niapu.

Grayia cæsar seems to be closely confined to the Rain Forest. It is known from only a few specimens from Gaboon and Cameroon, and reaches Fernando Po. The present record indicates that it is widely distributed throughout the eastern division of the forest.

The specimen, a female, agrees with Boulenger's description except in having only two posterior temporals. The color is grayish brown

above, with thirty light, narrowly black-edged crossbars, occasionally interrupted on the vertebral line. Tail faintly crossbarred. Venter entirely uniform grayish yellow. Lower labials immaculate, except the last. Upper labials light, with dark markings mostly on the sutures. Top of head black, a faint light spot on each parietal, and still fainter ones on the frontal. A light postocular line, followed by a sharply defined one from the angle of the mouth to the posterior corner of the parietals.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12182
Sex	♀
Length	1155 mm.
Tail	555 mm.
Tail/Length	0.48
Ventral Plates	141
Subcaudals	142
Dorsal Scales	15-15-15
Preoculars	1
Postoculars	2
Temporals	2-2
Upper Labials	8 (fourth and fifth entering the eye)
Lower Labials	9

Dasypeltinae**DASYPELTIS** Wagler**Dasypeltis scaber** (Linnæus)

Coluber scaber LINNÆUS, 1766, 'Syst. Nat.,' I, p. 384.

Dasypeltis scaber SMITH, 1849, 'Ill. Zoöl. S. Africa, Rept.,' Pl. LXXIII.

Dasypeltis scabra BOULENGER, 1894, 'Cat. Snakes,' II, p. 354; 1896, III, p. 648; Ann. Mus. Stor. Nat. Genova, (2) XVI, p. 553; (2) XVII, p. 20. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, pp. 78, 93; 1897, p. 210. DURHAM, 1896, Proc. Zoöl. Soc. London, p. 715, Pl. xxxii. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 279; Proc. Zoöl. Soc. London, p. 801. JOHNSTON, 1897, 'British Central Africa,' p. 361a. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 25. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 78. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 399. ANDERSON, 1898, Zool. Egypt, I, p. 278, Pl. xxxiv, fig. 3, XXXIX. BOULENGER, 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 720. KATHARINER, 1898, Zool. Jahrb. (Anat.), XI, p. 501, Pl. xli. BOULENGER, 1902, Proc. Zoöl. Soc. London, II, p. 17; in Johnston, 1902, 'Uganda Protectorate,' p. 447. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 340, 345. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 10. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 180; Proc. Zoöl. Soc. London, II, p. 255. FERREIRA, 1905, Journ. Sci. Lisboa, (2) VII, p. 115; 1906, (2) VII, p. 168. JOHNSTON, 1906, 'Liberia,' II, p. 832.

- BOULENGER, 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, part 3, No. 12, p. 11. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 735. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1873. BOULENGER, 1898, Ann. Natal Mus., I, p. 229; Ann. Mus. Stor. Nat. Genova, (3) IV, p. 5. GOUGH, 1908, Ann. Transvaal Mus., I, p. 26. OHDNER, 1908, Ark. Zool., Stockholm, IV, No. 18, p. 5. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 409; IV, p. 216. BOULENGER, 1909, Ann. Mus. Stor. Genova, (3) IV, p. 303. CHUBB, Proc. Zool. Soc. London, p. 595. BOULENGER, 1910, Ann. S. African Mus., V, p. 509. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 15. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, pp. 55, 58. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 165; 1912, p. 332. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 250. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 5. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 271. BOETTGER, 1913, 'Wiss. Ergeb. Reise Ost-Afrika, Voeltzkow,' III, p. 361. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 162. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool., Stockholm, VIII, No. 20, p. 4. STERNFELD, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 109, figs. 3-7. WERNER, 1913, in Brehms 'Tierleben,' 4th Ed., V, p. 385. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 373. LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 79; 1918, No. 13, p. 381. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 25; 1920, Proc. Zool. Soc. London, p. 256.
- Dasypeltis scabra fasciolata* WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 334. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214.
- Dasypeltis scabra atra* STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 272.

***Dasypeltis scaber scaber* (Linnæus)**

Plate III, Figure 2

The twenty specimens of *Dasypeltis* in the Congo collection fall into three groups. A single specimen, A. M. N. H. No. 12188 (August 1913), taken at Poko, on the forest border, agrees in coloration with the typical form. The specimens secured within the borders of the Rain Forest are referable to *D. macrops*, and those from the savannah represent the variety *palmarum* of *D. scaber*. Consideration of the color variations enumerated by Boulenger (1894, p. 355) leads to the conclusion that they represent only two groups, one uniform brown and the other variously spotted, with an intermediate form which might well be a hybrid. The conclusion that these are two distinct species which occasionally interbreed is tempting but requires much more thorough examination. The variety *atra* Sternfeld, moreover, does not fit into either of these categories.

The spotted form ranges from Lower Egypt to Portuguese Guinea, and southward throughout Africa south of the Rain Forest.

The specimen, a female, measures 557 mm., tail 76 mm., .14 of the total. Ventral plates 225, subcaudals, 57, dorsal scales 23-25-21. One preocular, two postoculars, temporals 2-3 on each side. Upper labials 7, lower labials 8, 3 in contact with the anterior chin shields.

The color pattern is well defined. On a light grayish brown there are 55 dorsal rhombic markings of dark brown, three to five scales long, and six or seven scale rows wide, with interspaces of only a scale or a scale and a half (longitudinally). On the sides are vertical bars of the same color corresponding somewhat to the dorsal rhombs, and frequently confluent with them, especially anteriorly, but rarely opposite each other. The anterior dorsal markings are drawn out into V's, parallel with a V which has its apex on the posterior angle of the frontal. There are three transverse dark lines on the head anterior to this V, one of which forks laterally with a branch across the temporals and one just behind the eye to the labial border. All of the labial sutures are dark-edged. Venter yellowish, grayish anteriorly, shaded at the sides.

***Dasypeltis scaber palmarum* Leach**

Dasypeltis palmarum LEACH, 1818, in Tuckey's 'Expl. River Zaire,' App., p. 408.

Dasypeltis scabra palmarum WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 139. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112. WERNER, 1913, in Brehms 'Tierleben,' 4th Ed., V, p. 386, Pl. VII, fig. 4. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 373; 1917, XXIII, p. 12.

Dasypeltis macrops CHABANAUD (*non* Boulenger), 1918, Bull. Mus. Hist. Nat., Paris, XXIV, p. 165.

Ten specimens from the Uele District: A. M. N. H. No. 12201 (April 1911), Faradje; 12202 (June 1912), Garamba; 12193-200 (November 1911), Niangara.

Dasypeltis scaber palmarum, whatever its specific status, has a wide range in the Savannah Province, with no discovered distinction from that of the typical form except its absence in northeast and in southwest Africa.

The largest male measures 512 mm., the largest female 789 mm. The tail length in males varies from .16-.18 of the total, in females it is uniformly .13. The ventral plates number 203-216 in males, 221-234 in females; the subcaudals respectively 68-71 and 58-61. The dorsal scale count varies from 23-25-19 to 27-27-25, usually 25 at mid-body. A single preocular except in one specimen with two on one side. Two postoculars. Temporals 2-3 or 2-4, one specimen aberrant in having the lower temporal on one side and both on the other fused with the fifth labial. Labials seven, above and below, except in one specimen in which the upper labials are 5-6.

The color is uniform, slightly reddish brown, somewhat lighter on the venter. One specimen exhibits the coloration "C" of Boulenger, with faint darker crossbands. A juvenile specimen with the umbilical scar still evident (287 mm.) differs in no way from the adults.

The eggs in a large female from Niangara (November) are very large and entirely fill the body cavity, so that one ovary is anterior to the other, and the ends of the eggs are pressed in, making them nearly cylinders. The posterior viscera are very much crowded together on the dorsal side. The eggs, 5+6 in number, measure 13×23 mm. The alimentary canal is empty save for a few fragments of egg shell.

***Dasypeltis macrops* Boulenger**

Dasypeltis macrops BOULENGER, 1907, Ann. Mag. Nat. Hist., (7) XIX, p. 324. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 410. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 603. BOULENGER, 1920, Proc. Zool. Soc. London, p. 286. CHABANAUD, 1921, Bull. Com. Etudes Hist. Scient. Afrique Occ. Française, p. 469.

Nine specimens are referable to this species: A. M. N. H. No. 12184 (September 1909), Batama; 12190-91 (April 1914), Medje; 12187 (July 1913), Nala; 12185-86 (November 1910), Niangara; 12189 (December 1913), Niapu; 12183 (August 1909), Stanleyville; 12192 (tag corroded), Belgian Congo.

Dasypeltis macrops is evidently confined to the Rain Forest, where it replaces the various forms of *D. scaber* of the savannah.

The largest male measures 660 mm., the largest female 820 mm. The tail length in males varies from .17-.19 of the total, in females from .15-.16 (compare with *D. scaber palmarum* above). The ventral plates range from 233-242 in males, 244-253 in females; subcaudals 75-81 and 70-73 respectively. The dorsal scale count is 25-21-19 to 27-25-23, 25 at mid-body in four, 23 in four, and 21 in one specimen. One specimen has two preoculars on each side, another has a single postocular on one side. The temporals are 2 or 3 in the first row, 3 or 4 in the second. Seven upper labials, and seven or eight, usually eight, below.

The series in question is amply distinct from *Dasypeltis scaber*. The eye is larger; the frontal is larger, with parallel instead of convergent sides; the parietals are wider and more rounded behind; the suture between the internasals equals or exceeds that between the prefrontals. The difference in number of ventrals is striking, especially when the respective sexes are compared, but Boulenger (1894, p. 355) records a much wider range of variation in this character than appears in the

present specimens. The number of dorsal scale rows is not a good character for the separation of the species.

The coloration is very uniform, olive-green with narrow yellow crossbands, the lower scale rows outlined with black, the head shields ornamented with black markings. Venter uniform olive-green, the ventrals in some cases with a yellow lateral edge.

Boiginæ

GEODIPSAS Boulenger

Geodipsas depressiceps (Werner)

Tropidonotus depressiceps WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 402; 1899, XLIX, p. 135. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 211.

Geodipsas depressiceps STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 410. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 604. WERNER, 1913, Mitt. Naturh. Mus. Hamburg, XXX, p. 27. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 25.

Geodipsas manpajensis ANDERSSON, 1901, Bihang Svenska Vetensk.-Akad. Handl., XXVII, part 4, No. 5, p. 19, Pl. II, fig. 15.



Fig. 10. Dorsal and lateral views of head of *Geodipsas depressiceps* (Werner), (12208, $\times 2$).

Nine specimens in the collection: A. M. N. H. No. 12204 (October 1909), Ambelakudi; 12203 (September 1909), Batama; 12209, 12211 (June 1914), 12210 (July 1914), Medje; 12205-06, 12207 (November and December 1913), 12208 (January 1914), Niapu.

Geodipsas depressiceps is evidently one of the characteristic species of the forest, ranging from Cameroon to the Ituri.

The largest male in the series measures 280 mm., the largest female 280 mm., the tail respectively 46 and 36 mm. The tail length varies from .16-.17 of the total in six males, from .13-.14 in three females. The ventral plates range from 140-143 in the males, 146-147 in the females; subcaudals 37-41 in males, 32-36 in females. The dorsal scales are 19-19-17. Two pre- and two postoculars. Temporals 1-2, exceptionally 1-3. Supralabials normally 7, 8 in one specimen; infralabials 8 or 9.

Coloration as well as scutellation is very constant in this species. A dark brown vertebral line, very distinct posteriorly, breaks up an-

teriorly into a more or less distinct double row of spots, which may be somewhat confluent, forming a zigzag line. The sides from the first to the middle of the sixth scale row are dark brown, usually bordered on the sixth scale row by black, and sometimes with a faint black line on the top of the first scale row. Between the sixth scale row and the dorsal line the color is much lighter grayish brown. Venter bright yellow, with a black lateral line, which is interrupted anteriorly, with a spot on each ventral. The tips of the ventrals brown like the sides, in one specimen without the black ventral lines, the lateral brown extending as far as the line normally does. Ventrals between the black lines uniform yellow in two specimens, more or less heavily shaded posteriorly in the others. Head very dark brown, the labials yellow, heavily edged with brown on the sutures. A pair of very distinct adjacent light brown oval marks on the neck, with a vertical yellow mark on the sides below them.

BOIGA Fitzinger

Boiga pulverulenta (Fischer)

Plate X, Figures 1 and 2

Dipsas pulverulenta FISCHER, 1856, Abh. Naturw. Ver. Hamburg, III, p. 81, Pl. III, fig. 1.

Dipsadomorphus pulverulentus BOULENGER, 1896, 'Cat. Snakes,' III, p. 68. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., XXIII, part 4, No. 2, p. 25. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 403; 1899, XLIX, p. 139. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 453. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214. JOHNSTON, 1906, 'Liberia,' II, p. 832. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 410; IV, p. 216. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 605. NIEDEN, 1914, Sitzber. Ges. Naturf. Freunde Berlin, p. 366. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 211. CHABANAUD, 1917, Bull. Mus. Hist. Nat., Paris, XXIII, p. 452. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zoöl. Soc. London, p. 288. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 469.

Dipsadomorphus boueti CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 373.

Twenty-one specimens were secured at various localities in the forest: A. M. N. H. No. 12224 (September 1913), Akenge; 12215-16, 12217 (October and November 1909), Avakubi; 12218 (February 1910), Gamagui; 12219, 12220-21 (August and September 1910), 12226-28, 12229-32, 12233-35 (April, May and June 1914), Medje; 12222-23 (November 1910), Niangara; 12225 (December 1913), Niapu.

The present records extend the known range of *Boiga pulverulenta* throughout the Rain Forest. It is well known from the western area, and appears to be entirely uniform throughout its range.

The maximum size in this series is reached by a female of 1210 mm., the largest male measures 1082 mm. The sexes are not distinguishable by tail length, though the maximum number of subcaudals and the proportionately longest tail occur in a male. The tail length varies from .21-.24 of the total, mean .22. The ventral plates vary from 251-269, mean 259; the subcaudals from 108-126, mean 118. The dorsal scales are 19 at mid-body, 21-23 on the neck, and 15 posteriorly.

The lateral head shields are somewhat variable; the normal condition is one pre- and two postoculars, one loreal and temporals 2-2. In one specimen the temporals are 3-2, in one, 2-3; and in one the temporals are 1-2 on one side. One specimen has two preoculars on each side. One has the upper portion of the preocular fused with the supraocular on one side. In two specimens the loreal, by fusion with the lower portion of the preocular, enters the eye. In one the loreal is horizontally divided on one side. The upper labials are normally 8, rarely 9. Lower labials 10-13.

The coloration is very uniform in the series, but exhibits every degree of fading in the lateral ocellar rhombic markings. When these are entirely obsolete, their position is still indicated by a row of vertebral black spots and another at the edge of the venter, representing the ends of the rhombs.

A female taken in June 1914 contains well-developed eggs, 29×11 mm.

"Coloration, in life, reddish brown above, head darker brown. Irregular dark gray lateral bars, wider in the middle, extend from the vertebral line to the venter, tipped above and below with black. A cream-colored central spot in the broad portion of each lateral bar. Faint narrow grayish crossbars between the wider ones, disappearing posteriorly. The wider crossbars are usually alternate, sometimes confluent on the back. Venter pinkish gray, heavily dotted with brown which forms two lines at the inner edges of the ventral edges of the ventral angle. These lines are more distinct beneath the tail" (H. Lang).

***Boiga blandingii* (Hallowell)**

Plate X, Figure 3

Dipsas blandingii HALLOWELL, 1844, Proc. Acad. Nat. Sci. Phila., p. 170.

Dipsadomorphus blandingii BOULENGER, 1896, 'Cat. Snakes,' III, p. 77. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 403; 1899, XLIX, p. 139. BOULENGER, 1900, Proc. Zool. Soc. London, p. 454; 1902, in Johnston 'Uganda Protectorate,' p. 447. JOHNSTON, 1906, 'Liberia,' II, p. 832. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p.

411; IV, p. 217. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 605. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166; 1915, Proc. Zool. Soc. London, pp. 211, 628. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, pp. 75, 373. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zool. Soc. London, p. 288. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 469.

Twenty specimens were secured from various localities in the forest: A. M. N. H. Nos. 12243-44 (September and October 1913), Akenge; 12237-38 (October 1909), 12248 (September 1913), Avakubi; 12239 (February 1910), Gamangui; 12236 (September 1910), 12247 (April 1914), Medje; 12240-41, 12242 (November and December 1910), 12253 (May 1913), Niangara; 12245, 12254 (November 1913), 12246 (December 1913), 12249 (January 1914), Niapu; 12251 (August 1909), 12255 (April 1915), Stanleyville; 12250, 12256 (tags corroded), Belgian Congo.

Boiga blandingii occurs throughout the Rain Forest, ranging into Uganda to the east of the present localities. It is an abundant snake in the Cameroon-Gaboon area, as well as in the Ituri, as evidenced by the number of specimens secured by the Congo Expedition.

The largest specimen, measuring 2290 mm., is a female; the largest male measures 2180 mm. The sexes are not distinguishable by tail length, which varies from .21-.25 of the total, mean .23. The ventral plates vary from 254-270, mean 263; the subcaudals from 120-134, mean 128. The dorsal scales, always 23 at mid-body and 15 posteriorly, vary from 23-27 on the neck, normally 25.

The temporals are very variable, 2-2 or 2-3, but divided into small or fused into large plates, differing in each individual. The postoculars are normally 2, 3 on one side in three specimens. The preoculars are normally 2, one on one side on one specimen. The prefrontals are united into a single transverse shield in two specimens.

The anal plate is said to be divided in *Boiga blandingii*, in all descriptions. Werner (1897, p. 403) records a single specimen with entire anal. In the present series, only five specimens have the divided anal, with indications of a groove in two others, but there is no indication of any correlation of other characters with this condition. The description of the species must be amended to "anal entire or divided," and the condition is obviously useless as a "key character."

The coloration is very variable, with two distinct phases. Four of the specimens examined are black, the throat and anterior portion of the venter yellow; each ventral is bordered with black on its posterior edge, the border increasing in width until the yellow is crowded out; the

posterior two-thirds of the venter is uniform black. The remainder of the specimens are brownish, with more or less distinct wide dark cross-bars, confluent anteriorly, alternate posteriorly on the vertebral line.

DIPSADOBOA Günther

Dipsadoboa unicolor Günther

Plate XI, Figure 1

Dipsadoboa unicolor GÜNTHER, 1858, 'Cat. Snakes,' p. 183. BOULENGER, 1896, 'Cat. Snakes,' III, p. 81. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 13. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 399; 1899, XLIX, p. 140. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 454. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 345. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 43. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 412; IV, p. 217. MÜLLER, 1910, Abh. Bayer. Akad. Wiss, 2Kl., XXIV, p. 607. DESPAX, 1911, in Cottés, 'Mission Cottés au Sud Cameroun,' p. 239. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 286. NIEDEN, 1914, Sitzber. Ges. Naturf. Freunde Berlin, p. 366. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 211; 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zoöl. Soc. London, p. 288. CHABANAUD, 1921, Bull. Com. Etudes Hist. Scient. Afrique Occ. Française, p. 469.

Twenty-seven specimens of *Dipsadoboa unicolor* attest its abundance in the Ituri Forest: A. M. N. H. No. 12487 (August 1913), Avakubi; 12488, Gama Gama; 12458, 12459 (August and September 1910), 12466, 12467-72, 12474-82 (March, April and June 1914), Medje; 11987 (December 1910) Niangara; 12460, 12462-63 (November and December 1913), 12465 (January 1914), Niapu; 12489, 12541 (tags corroded), Belgian Congo.

This species is plainly a forest inhabitant, and apparently it replaces *Leptodeira hotambæia* of the savannah in feeding on the forest toads. It is known from western localities in the forest from Sierra Leone to the Congo, but had not previously been recorded from the upper Congo.

The series is remarkably uniform in scale characters as well as in coloration. The largest male measures 925 mm., tail 171 mm., the largest female 892 mm., tail 167 mm. The proportionate tail length in males varies from .18-.21, mean .19; in females from .16-.19, mean .17. The males have a slightly lower number of ventral plates and higher number of subcaudals than the females: ventrals 191-205, mean 196, subcaudals 64-73, mean 68, in males; 197-207, mean 202, and 62-70, mean 67, in females. The dorsal scales are uniformly 17 at mid-body, 13 posteriorly, and 15-19 on the neck. Preoculars and postoculars 1 and 2 respectively. Temporals usually 1-2, the anterior divided in four specimens, making 1-1-2; in four specimens there is only one posterior

temporal on one side, and in one specimen there are three. There are 8 upper labials (9 in three specimens) and 10–12 lower, usually 11.

The coloration is dark greenish above, yellow beneath with the exception of the tail, which is dark, in all specimens. The upper labials are yellow from the first to the sixth, the seventh and eighth invariably dark.

The food seems to consist of various forest frogs and toads. Two specimens had swallowed specimens of a *Bufo*, two others are recorded as having disgorged frogs.

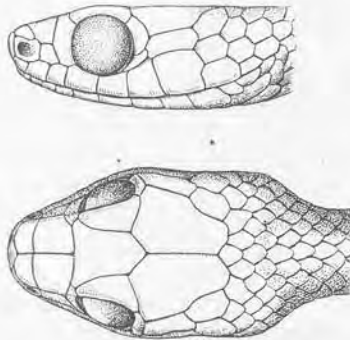


Fig. 11. Dorsal and lateral views of the head of *Dipsadoboa elongata* (Barbour), (12473, $\times 2$).

Dipsadoboa elongata (Barbour)

Plate XI, Figure 2

Dipsadoboa unicolor (part) BOULENGER, 1896, 'Cat. Snakes,' III, p. 183.

Crotaphopeltis elongata BARBOUR, 1914, Proc. New England Zool. Club, IV, p. 95.

Ten specimens are referred to this form: A. M. N. H. Nos. 12456–57 (February 1910), Gamangui; 12214, 12473, 12483–85 (June 1914), 12486 (July 1914), Medje; 12461, 12464 (November and December 1913), Niapu.

Two species appear to have been commonly confused under the name *Dipsadoboa unicolor*, one much more elongate and slender than the other. Comparing individuals of the same length and sex of *elongata* and *unicolor*, the greater length of the tail and especially the small head of the former are striking characters, and it does not seem possible to unite them as a single species. In the series at hand, there is a considerable discontinuity in the numbers of ventral plates and subcaudals.

The series is relatively uniform in all characters. Two specimens have three postoculars instead of the normal two; the lower labials are usually ten (eleven in *D. unicolor*); one specimen has temporals 1-3 instead of the normal 1-2 (1-1 in the type).

The ventral plates, subcaudals, and the tail length may be compared with the figures for *D. unicolor* as follows:

	<i>D. unicolor</i>	<i>D. elongata</i>
Ventral Plates ♂	191-205	219-230
Ventral Plates ♀	197-207	218-227
Subcaudals ♂	64-73	101-110
Subcaudals ♀	62-70	85-100
Tail-length ♂	.18-.21	.23-.26
Tail-length ♀	.16-.19	.21-.24

Color dark brown above, slightly reddish on the sides, extending to the ends of the ventrals; venter uniform grayish yellow; subcaudals dark bluish gray, light-edged posteriorly; the ventral color extends on the upper labials from the angle of the mouth to the first labial, and reaches the eye. In the series of *D. unicolor*, the ventral color does not reach the eye or the seventh and eighth upper labials.

This species is probably a direct modification of *D. unicolor* for a more arboreal habitat. It would be interesting to know whether or not the food is exclusively amphibians, as appears to be the case with the ancestral species.

LEPTODEIRA Fitzinger

Leptodeira hotambœia (Laurenti)

Plate XII, Figure 1

Coronella hotambœia, LAURENTI, 1768, 'Syn. Rept.', p. 85.

Leptodira hotambœia BOULENGER, 1896, 'Cat. Snakes,' III, p. 89; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 279. JOHNSTON, 1897, 'British Central Africa,' p. 316a. PERACCA, 1897, Boll. Mus. Torino, XII, No. 273, p. 3. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 400. MOCQUARD, 1899, Bull. Mus. Hist. Nat., Paris, V, p. 219. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 147. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, pp. 406, 415. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 336, 345. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 12. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214; Ann. Mag. Nat. Hist., (7) XVI, p. 112. FERREIRA, 1905, Journ. Sci. Lisboa, (2) VII, p. 116; 1906, p. 169. BOULENGER, 1907, Proc. Zool. Soc. London, p. 487; Mem. Proc. Manchester Lit. Philos. Soc., LI, part 12, p. 11. ROUX, 1907, Rev. Suisse Zool., XV, p. 77; Zool. Jahrb. (Syst.), XXV, p. 735. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1874, Pl. III, fig. 7. BOULENGER, 1908, Ann. Natal Mus., I, p. 229. GOUGH, 1908, Ann. Transvaal Mus., I, p. 27. ODHNER, 1908, Ark. Zool., IV, No. 18,

¹⁸⁰ in the type.

p. 5. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 412, IV, pp. 217, 240, 243, 246. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 309. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 596. PELLEGRIN, 1909, Bull. Mus. Hist. Nat., Paris, XV, p. 414. ANDERSSON, 1910, Jahrb. Nassau. Ver. Naturk., LXIII, p. 203. BOULENGER, 1910, Ann. S. African Mus., V, p. 511. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 15. MEEK, 1910, Publ. Field Mus. Zoöl., VII, p. 406. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 4. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 64. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 358. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166. LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 23. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 250. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 5. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Africa Exp.,' IV, p. 272. BOETTGER, 1913, 'Wiss. Ergeb. Reise Ostafrika, Voeltzkow,' III, pp. 348, 353, 361, 364. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 163. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool. Stockholm, VIII, No. 20, p. 4. WERNER, 1913, Mitt. Naturh. Mus. Hamburg, XXX, pp. 28, 45. PELLEGRIN, 1914, 'Doc. Sci. Miss. Tilho,' III, p. 126. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 210, 628, 651. CHABANAUD, 1917, Bull. Mus. Hist. Nat., Paris, XXIII, p. 12. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 331. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 25. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-natur. Kl., XLVI, p. 503. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 287. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 469.

Thirteen specimens of *Leptodeira hotambæia* come from localities in the Sudan: A. M. N. H. Nos. 12301-02, 12544 (March 1911), Faradje; 12303, 12542-43 (June and July 1912), Garamba; 12300 (November 1910), 11992, 12304-06, 12307, 12308 (April, May, June and July 1913), Niangara.

Werner (1907, p. 1875) found typical *Leptodeira hotambæia* at Gondokoro, 150 miles northeast of the present localities, and supposed *L. attarensis* to be a northern offshoot of *hotambæia*. Boulenger (1915, p. 628) regards *attarensis* as synonymous with *L. degeni*, from Uganda (as suggested also by Werner), in which case there can be no possibility that it is a subspecies of *hotambæia*, although unquestionably closely related. The present localities unite the West African records (from Senegambia to Cameroon) with the East African.

The largest male measures 587 mm., the largest female 623 mm. The tail length in males varies from .13-.14 of the total, mean .14; in the females from .11-.13, mean .12. The ventral plates vary from 164-174, mean 169; the subcaudals in males range from 39-45, mean 42, in females from 35-39, mean 36. The dorsal scale count is 17-19-15, rarely 19 anteriorly. One preocular and two postoculars in every speci-

men. Temporals normally 1-2, 1-1 on one side in a single specimen. Postmentals normally 3, 3-4 in three specimens, 4-4 in two. The upper labials are 8, the lower 10. The loreal may be either slightly higher than long, or slightly longer than high. The character used by Werner to distinguish *attarensis*, the slenderness of the head, is reached in the same degree by half-grown specimens in the present series. Critical examination of a series of *L. degeni* with *hotambæia* from the same region may reduce *degeni* to synonymy, although Werner (1913, p. 28) has maintained the distinctness of *attarensis*. The number of ventrals is considerably higher in this series than the average in South African specimens, and more extensive collections may warrant subspecific division of *hotambæia*.

In coloration the series is very uniform and apparently distinct from *degeni*, for the lower scale rows, though pale, are never yellow and the black postocular mark is always present, though its distinctness varies. Two juvenile specimens have many of the scales white-edged.

A female taken in July contained 5 + 8 eggs, measuring 20 × 8 mm.

The stomachs of two specimens contained frogs too much digested for identification. The species is known to feed chiefly, if not exclusively, on batrachians.

***Leptodeira duchesnii* Boulenger**

Plate XII, Figure 2

Leptodira duchesnii BOULENGER, 1901, Ann. Mus. Congo, (1) II, p. 10, Pl. iv, fig. 1. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, p. 410. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1876. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 605. BOULENGER, 1915, Proc. Zool. Soc. London, p. 210; 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zool. Soc. London, p. 287.

Dipsadomorphus viridis STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 411, figs. 3-4.

Dipsadomorphus brevirostris STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 411, figs. 5-6.

Two specimens of this species were secured by the Congo Expedition: A. M. N. H. No. 12212 (August 1910), Medje; 12213 (July 1913), Nala.

The species evidently ranges throughout the forest, and is obviously adapted to arboreal life. The types came from localities on the Congo close to Stanleyville.

This species is readily distinguished by the great elongation of the body, with small head and bulging eyes, and the loreal entering the eye below the single preocular. Both specimens agree with the description and figure of Boulenger, but have an entire anal plate. Müller (1910, p.

men. Temporals normally 1-2, 1-1 on one side in a single specimen. Postmentals normally 3, 3-4 in three specimens, 4-4 in two. The upper labials are 8, the lower 10. The loreal may be either slightly higher than long, or slightly longer than high. The character used by Werner to distinguish *attarensis*, the slenderness of the head, is reached in the same degree by half-grown specimens in the present series. Critical examination of a series of *L. degeni* with *hotambæia* from the same region may reduce *degeni* to synonymy, although Werner (1913, p. 28) has maintained the distinctness of *attarensis*. The number of ventrals is considerably higher in this series than the average in South African specimens, and more extensive collections may warrant subspecific division of *hotambæia*.

In coloration the series is very uniform and apparently distinct from *degeni*, for the lower scale rows, though pale, are never yellow and the black postocular mark is always present, though its distinctness varies. Two juvenile specimens have many of the scales white-edged.

A female taken in July contained 5 + 8 eggs, measuring 20 × 8 mm.

The stomachs of two specimens contained frogs too much digested for identification. The species is known to feed chiefly, if not exclusively, on batrachians.

***Leptodeira duchesnii* Boulenger**

Plate XII, Figure 2

Leptodira duchesnii BOULENGER, 1901, Ann. Mus. Congo, (1) II, p. 10, Pl. iv, fig. 1. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, p. 410. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1876. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 605. BOULENGER, 1915, Proc. Zool. Soc. London, p. 210; 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zool. Soc. London, p. 287.

Dipsadomorphus viridis STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 411, figs. 3-4.

Dipsadomorphus brevirostris STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 411, figs. 5-6.

Two specimens of this species were secured by the Congo Expedition: A. M. N. H. No. 12212 (August 1910), Medje; 12213 (July 1913), Nala.

The species evidently ranges throughout the forest, and is obviously adapted to arboreal life. The types came from localities on the Congo close to Stanleyville.

This species is readily distinguished by the great elongation of the body, with small head and bulging eyes, and the loreal entering the eye below the single preocular. Both specimens agree with the description and figure of Boulenger, but have an entire anal plate. Müller (1910, p.

605) has studied the variation in this species in a Cameroon series, and it is evident that the divided anal of the types is abnormal. Nevertheless, its occurrence in occasional specimens makes it impossible to divide the genus on the basis of this character, as Barbour has done (1914, Proc. New England Zoöl. Club, IV, p. 95). The temporals are 1-1-2 in one specimen, 2-1-2 in the other. Labials 8 above, 9 below in one, 10 in the other.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12212	12213
Sex	♂	♀
Length	830	1040 mm.
Tail	195	261 mm.
Tail/Length	0.23	0.25
Ventral Plates	217	207
Subcaudals	102	105
Dorsal Scales	17-17-13	17-17-13

DROMOPHIS Peters

Dromophis lineatus (Duméril and Bibron)

Plate XIII

Dryophylax lineatus DUMÉRIL AND BIBRON, 1864, 'Erpétol. Gén.', VII, p. 1124.
Dromophis lineatus BOULENGER, 1895, Ann. Mag. Nat. Hist., (6) XVI, p. 33; 1896, 'Cat. Snakes,' III, p. 149; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 279. JOHNSTON, 1897, 'British Central Africa,' p. 361a. BOULENGER, 1905, Ann. Mus. Stor. Nat., Genova, (3) II, p. 214. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1877. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 217; 1910, V, p. 64. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166. STERNFELD AND NIEDEN, 1911, Mitt. Zool. Mus. Berlin, V, p. 385. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 212, 630, 653. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 376; 1917, XXIII, p. 12. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 289. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 470.

A single specimen, A. M. N. H. No. 12261, was taken at Faradje, September 1912.

Dromophis lineatus was collected in the Lado by Emin Pasha. It ranges throughout the Sudan, extending east and south to Zanzibar and Nyassaland.

The specimen, a male, measures 890 mm., tail 267 mm., .30 of the total length. Ventral plates 153, subcaudals 94, dorsal scales 17-17-13. One preocular and two postoculars. Temporals 1-1-3 and 1-2-3. Labials 8 above and 9 below.

The coloration is olive-brown above, with a narrow vertebral and two lateral stripes of dull yellow, obscure anteriorly. Venter uniform bluish green, chin and throat white, dark spotted.

PSAMMOPHIS Boie**Psammophis sibilans** (Linnæus)

Coluber sibilans LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 383.

Psammophis sibilans BOIE, 1827, 'Isis,' p. 547. BOULENGER, 1896, 'Cat. Snakes,' III, p. 161; Ann. Mus. Stor. Nat. Genova, (2) XVI, p. 545; (2) XVII, pp. 13, 21. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, pp. 78, 93, 113, 177. PERACCA, 1896, Boll. Mus. Torino, XI, No. 255, p. 2. BOULENGER, 1897, Proc. Zoöl. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 279. JOHNSTON, 1897, 'British Central Africa,' p. 361a. MEEK, 1897, Publ. Field Mus. Zoöl., I, p. 179. PERACCA, 1897, Boll. Mus. Torino, XII, Nos. 273 and 304. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 82. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 400. ANDERSON, 1898, 'Zoöl. Egypt,' I, p. 302, Pl. XLIII, text fig. 12. MOCQUARD, 1899, Bull. Mus. Hist. Nat., Paris, V, p. 219. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 454. FLOWER, 1900, Proc. Zoöl. Soc. London, p. 968. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447; Proc. Zoöl. Soc. London, II, p. 18. LAMPE, 1902, Jahrb. Nassau. Ver. Naturk., LV, p. 34. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, pp. 406, 415. SCHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 172. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 335, 338, 340, 345. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214; Ann. Mag. Nat. Hist., (7) XVI, p. 113; Proc. Zoöl. Soc. London, p. 255. FERREIRA, 1905, Journ. Sci. Lisboa, (2) VII, p. 116. JOHNSTON, 1906, 'Liberia,' II, p. 832. BOULENGER, 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, part 3, No. 12, p. 11; Proc. Zoöl. Soc. London, p. 487. ROUX, 1907, Rev. Suisse Zool., XV, p. 77. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 2, p. 1879. BOULENGER, 1908, Ann. Natal Mus., I, p. 229. GOUGH, 1908, Ann. Transvaal Mus., I, p. 29. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 412; IV, pp. 218, 241, 244, 246. WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 171. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, pp. 193, 303. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 596. GENDRE, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cvi. BOULENGER, 1910, Ann. S. African Mus., V, p. 514. MEEK, 1910, Publ. Field Mus. Zoöl., VII, p. 405. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 166. LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 23. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 250. HEWITT, 1912, Rec. Albany Mus., II, p. 272. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 6. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOETTGER, 1913, 'Wiss. Ergeb. Reise Ostafrika, Voeltzkow,' III, pp. 353, 361. KLAFTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 286. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool., Stockholm, VIII, No. 20, p. 4. BOULENGER, 1913, Proc. Zoöl. Soc. London, pp. 213, 631, 653. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, pp. 75, 377; 1917, XXIII, p. 12; 1918, XXIV, p. 165. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 328. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 26. CHABANAUD, 1919, Bull. Mus. Hist. Nat., Paris, XXV, p. 568. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-natur. Kl., XLVI, p. 503. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 290. CHABANAUD, 1920, Bull. Mus. Hist. Nat., Paris, XXVI, pp. 462, 464. ANGEL, 1921, Bull. Mus.

Hist. Nat., Paris, XXVII, p. 141. CHABANAUD, 1921, Bull. Etudes Hist. Sci. Afrique Occ. Française, p. 470.

Thirteen specimens of *Psammophis sibilans* were collected in the Uele District and another from Beni (also in the savannah, near the Ruwenzori) was presented to the expedition by Dr. J. Bequaert: A. M. N. H. No. 12271 (1914), Beni; 12262, 12267, 12268-69 (February, October and January 1912), Faradje; 12263-66 (June 1912), Garamba; 12257-59, 12260 (November and December 1910), 12270 (June 1913), Niangara.

The largest male measures 1500 mm., the largest female 1100 mm., and a specimen represented only by a head measured 1720 mm. when caught. The tail is frequently injured in this species, .27-.29 of the total in nine specimens. The ventral plates range from 170-181, mean 178, the subcaudals from 87-101, mean 96. Dorsal scales 17-17-13. One preocular and two postoculars. Temporals normally 2-2-3, somewhat variable, 3-3-3 in one specimen, 1-2 in another. Upper labials 8, lower 9-11, usually 10.

The specimens from the Uele represent the color form "F" of Boulenger, uniform olive-brown above, extending to the ends of the ventrals, yellowish below, with a well-marked black line on each side of the venter.

The specimen from Beni possibly represents the color form "B," but has no trace of the head markings of the typical *sibilans*. The color is olive-brown above, extending to the lower third of the first scale row; a broad white line outlined with black, on the third and fourth scale rows, beginning some distance behind the head, extends to the tip of the tail. Venter bluish on the median two-thirds, outlined with a fairly well-marked darker line, outside of which the ventrals and the lower third of the first scale row are pure white.

The species of *Psammophis* are of exceptional systematic interest and offer fascinating problems in variation and distribution for a revisor of the genus. It seems probable that *P. sibilans* will be found to have several well-defined subspecies when the variation can be critically compared in the several faunal areas in which it occurs.

THELOTORNIS Smith

Thelotornis kirtlandii (Hallowell)

Plate XIV

Leptophis kirtlandii HALLOWELL, 1844, Proc. Acad. Nat. Sci., Phila., p. 62.

Thelotornis kirtlandii PETER, 1882, 'Reise nach Mossambique,' III, p. 131, Pl. XIX, fig. 2. BOULENGER, 1896, 'Cat. Snakes,' III, p. 185; 1897, Proc. Zoöl. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 279. JOHNSTON, 1897,

'British Central Africa,' p. 361a. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 83. MOCQUARD, 1899, Bull. Mus. Hist. Nat., Paris, V, p. 219. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 140. TORNIER, 1901, Zool. Anz., XXIV, p. 64. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LIII, p. 345. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214. JOHNSTON, 1906, 'Liberia,' II, p. 832. BOULENGER, 1907, Proc. Zoöl. Soc. London, p. 487; Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 11; 1908, Ann. Natal Mus., I, p. 229. GOUGH, 1908, Ann. Transvaal Mus., I, p. 32. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 413; IV, p. 219. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 596. BOULENGER, 1910, Ann. S. African Mus., V, p. 515. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 16. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 607. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 4. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 56; 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 251. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 6. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 614. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool., Stockholm, VIII, No. 20, p. 4. MÜLLER, 1913, Zool. Anz., XLI, p. 234. WERNER, 1913, in Brehm's 'Tierleben,' 4th Ed., V, p. 402. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 213, 631, 654. BREIJER, 1915, Ann. Transvaal Mus., V, p. 113. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc. No. 13, p. 327. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zoöl. Soc. London, p. 290; CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 471.

Thelotornis kirtlandii is represented in the collection by fifteen specimens: A. M. N. H. No. 12282 (September 1913), Akenge; 12272-12279 (November 1910), Niangara; 12283-85 (November 1913), Niapu; 12280-81 (August 1913), Poko; 12286 (tag corroded), Belgian Congo.

The range of this species represents a type of distribution very distinct from that of its relative *Dispholidus typus*, although the ranges of both have been correctly enough referred to as "Tropical and South Africa." It is abundant in various parts of the Rain Forest of Gaboon and Cameroon as well as the Ituri but, instead of being confined to the forest or to the neighborhood of the forest, it has an even wider range in the Savannah Province. It extends roughly from Togo to Uganda, from the Juba River to Natal, and from Northern Rhodesia to Angola and even northern Southwest Africa. The southward extension of the range to Natal (and not to western South Africa) is a characteristic feature of the distribution of many widely ranging species, not only of animals but of plants. Hewitt (1910, Ann. Transvaal Mus., II, p. 56) has called attention to this feature of South African distribution. *Thelotornis* represents an extreme specialization for the arboreal habitat, and it is known to feed on birds and tree lizards; from this fact the assumption is

logical that it is primarily a forest species which has spread outside of the forest limits after reaching its specific distinctness. An arboreal form originating in the savannah would be expected to become still more specialized for the arboreal habitat if it entered the Rain Forest, while the reverse is obviously not the case (irreversibility of evolution). The specimens from South and East Africa probably represent a valid subspecies, *Thelotornis kirtlandii capensis* (Smith) characterized by the uniform presence of black head markings.

The depressed and flat head, with the canthus rostralis distinctly projecting, forming a shallow loreal groove, is very characteristic, distinguishing the species at once from all other African snakes. The largest male in the present series measures 1330 mm., the largest female 1445 mm., the tail occupying .33-.37 of the total, but frequently injured. The ventral plates range from 173-189, slightly higher in females, mean 178. Subcaudals 150-157 in males, 140-154 in females. Dorsal scales 19-19-13, frequently 21 anteriorly. One preocular and three postoculars, temporals 1-2 in every specimen. Labials 8-9 above, 9-11 below. There are usually three enlarged occipitals behind the parietals, five in one specimen.

The coloration is uniform in the series but difficult to describe: a very fine mixture of greens, browns, grays, and pink, the latter color predominating on the venter, the comparison made in the field notes being "mouldy." The top of the head is uniform green in life, brownish in alcohol. The neck is crossbarred with black, much more distinct when the neck is distended.

The distension of the neck in this species has been excellently described in vivarium specimens by Müller (1910, p. 607), who regards it as a warning or frightening adaptation of special interest since the remainder of the body offers an exceptionally good example of protective coloration.

DISPHOLIDUS Duvernoy

Dispholidus typus (Smith)

Plate XV

Bucephalus typus SMITH, 1829, Zoöl. Journ., IV, p. 441.

Dispholidus typus BOULENGER, 1896, 'Cat. Snakes,' III, p. 187; Ann. Mus. Stor. Nat. Genova, (2) XVI, p. 553; 1897, Proc. Zoöl. Soc. London, p. 801. JOHNSTON, 1897, 'British Central Africa,' p. 361a. BOULENGER, 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 721. FERREIRA, 1898, Journ. Sci. Lisboa, (2) V, p. 244. BOULENGER, 1902, Proc. Zoöl. Soc. London, II, p. 18. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 34. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 12. GOUGH, 1903, Zool. Jahrb. (Syst.), XVII, p. 468. BOULENGER, 1905, Proc. Zoöl. Soc. London, p. 255; Ann. Mag. Nat. Hist., (7) XVI, p. 113.

- BOULENGER, 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 12. ROUX, 1907, Rev. Suisse Zool., XV, p. 77; Zool. Jahrb. (Syst.), XXV, p. 739. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), CXVI, part 2, p. 1880. BOULENGER, 1908, Ann. Natal Mus., I, p. 230. GOUGH, 1908, Ann. Transvaal Mus., I, p. 32. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 219. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 596. FITZSIMMONS, 1909, Ann. Mag. Nat. Hist., (8) III, p. 271. BOULENGER, 1910, Ann. S. African Mus., V, p. 515. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 57. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 363. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 274. BOETTGER, 1913, 'Wiss. Ergeb. Reise Ostafrika, Voeltzkow,' III, p. 362. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 164. LÖNNBERG AND ANDERSSON, 1913, Ark. Zool., Stockholm, VIII, No. 20, p. 5. WERNER, 1913, in Brehm's 'Tierleben,' 4th Ed., V, p. 402, fig. 00. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 213, 631, 654. CHABANAUD, 1913, Bull. Mus. Hist. Nat., Paris, XXII, p. 377. LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 80; 1918, No. 13, p. 325. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 290. CHABANAUD, 1920, Bull. Mus. Hist. Nat., Paris, XXVI, p. 464; 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 471.
- Dispholidus typus viridis* BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 214.
- Dispholidus typus belli* CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 377.

Eight specimens of this widely distributed species were collected: A. M. N. H. Nos. 12494, 12495-96 (February and March 1911), 12498 (December 1912), Faradje; 12497 (July 1912), Garamba; 12493 (November 1910), 12499 (June 1913), Niangara; 12509 (tag corroded), Belgian Congo.

Dispholidus typus evidently does not occur in the Rain Forest, though reaching its borders. It is one of the most widely distributed African snakes, ranging from Senegal to Eritrea, and reaching even the Cape Peninsula in South Africa. In Angola it is recorded from San Salvador and Duque de Bragança, well to the north, so that its range completely circumscribes the Rain Forest.

The form of the head is characteristic, but resembles that of several other large-eyed snakes, the diameter of the eye nearly or quite equalling the length of the snout. The largest male measures 1221 mm., the largest female 1292 mm. The tail length varies from .26-.27 of the total in males, .24-.26 in females. Ventral plates 181-185 in males, 186-191 in females; subcaudals 108-121, 101-107, respectively. The dorsal scale count is 23-19-11, occasionally 25-21-13. One preocular, and three postoculars, two postoculars in one specimen, 2-3 in another. Temporals uniformly 1-2. Labials seven above, 9-12 below. Enlarged occipitals very variable, 1-3.

Three types of coloration are represented in the present small series. Two adult specimens are uniform brown, two are uniform green, and two are greenish or brownish, the scales black-edged and the head shields heavily vermiculated with black. The spotted specimens have a shorter snout and higher loreal, but are otherwise indistinguishable from the uniformly colored forms. The two small specimens are of especial interest, for they evidently are the juvenile coloration of the brown form. The upper surface of the head is uniform brown; the dorsal scales are spotted with white and edged at the base with black; the tips of the ventrals are black; there is a series of more or less vertical black spots on the sides of the neck, and a concealed black spot between the posterior chin shields. On distension of the neck these black marks become much more vivid, since the color extends to the skin between the scales, as in *Thelotornis*. In the adult brown specimens the black neck marks are still visible, though ill-defined, and the black spot between the chin shields is also present. The species also distends its neck when excited or disturbed, but the distension is cylindrical instead of laterally compressed, as in *Thelotornis* (Werner, 1913, p. 402). The correlation of a vivid neck pattern, in this species as well as in *Thelotornis*, with the habit of distending the neck when disturbed, adds to the evidence that it is a "frightening" coloration (distinguished from "warning" coloration). The distension of the neck in various forms, with various structural modifications, associated with a frightening or warning posture, is an extraordinarily widespread characteristic of snakes.¹

CALAMELAPS Günther

Calamelaps unicolor (Reinhardt)

Calamaria unicolor REINHARDT, 1843, Danske Vidensk. Selsk. Afh., X, p. 236, Pl. 1, figs. 1-3.

Calamelaps unicolor GÜNTHER, 1866, Ann. Mag. Nat. Hist., (3) XVIII, p. 25. BOULENGER, 1896, 'Cat. Snakes,' III, p. 245. TORNIER, 1901, Zool. Jahrb. (Syst.), XIV, p. 85. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 219. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166; 1915, Proc. Zool. Soc. London, p. 632; 1920, p. 291.

A single female specimen of this species, A. M. N. H. No. 12445, was collected at Faradje, April 1911.

Well known from Togo and Uganda, the occurrence of *Calamelaps unicolor* at Faradje establishes the fact of a Sudanese distribution for this species. It is another illustration of the obvious rule that members of the Togo-Niger fauna have reached Uganda via the plains, while species from the Gaboon-Cameroon area reaching Uganda have spread through the forest.

¹See Noble, 1921, Natural History, XXI, pp. 166-171.

The specimen agrees excellently with Boulenger's description, but is of extraordinary size, measuring 722 mm. The tail measures 50 mm., .07 of the total. Ventral plates, 202; subcaudals, 23; dorsal scale count, 15-17-17. No pre- or postocular, the supraocular bordering the eye behind. Temporal widely separated from the eye by a suture of the fifth labial and parietal. Labials, 6 above and 7 below.

Uniformly colored above and below, a very dark grayish brown.

This species is extraordinarily like *Atractaspis*, and it was supposed by the collectors that the fangs had been removed by the natives who brought the specimen.

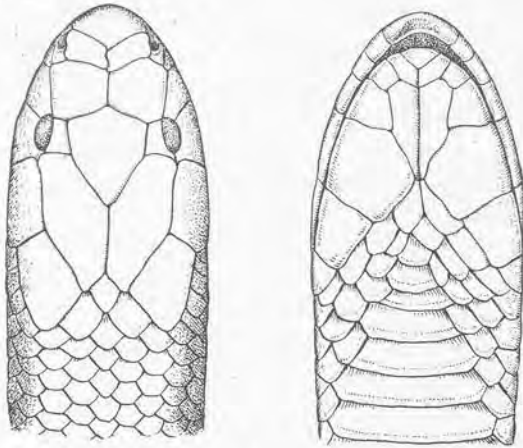


Fig. 12. Dorsal and ventral views of head of *Calamelaps niangaræ*, new species, (12455, type, $\times 2$).

Calamelaps niangaræ, new species

A smaller specimen of *Calamelaps* in the collection, A. M. N. H. No. 12453, taken at Niangara, November 1910, was at first identified with *C. feæ* Boulenger, from the Rio Cassine in Portuguese Guinea. On closer examination it appears that the new specimen is almost exactly intermediate between *C. unicolor* and *C. feæ* and, as comparison with the specimen of *C. unicolor* above described does not warrant the assumption that they are the same species, it seems best to describe the new form separately.

DIAGNOSTIC CHARACTERS

Habitus more slender than in *Calamelaps unicolor* with a smaller head, a more pointed snout and a much longer tail; the prefrontals longer than the internasals, but their suture shorter than that between the internasals; supraoculars very small; 6 upper labials, the fifth broadly in contact with the parietal. Ventral plates 182, subcaudals 34, dorsal scales in 17 rows.

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 12453, ♂.

Habitus rather slender, head not at all distinct from neck, tail short and obtuse, but decidedly longer than in *Calamelaps feæ*.

Rostral large, broader than deep, the part visible from above shorter than its distance from the frontal, beneath with a deeply impressed groove. The rostral extends relatively further forward beyond the mental than in *C. feæ*. Frontal six-sided, longer than its distance from the snout. Internasals much broader than long, shorter than the prefrontals, but their suture longer than that between the prefrontals. Supraocular very small, probably a single postocular. Six upper labials, the fifth largest and forming a suture with the parietal. Seven lower labials, the first pair forming a suture behind the mental, fourth very large and meeting its fellow behind the single pair of chin shields. Dorsal scales 15–17–17; ventral plates 182; anal plate divided; subcaudals 34, in two rows.

Total length 414 mm., tail 48 mm., .12 of the total.

Uniform blackish brown, the scales very narrowly light-edged and distinct, the ventrals more distinctly light-edged.

The specimen has been slightly damaged by ants, so that the nasals and the edges of the shields surrounding the eyes are destroyed.

From *Calamelaps unicolor* it is distinguished by the more slender habitus, the much smaller supraoculars, the smaller prefrontals, and especially the short suture between them. In these characters it agrees with *C. feæ*. It is distinguished from *C. feæ* in having six upper labials, the fifth in contact with the parietal; in the meeting of the fourth lower labials behind the chin shields; in the 17 dorsal scale rows (as in *C. unicolor*); and in the lower number of ventrals and higher number of subcaudals, corresponding to the longer tail. This last character might be considered a sex variation were not the type of *feæ* also a male.

Miodon Duméril**Miodon gabonensis (Duméril)**

Elapomorphus gabonensis A. DUMÉRIL, 1856, Rev. Mag. Zool., (2) VII, p. 468.

Miodon gabonensis BOULENGER, 1896, 'Cat. Snakes,' III, p. 252. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 450; 1899, XLIX, p. 140. ANDERSSON, 1902, Bihang Svenska Vetensk.-Akad. Handl., XXVII, part 4, No. 5, p. 23. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 413; IV, p. 219. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 609. BOULENGER, 1915, Proc. Zool. Soc. London, pp. 215, 633; 1919, Rev. Zool. Africaine, VII, p. 26; 1920, Proc. Zool. Soc. London, p. 291.

Two specimens from Medje, A. M. N. H. No. 12449 (March 1914) and 12450 (April 1914), were collected.

Miodon gabonensis is known from the west African forest, and Boulenger (1915, p. 633) records its occurrence in East Africa.

The specimens correspond excellently with Boulenger's description, but represent the uniformly colored phase, without longitudinal lines. One preocular, two postoculars; temporals 1-1, subequal; labials 7 above and below, the third and fourth entering the eye.

The dorsal color is dark grayish brown, darker posteriorly, the head gray. The two scale rows next the ventrals are lighter in color and more reddish brown. The venter is uniform light yellow, with no dark color on the end of the ventrals, as in *M. collaris*. The yellow of the venter extends onto the sides of the neck, suggesting an approach to the nuchal collar often present in species of this genus.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12449	22450
Sex	♂	♀
Length	722	652 mm.
Tail	39	27 mm.
Tail/Length	0.05	0.04
Ventral Plates	228	252
Subcaudals	20	18
Dorsal Scales	15-15-15	15-15-15

Miodon unicolor, new species

A single specimen from Poko, A. M. N. H. No. 12454, taken in August 1913, represents a distinct species of *Miodon*.

DIAGNOSTIC CHARACTERS

Habitus, dentition, and arrangement of head shields of *Miodon*. Rostral deeper in proportion to width than in *M. gabonensis*. Diameter of eye equal to half its distance from the labial border. Seventh upper labial highest, forming a suture with the parietal behind the first temporal. Color uniform bluish gray above and below, the ventral plates narrowly edged with white.

DETAILED DESCRIPTION

Type.—A. M. N. H. No. 12454, ♂.

Head not at all distinct from neck, body cylindrical, tail very short, ending in a large spinous scale; head narrower and less depressed than in *Miodon gabonensis*.

Rostral four-fifths as deep as broad, visible from above. Nostril in the anterior half of a divided nasal, directed backwards. Internasals longer than broad, shorter than the prefrontals, which are wider than long. No loreal. Frontal small, longer than the prefrontals, a little more than half the length of the parietals, half as broad as the interorbital width. Parietals large, as wide behind as in front, in contact with the upper postocular in front and the seventh labial behind, emarginate on their lateral border. One pre- and two postoculars. A large temporal, three-fourths as long as the parietal. Seven upper labials, the last highest and reaching the parietal behind the temporal. Seven lower labials, the first pair forming a suture behind the mental, the fifth largest. Two pairs of chin shields, the anterior larger.

Length 563 mm., tail length 40 mm., .07 of the total. Ventral plates 202, subcaudals 23; dorsal scales 15-15-15.

Color bluish gray, each scale finely outlined with darker color. Ventrals of the same shade, their posterior edges mottled with white, more heavily anteriorly, where the white extends the full width of the venter.

The cutting off of the temporal behind by a parietal-labial suture may prove to be an individual anomaly by fusion of the second temporal with the parietal. In this event, however, the height of the seventh labial and the small size of the posterior temporal would still be distinctive of the species.

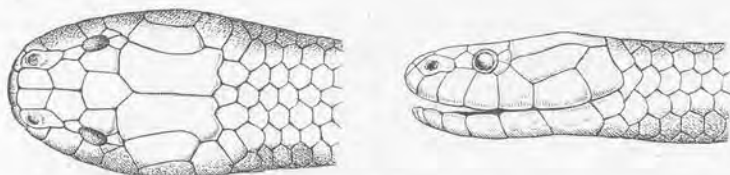


Fig. 13. Dorsal and lateral views of head of *Miodon unicolor*, new species, (12454, type, $\times 2$).

Miodon collaris (Peters)

Microsoma collare PETERS, 1887, Sitzber. Ges. Naturf. Freunde, Berlin, p. 148.

Miodon collaris BOULENGER, 1896, 'Cat. Snakes,' III, p. 251. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) X, p. 13. BOULENGER, 1900, Proc. Zool. Soc. London, p. 454. GOUGH, 1903, Zool. Jahrb. (Syst.), XVII, p. 468. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 114. FERREIRA, 1906, Journ. Sci. Lisboa, (2) VII, p. 169. BOULENGER, 1915, Proc. Zool. Soc. London, p. 215; 1920, p. 291.

Six specimens are referred to this species: A. M. N. H. No. 12445 (August 1910), 12451-52 (April 1914), Medje; 12446-46 (November 1913), Niapu.

These specimens correspond in coloration and scale characters with *Miodon collaris* in every respect with the exception of a higher range of ventral plates. The dentition resembles that of *Cynodontophis* Werner (1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 345), but the writer has retained *Miodon* (as currently used) pending a revision of this difficult group. Müller (1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 611) has referred *Cynodontophis æmulans* to *Miodon notatus*, but retains the new genus which has also been recognized by Boulenger (1915, p. 215).

The specimens agree in having one pre- and two postoculars; seven labials above and below, of which the third and fourth upper labials enter the eye; and temporals 1-1, subequal.

The coloration is strikingly like that of *Miodon collaris* figured by Bocage (1895, 'Herpétol. Angola,' Pl. xv, fig. 1). The dorsal scales are a dark grayish brown, slightly reddish on the sides, and the ventrals have

a spot of the same color at each end as wide as the adjacent scale. The remainder of the venter is light yellow. A sharply defined collar of the ventral color crosses the neck about four scales behind the parietals, and extends forward on the sides of the head and edges of the parietals. The tip of the chin is black, the tip of the tail yellow.

The black head-pattern is vividly marked in a juvenile specimen. The central portion of the parietals, all of the frontal, and a large central spot on each of the supraoculars and prefrontals is black, sharply outlined against the orange ground color. A black subocular spot on the third and fourth labials, and a small black spot on the mental and each of the first lower labials completes the pattern.

This small specimen, measuring 230 mm., contained a snake 180 mm. in length, its head, unfortunately, digested.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12445	12446	12447	12448	12451	12452
Sex	♂	♀	♀	♀	♀	♂
Length	230	653	602	675	416	535 mm.
Tail	13	33	26	35	21	34 mm.
Tail/Length	0.06	0.05	0.04	0.05	0.05	0.06
Ventral Plates	232	238	235	235	238	227
Subcaudals	20	20	18	19	18	21
Dorsal Scales	15	15	15	15	15	15

ELAPOPS Günther***Elapops modestus*** Günther

Plate XVII, Figure 2

Elapops modestus GÜNTHER, 1859, Ann. Mag. Nat. Hist., (3) IV, p. 161, Pl. iv. fig. C. BOULENGER, 1896, 'Cat. Snakes,' III, p. 262. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 141. BOULENGER, 1900, Proc. Zool. Soc. London, p. 454. GOUGH, 1903, Zool. Jahrb. (Syst.), XVII, p. 468. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 217. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 414; IV, p. 220. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 615. DESPAX, 1911, in Cottes, 'Mission Cottes au Sud Cameroun,' p. 240. BOULENGER, 1915, Proc. Zool. Soc. London, p. 217; 1919, Rev. Zool. Africaine, VII, p. 27; 1920, Proc. Zool. Soc. London, p. 293.

Aparallactus Boulengeri WERNER, 1896, Verh. Zool.-Bot. Ges. Wien, XLVI, p. 363.

Aparallactus peraffinis, WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 404, Pl. II, fig. 3.

Nineteen specimens from the Rain Forest: A. M. N. H. No. 12528 (May 1914), Avakubi; 12510-17, 12518-25, 12526-27 (April, June and July 1914), Medje.

Elapops modestus is doubtless a forest species, ranging from Liberia and Gaboon to the Ituri.

The present series exhibits a considerable range of variation in dentition, scale characters, and coloration. The preliminary identification was far from satisfactory, as a considerable number of maxillæ were examined before finding grooved teeth, three out of eight specimens had faint grooves while the other five had solid posterior teeth. The specific identification offered still greater difficulties, for the coloration of many specimens is exactly that of *Aparallactus ubangensis* and *A. flavitorques* (Boulenger, 1901, Ann. Mus. Congo, (1) II, p. 11, Pl. iv, figs. 2-3), one of which at least comes from the Rain Forest and specimens of *Elapops modestus* from Cameroon appear to represent a larger form. The feeble enlargement of the posterior teeth and the faintness of the grooves when these are present at all preclude the possibility of identifying them as *Aparallactus*. *Elapops modestus* is not described as collared, but in the present series there is a complete transition from the collared juvenile and half-grown specimens to the uniformly colored adults. The dorsal extension of the rostral, the size of the prefrontals, the size of the eye, the size of the postoculars, and the shape and size of the frontal and parietals are not precisely alike in any two specimens, and it has proved impossible to correlate any group of characters to distinguish any particular group of specimens. The sublabials in contact with the anterior chin shields are 3 in five specimens, 3-4 in two specimens, and 4 in twelve. The upper labials bordering the parietal are the fifth and sixth, but the extent of the suture with the fifth varies greatly. One specimen has the lower postoculars fused with the fourth labial. One specimen has the nasals and preoculars barely in contact at a point.

The largest male measures 442 mm., the largest female 540 mm. The tail length in males is .18-.19 of the total, in females .13-.16. The sexes are sharply distinguished by the number of ventrals, 139-144 in males, 154-164 in females; subcaudals 43-47 in males, 37-44 in females.

Aside from the presence or absence of a light brown nuchal collar already mentioned, the coloration varies in shade of gray, two specimens being much lighter bluish gray, and the venter may be immaculate yellow or heavily mottled with dark gray.

The writer is convinced that the species of *Aparallactus* require revision and, although far from satisfied with the present reference of an apparently heterogeneous series of specimens, it appears undesirable to add to the number of named forms without reference to comparison material and to types.

Elapinae

BOULENGERINA Dollo

Boulengerina annulata (Buchholtz and Peters)

- Naja annulata* BUCHHOLTZ AND PETERS, 1876, Monatsber. Akad. Wiss. Berlin, p. 419. MOCQUARD, 1887, Bull. Soc. Philom. Paris, (7) XI, p. 84. BOCAGE, 1895, 'Herpétol. Angola,' p. 137.
- Aspidelaps bocagei* SAUVAGE, 1884, Bull. Soc. Zool. France, IX, p. 205, Pl. VI, fig. 2.
- Boulengerina annulata* MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 14. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 141. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 455, Pl. XXXII. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 347. BOULENGER, 1904, Ann. Mag. Nat. Hist., (7) XIV, p. 15. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 415. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 218; 1919, Rev. Zool. Africaine VII, p. 27; 1920, Proc. Zoöl. Soc. London, p. 294.
- Boulengerina dybowskyi* MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 15. BOULENGER, 1904, Ann. Mag. Nat. Hist., (7) XIV, p. 15; 1920, Proc. Zoöl. Soc. London, p. 294.

Five specimens of *Boulengerina* were secured by the Congo Expedition: A. M. N. H. No. 12331 (October 1913), Avakubi; 12393 (March 1914), Medje; 12329 (December 1909), N'Gayu; 12330, 12394 (November 1913), Niapu.

The series is of especial interest in necessitating the reference to synonymy of *B. dybowskyi* Mocquard, which makes its range co-extensive with the eastern division of the Rain Forest, from Cameroon to the Tanganyika. The fact that it is a water snake, confused in the field with the crossbarred *Grayia*, is of interest in connection with its range, which is determined not by the Congo but by the Rain Forest.

The largest specimen, a male, measures 1900 mm. The mean proportion of tail length to total is .20. The scales at mid-body are in 21 rows in three specimens, in 23 in two. The preoculars are 1 on each side, the postoculars 2. The temporals are 1-3 in three specimens, 1-2 in one, and 1-3 on one side and 2-3 on the other in the last. Upper labials 7, lower 8 or 9.

The variation in this small series is obviously sufficient to connect the species *dybowskyi* with *annulata*. The only distinction of *stormsi*, besides a difference in coloration from *annulata*, is in the 21 scale rows instead of 23, and the longer tail. In three of the specimens examined, the temporals are 1-3, a condition not hitherto recorded in *annulata*; but one of the specimens has temporals 1-2, exactly as in Boulenger's figures of this species (1900, Pl. xxxii). The fifth specimen, with the usual temporal configuration of 1-3 on one side, has 2 anterior temporals on the other side followed by 3 in the second row. This is exactly as in

B. dybowskyi, and it is evident that Mocquard's specimen represents a symmetrical variation in this respect. The characters adopted by Boulenger in his key to the genus (1904, p. 15) of the height of the rostral is unfortunate. It is said to be nearly as deep as broad in *annulata* and *stormsi*, much broader than deep in *dybowskyi* and *christyi*; all of the present specimens have a rostral considerably broader than deep, with slight variation, but it is impossible to identify them otherwise than as *annulata*. It appears that by the horizontal division of the normally high sixth supralabial, the change from *annulata* to the *dybowskyi* arrangement of labials is made; and an exact analogue of this variation appears in *Dendraspis jamesonii*, which is described as having the lower anterior temporal usually bordering the lip.

The coloration is very characteristic, and has been excellently figured by Boulenger. In the present series the number of black rings is 22-24, of which the first three or four are not divided into pairs. In all of the specimens the ground color is much darker posteriorly, and in two, the posterior rings are entirely obscured.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12329	12330	12331	12393	12394
Sex	♂	♂	♂		
Length	1385	865	1900	1760	1870 mm.
Tail	275	204	365	360 mm.	
Tail/Length	0.20	0.23	0.19	0.20	
Ventral Plates	204	201	207	201	215
Subcaudals	72	76	71	77	
Dorsal Scales	23-21-17	25-21-17	25-21-17	25-23-16	25-23-17
Temporals	1-3	1-3	1-3	1-2	<u>1-3</u> 2-3

LIMNONAJA, new genus

Boulengerina christyi Boulenger appears to be so distinct from *Boulengerina annulata* as to warrant the erection of a distinct genus whose characters follow.

Maxillary bone extending forward as far as the palatine, with a pair of large grooved poison fangs, followed by two or three small teeth; anterior mandibular teeth longest; head very distinct from neck; eye small with round pupil; nostril very large, pierced in a single nasal; scales smooth, without pits, in seventeen rows; tail moderate, subcaudals in two rows; posterior half of body and tail strongly compressed; a median row of transversely widened dorsal scales on the compressed part of the body.

TYPE.—*Limnonaja christyi* (Boulenger).

It is distinguished from *Boulengerina* by the widened head, distinct from the neck, the compressed instead of cylindrical body and tail, and

the transversely widened dorsal scales. In addition, its coloration is wholly distinct from that of *Boulengerina*.

***Limnonaja christyi* (Boulenger)**

Boulengerina christyi BOULENGER, 1904, Ann. Mag. Nat. Hist., (7) XIV, p. 14; 1915, Proc. Zool. Soc. London, p. 218.

A single small specimen, A. M. N. H. No. 11902, of this species, comes from Boma, collected in June 1909. It has been known only from the type, collected at Leopoldville.

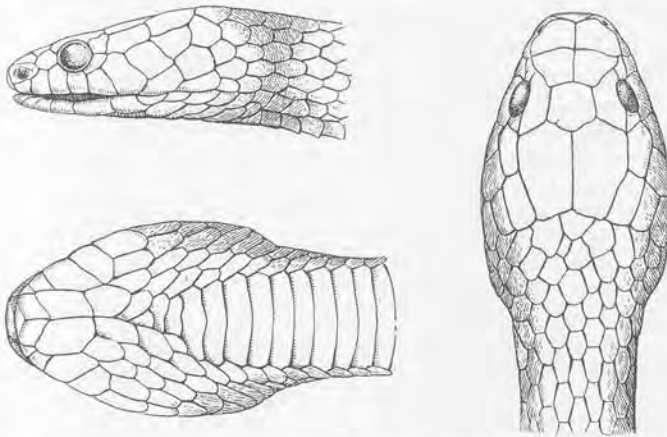


Fig. 14. Dorsal, lateral, and ventral views of head of *Limnonaja christyi* (Boulenger), (11902, $\times 2$).

The juvenile (female ?) specimen measures 474 mm., tail 89 mm., slightly larger than the type. Ventral plates 206, subcaudals 69; dorsal scales 17-17-13; one preocular; two postoculars; temporals 1-3; seven upper labials, the third and fourth entering the eye; eight lower labials, four in contact with the anterior chin shields. The agreement with the type is close in every respect except that there are 1-3 temporals instead of 2-2 or 2-3 and the fourth, fifth and sixth upper labials are in contact with the lower postocular instead of only the fourth and fifth. This is evidently the same variation as occurs in *Boulengerina annulata*, on which *B. dybowskyi* Mocquard was based. Reference to the figure shows how the cutting off of an anterior lower temporal from the sixth upper labial changes the condition in the present specimen to that described in the type.

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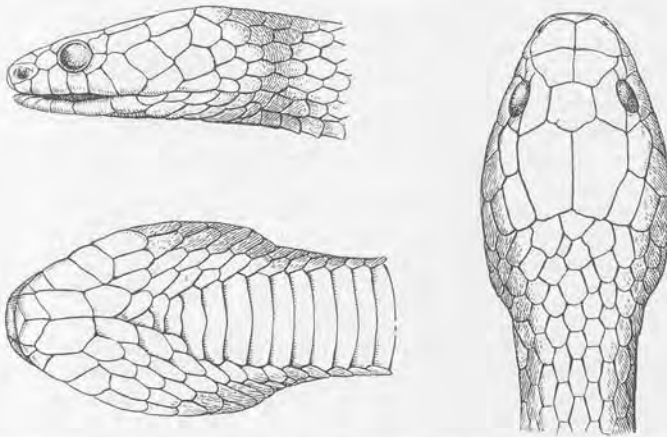


Fig. 14. Dorsal, lateral, and ventral views of head of *Limnonaja christyi* (Boulenger), (11902, $\times 2$).

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The coloration is black above and below, the neck with more or less irregular crossbands of yellowish, which become indistinct posteriorly, and disappear entirely beyond the anterior fourth of the body. Throat and chin yellow, head brownish, darker above, lighter on the sides.

The field notes recorded under field number 1 read as follows: "Snake, bought in Boma for 50 cents, June 22, 1909. Evidently a water snake, as it was sold in a bottle of water. Saw a much larger one in the street of Matadi, June 27, at least twice as big as the first" (H. Lang).

Naja Laurenti

Naja haje (Linnæus)

Coluber haje LINNÆUS, 1764, 'Mus. Adolph. Frid.,' II, p. 46.

Naja haje MERREM, 1820, 'Tent. Syst. Amphib.,' p. 148. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 84. ANDERSON, 1898, Zool. Egypt, I, p. 312, Pl. XLIV. BREIJER, 1915, Ann. Transvaal Mus., V, p. 115.

Naja hajæ WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 176, Pl. XVII, fig. 1.

Naja haie LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 23.

Naja haie BOULENGER, 1896, Cat. Snakes, III, p. 374. FRANCAVIGLIA, 1896, Boll. Soc. Romana Zool., V, p. 35. BOULENGER, 1897, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 279; 1902, Proc. Zool. Soc. London, II, p. 18; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 180. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, Pl. I, p. 1882. BOULENGER, 1908, Ann. Natal Mus., I, p. 230. GOUGH, 1908, Ann. Transvaal Mus., I, p. 35. CHUBB, 1909, Proc. Zool. Soc. London, p. 552. BOULENGER, 1910, Ann. S. African Mus., V, p. 517. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 164. WERNER, 1913, in Brehm's 'Tierleben,' 4th Ed., V, p. 443. BOULENGER, 1915, Proc. Zool. Soc. London, pp. 636, 655. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 324. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-naturw. Kl., XLVI, p. 507. BOULENGER, 1920, Proc. Zool. Soc. London, p. 294.

A single specimen, A. M. N. H. No. 12326, was taken at Faradje, February 1911.

The occurrence of *Naja haje* in this part of the Sudan is of considerable interest. There is no satisfactory record of this species from Togo or Nigeria or the arid interior of Cameroon, the specimen reported by Bavay (1895, Bull. Soc. Zool. France, XX, p. 210) from Dahomey being probably referable to *N. nigricollis*, especially as he refers to the spitting habit. The records from Angola and the Congo are still more dubious, as Bocage confuses it with *melanoleuca*. If *Naja haje* does not range through the Sudanese Subprovince, its distribution is a peculiar one, reminiscent to a degree of *Varanus griseus*. The extension south in East Africa to Zululand and west in North Africa to Morocco indicates a

relatively recent migration from Lower Egypt as a center; for had it spread from any center in the Savannah Province, it must inevitably have possession of the Sudan. On this hypothesis, Faradje represents a western outpost of its range in the Eastern Sudan.

The specimen, a female, measures 1335 mm., of which the tail occupies 196 mm., .15 of the total. There are 210 ventral plates and 57 subcaudals. The dorsal scale count is 23-21-15. One preocular and four postoculars on each side. Upper labials 7, lower 9.

Naja melanoleuca Hallowell

Plate XVI

Naja haje var. *melanoleuca* HALLOWELL, 1857, Proc. Acad. Nat. Sci., Phila., p. 61.

Naja melanoleuca MATSCHIE, 1893, Mitt. Deutsch. Schutzgeb., VI, p. 214. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 14. SHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 175. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 347. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 94. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 12. JOHNSTON, 1906, 'Liberia,' II, p. 808. STERNFELD, 1908, Mitt. Zoöl. Mus. Berlin, III, p. 415; IV, p. 220; 1910, V, p. 64. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 16. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 615; 1913, Zool. Anz., XLI, p. 234.

Naja melanoleuca BOULENGER, 1896, 'Cat. Snakes,' III, p. 376; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 280. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 25. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 401; 1899, XLIX, p. 141. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 455; 1902, in Johnston, 'Uganda Protectorate,' p. 447; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 114; Ann. Mus. Stor. Nat. Genova, (3) II, p. 215; 1909, (3) IV, p. 303; 1911, (3) V, p. 166; 1915, Proc. Zoöl. Soc. London, pp. 219, 636. CHABANAUD, 1915, Bull. Mus. Hist. Nat., Paris, XXII, pp. 75, 318; 1917, XXIII, p. 13; 1918, XXIV, p. 166. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc. No. 13, p. 324. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 27. CHABANAUD, 1919, Bull. Mus. Hist. Nat. Paris, XXV, p. 568. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 294. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 471.

Naja melanoleuca is abundant in the Rain Forest. Thirty-two specimens were collected: A. M. N. H. Nos. 12387-88 (October 1913), Akenge; 12380 (October 1909), 12319 (August 1913), Avakubi; 12366, Bafwabaka; 12314-16, 12369, 12373 (August 1910), 12325 (September 1910), 12323-24, 12370, 12375, 12377-78 (June 1914), Medje; 12376 (July 1913), Nala; 12317 (April 1913), 12379 (November 1910), Niangara; 12320-21, 12367, 12374, 12389-90 (November 1913), 12322, 12371 (December 1913), Niapu; 12318, 12368 (August 1913), Poko; 12365, 12381 (tags corroded), Belgian Congo.

The range of this species is practically co-extensive with that of the Western Forest Province of the Botanical Map. It has been recorded

from Nyassaland to Uganda in East Africa, with extreme eastern record from the Kilimandjaro (Lönnerberg, 1910, p. 16). Its occurrence outside the continuous forest is probably restricted to forest islands, as at Niangara, Sesse Islands in Victoria Nyanza, and the Kilimandjaro.

The maximum length in fifteen males is 2124 mm., in ten females, 1630 mm. No difference in the proportion of tail length to total can be discerned in the sexes, the range being .16-.19, mean .17. The ventral plates vary from 212-226, mean 218; the subcaudals from 60-71, mean 66. The dorsal scales are 23-29 at the neck, 17-19 at mid-body, and 11-13 posteriorly, the usual count being 25-19-13 (27 is equally common across the neck). The shields of the head are very constant, every specimen showing one pre- and three postoculars; seven upper and eight lower labials, the third and fourth upper labials entering the eye.

The coloration of *Naja melanoleuca* is very distinctive. Adult specimens are entirely black above; posterior three-fourths of the venter, black; throat and sides of the head, light yellow, extending backward on the venter from 6-15 ventral plates, after which, black crossbands appear, increasing in breadth until the venter is entirely black, usually before the fiftieth ventral. In two specimens the venter is mottled with light color to the hundred and first and one hundred and thirty-fifth ventral. In specimens less than a meter in length light crossbands, consisting of rows of white-edge scales, are visible (coloration "B" of Boulenger). In both young and adult specimens the light labials (beginning with the second above and the third below) and the lower temporal are heavily outlined with black, the upper and lower labial sutures corresponding.

Naja nigricollis Reinhardt

Naja nigricollis REINHARDT, 1843, Danske Vidensk. Selsk. Afh., X, p. 269, Pl. III, figs. 5-7. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, pp. 79, 95, 113, 178. PERACCA, 1896, Boll. Mus. Torino, XI, No. 255, p. 4. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 84. ANDERSON, 1898, Zool. Egypt, I, p. 322, Pl. XLV. JOHNSTON, 1906, 'Liberia,' II, p. 810. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 415; IV, pp. 220, 241, 244; WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' pp. 171, 176, Pl. XVIII, fig. 2. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 57. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 4. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 251; 1912, 'Wiss. Ergeb. Deutsch. Afrika Exp.,' IV, p. 274.

Naja nigricollis BOULENGER, 1896, 'Cat. Snakes,' III, p. 378; Ann. Mus. Stor. Nat. Genova, (2) XVII, pp. 13, 21, 279. MOCQUARD, 1896, Bull. Mus. Hist. Nat., Paris, II, p. 59. BOULENGER, 1897, Proc. Zool. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 280. MEEK, 1897, Publ. Field Mus., Zool., I, p. 179. MOCQUARD, 1899, Bull. Mus. Hist. Nat., Paris, V, p. 219. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 148. BOULENGER, 1902, Proc. Zool. Soc.

- London, II, p. 18. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, p. 416. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 336. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 114; Ann. Mus. Stor. Nat. Genova, (3) II, p. 215; 1907, Proc. Zoöl. Soc. London, p. 487; Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 12. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1883. BOULENGER, 1908, Ann. Natal Mus., I, p. 230; 1909, Trans. Zoöl. Soc. London, XIX, p. 246. CHUBB, 1909, Proc. Zoöl. Soc. London, p. 597. BOULENGER, Ann. S. African Mus., V, p. 518. WERNER, 1910, Denschr. Med. Naturw. Ges. Jena, XVI, p. 364. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 166. CURTIS, 1911, 'Rept. Wellcome Res. Lab. Khartoum,' p. 195, Pl. xvi. FRASER, idem, p. 201. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 6. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 165. METHUEN AND HEWITT, 1914, Ann. Transvaal Mus., IV, p. 144. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 219, 636, 656. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, pp. 75, 381; 1917, XXIII, p. 13. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 321. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 27. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math.-natur. Kl., XLVI, p. 507. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 294.
- Naja nigricollis* var. *pallida* BOULENGER, 1896, 'Cat. Snakes,' III, p. 379; 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 721; 1909, (3) IV, p. 311.
- Naja nigricollis pallida* STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 275.

Naja nigricollis was collected at Faradje, A. M. N. H. No. 12327 (March 1911), and Garamba, No. 12364 (May 1912), with a third specimen, No. 12328, whose tag was corroded, doubtless also from the same region.

Naja nigricollis is the most widespread member of the genus in Africa, its range corresponding exactly with the Savannah Province. It is interesting that it does not occur in the southern parts of Cape Colony, where it is replaced by the very distinct *N. flava*. The present records are the first from the eastern part of the Sudanese Subprovince. It is strange that it was not observed along the Nile by Werner in his Sudan expedition.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12364	12327	12328	2830
Sex	♀ (juv.)	♀	♂	♂
Length	382	1298	1323	1180 mm
Tail	59	190	212	180
Tail/Length	0.15	0.15	0.16	0.15
Ventral Plates	203	198	194	185
Subcaudals	54	50	57	
Dorsal Scales	21-23-15	21-23-15	21-23-13	21-21-13
Preoculars	2-2	2-2	2-2	2-2
Postoculars	3-3	3-3	3-3	3-3
Supralabials	6-6	6-6	6-6	6-6
Infralabials	9-9	9-9	9-10	8-9

The specimens examined represent the variety *pallida* of Boulenger, but this does not seem to represent a subspecies. A. M. N. H. No. 2830, collected in Kenya Colony by Mr. Herbert Lang on a previous expedition, has been examined in comparison.

Naja goldii Boulenger

Naja goldii BOULENGER, 1895, Ann. Mag. Nat. Hist., (6) XVI, p. 33; 1896, 'Cat. Snakes,' III, p. 387, Pl. xx; 1900, Proc. Zool. Soc. London, p. 455; 1915, p. 219; 1919, Rev. Zool. Africaine, VII, p. 27; 1920, Proc. Zool. Soc. London, p. 296.

Naja goldii STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 417.

Naja yakomæ, MOCQUARD, 1895, C. R. Congr. Int. Zool., III, p. 233.

Naja guentheri BOULENGER, 1893, 'Cat. Snakes,' III, p. 388, Pl. xxi.

Naja guentheri STERNFELD, 1910, Mitt. Zool. Mus. Berlin, IV, p. 220.

Two small specimens of *Naja goldii* were collected in the Ituri Forest, A. M. N. H. No. 12362, (July 1913) from Poko, and No. 12363, (September 1913) from Akenge. It has been recorded from Togo, Cameroon, and the Gaboon region, and Mocquard's specimen from Yakoma on the upper Ubanghi proves the species to be widely distributed in the eastern portion of the Rain Forest.

Both specimens are juvenile, less than half grown. In scale characters they agree excellently with the description of Boulenger (1896, p. 387) and of Mocquard (1895, p. 233). One preocular and three postoculars on each side. Labials, 7 above and 8 below. A rather striking difference in habitus distinguishes this species from all others of the genus, the much greater tail length, .23 of the total in the present specimens, compared with .15 in *Naja nigricollis* and .17 in *N. melanoleuca*.

The coloration has been carefully described by both Boulenger and Mocquard, and is very characteristic. The fact that it appears in the specimen referred to *N. guentheri* by Sternfeld (1910, p. 220) is additional evidence that *guentheri* cannot be distinguished from *goldii*.

MEASUREMENTS AND SCALE CHARACTERS

A. M. N. H. No.	12362	12363
Sex	♀	♂
Length	608	645
Tail	139	146
Tail/Length	0.23	0.23
Ventral Plates	197	197
Subcaudals	92	88
Dorsal Scales	15-15-11	15-15-11

DENDRASPIS Schlegel**Dendraspis jamesonii** (Traill)

Plate XVII, Figure 1

Elaps jamesonii TRAILL, 1843, in Schlegel, 'Essai Phys. Serpents,' English Transl. p. 179, Pl. II, figs. 19 and 20.

Dendraspis jamesonii BOETTGER, 1888, Ber. Senck. Ges., p. 85. BOULENGER, 1896, 'Cat. Snakes,' III, p. 436. MOCQUARD, 1896, Bull. Mus. Nat. Hist., Paris, II, p. 60. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 280. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 404; 1899, XLIX, p. 141. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447. LAMPE, 1902, Jahrb. Nassau. Ver. Naturk., LV, p. 40. SHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 177. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 347. GOUGH, 1903, Zool. Jahrb. (Syst.), XVII, p. 467. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 215. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 415; IV, p. 221. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 167. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 275. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 220, 636. LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 80; 1918, No. 13, p. 321. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 27; 1920, Proc. Zoöl. Soc. London, p. 295.

Dendraspis neglectus BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 44.

Dendraspris (misprint) *jamesonii* MÜLLER, 1913, Zool. Anz., XLI, p. 234.

Twenty-seven specimens of *Dendraspis jamesonii* were collected: A. M. N. H. Nos. 12343, 12392 (September 1913), Akenge; 12344-47 (September 1913), Avakubi; 12332-33 (May 1910), 12334 (August 1910), 12382 (October 1910), Medje; 12235-39 (November 1910), 12340 (May 1913), 12341 (June 1913), Niangara; 12348-51, 12386, 12391 (November 1913), 12383-84 (December 1913), Niapu; 12342 (August 1913), Poko.

This species is distributed from French Guinea to the mouth of the Congo, and ranges throughout the Rain Forest to the lake region, where it occurs in the forest islands, as at Niangara in the present collection.

The specimens range in size from 567 mm. to 2470 mm. The largest male measures 2145 mm., the specimen of 2470 mm. being a female. The proportionate tail length is the same in the sexes, .22-.25 of the total, mean .23. The range of variation in number of ventrals is 211-230, mean 221; in number of subcaudals, 102-117, mean 107. The extremes in dorsal scales are 15-15-11 and 19-17-13, usually 17-17-11. The preoculars are 3 on each side in all specimens. The postoculars are four except in two specimens, which have, by fusion of the middle ones, 3 on one side. The enlarged postparietal scales number 3 (between the first temporals) in twenty specimens, 4 in one, and 5 in four. The lower temporal reaches the labial border (counted as the seventh upper

labial) in eighteen specimens; in four, a small seventh labial, longer than high, is cut off from the base of the temporal on one side, and in three, this condition is symmetrical. In one specimen the lower anterior temporal is cut off from the postoculars by the sixth labial. Instability of scale arrangement in the temporal area is evidently characteristic of this species.

Viperidæ

Viperinæ

Causus Wagler

Causus rhombeatus (Lichtenstein)

Plate XVIII, Figure 1

Sepedon rhombeatus LICHTENSTEIN, 1823, 'Verz. Doubl. Mus. Berlin,' p. 106.

Causus rhombeatus BOULENGER, 1896, 'Cat. Snakes,' III, p. 467, fig. 34. BOCAGE, 1896, Journ. Sci. Lisboa, (2) IV, pp. 80, 113. PERACCA, 1896, Boll. Mus. Torino, XI, No. 225, p. 4. BOULENGER, 1897, Proc. Zoöl. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 280. JOHNSTON, 1897, 'British Central Africa,' p. 361a. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 86. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 401; 1899, XLIX, p. 142. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447; 0000, Proc. Zoöl. Soc. London, II, p. 18. MOCQUARD, 1902, Bull. Mus. Hist. Nat., Paris, VIII, p. 416. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 336, 337, 347. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 44. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 169. JOHNSTON, 1906, 'Liberia,' II, p. 808. BOULENGER, 1907, Proc. Zoöl. Soc. London, p. 487. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 740; Rev. Suisse Zool., XV, p. 81. GOUGH, 1908, Ann. Transvaal Mus., I, p. 38. JOHNSTON, 1908, 'George Grenfell and the Congo,' p. 950. ODHNER, 1908, Ark. Zool., Stockholm, IV, No. 18, p. 6. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 416; IV, pp. 221, 245. WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 172, 178, Pl. xvii, fig. 3. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303. GENDRE, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cv. BOULENGER, 1910, Ann. S. African Mus., V, p. 521. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 17. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 5. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 65. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 167. LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., XLVII, No. 6, p. 24. STERNFELD AND NIEDEN, 1911, Mitt. Zool. Mus. Berlin, V, p. 385. FITZSIMONS, 1912, 'Snakes of South Africa,' p. 233. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, No. 25, p. 6. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 276. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 165. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 220, 637, 657. CHABANAUD, 1916, Bull. Mus. Nat. Hist., Paris, XXII, pp. 76, 382; XXIII, p. 13; 1918, XXIV, p. 166. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 317. CHABANAUD, 1919, Bull. Mus. Hist. Nat., Paris, XXV, p. 568. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 28; 1920, Proc. Zoöl. Soc. London, p. 295. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 472.

Causus rhombeatus bilineatus BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 114.

Causus rhombeatus tæniata STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 276.

Thirty-eight specimens of *Causus rhombeatus* were collected as follows: A. M. N. H. Nos. 11744-45, 11746-47 (February and April 1911) are from Faradje; 11724 (July 1910), Irebu; 11735-41, 11743 (November 1910), 11953-54 (May and June 1913), Niangara; 11755-56, 11757-59 (July and August 1913), Poko; 11734 (October 1910), Rungu; 11725-33 (August 1909), 11760-61 (April 1915), Stanleyville; 11762 (June 1915), Zambi.

Specimens from Natal and Matabeleland have also been examined.

This species is one of the most widely distributed of African snakes, occurring over the whole of Africa south of the Sahara, and it is in many places the most abundant form. Its range does not appear to be influenced appreciably by the Rain Forest, although it is probably less abundant inside the forest boundary. The distribution in the Ituri Region is peculiar in that it is recorded only from Stanleyville within the forest, where eleven specimens were taken, although it was taken at four localities outside the forest; and *Causus lichtensteinii*, characteristic of the forest, was not collected at Stanleyville; the suggestion being that the two species are more or less exclusive, and that *C. rhombeatus* occurs only in colonies inside the forest limits, offering an interesting question for further investigation. The number of specimens from the Sudanese localities does not sufficiently emphasize its abundance, for numbers of damaged specimens were rejected. *C. rhombeatus* was not recorded from the Sudan by Werner's expedition collecting in the Lade to the northeast of the area reached by Messrs. Lang and Chapin.

Comparison of the Stanleyville specimens with those from the open country to the north fails to discover any appreciable difference. The extremes in length are 149 mm. and 605 mm. The tail length varies from .06 to .10 of the total. The ventrals number from 131 to 152, the subcaudals in the male from 20 to 24, in the female from 16 to 23. The subcaudals are all divided except in two specimens, one of which has the last eight entire, the other the first seven. The most frequent dorsal scale count is 19-19-12, the lowest 17-17-11, the highest 20-20-14, an even number of scale rows being rather frequent. The scales of the ocular ring, without the supraocular, number from 4 to 7, usually 5; the temporals, normally 2-3, are 3-3 in one case, 2-4 in several. The loreal is normally a single shield; one specimen has loreals 1-2, three have 2-2, one has 2-4, and two have 3-3, unsymmetrical variation in this

character being rare. The upper labials are uniformly 6, or, if a small shield just touching the labial border behind be counted, 7.

The coloration is fairly uniform. In life it is "pinkish or reddish brown, with dark brown dorsal markings; chin, pinkish white, throat yellow, remainder of venter pinkish white with a metallic iridescence of blue and purple" (H. Lang). All of the specimens show a median dark line on the upper side of the tail. In many this can be seen to be the continuation of a dorsal band covering at its widest point about 9 middle scale rows (coinciding with the keeled and less obliquely placed scales). This band is rarely distinct on the anterior half of the body, while it is plainly visible in most specimens on the posterior half. The color might be said to consist of three shades of brown, the lighter ground color on the sides, the darker dorsal band, and the still darker dorsal spots on the dorsal band. The subtriangular dorsal spots have their apex directed backward, and the lateral corners more or less continuous with irregular transverse groups of small dark spots on the sides, which usually cover only the upper half of a scale. The number of dorsal spots is fairly constant, 28-30 to the anus, with occasionally a few less due to irregular spacing. The arrow-head-shaped mark on the head and nape is extremely constant, its tip on the frontal. In four of the thirty-eight specimens the dorsal spots are outlined with white dots, a character which does not appear to be related to age or sex.

A single specimen, No. 11741, the largest in the series, has much larger and hence fewer dorsal spots; has the labials sharply outlined with black, instead of shagreened; has the triangular head mark truncate in front, with a transverse mark in front of it, and another on the prefrontals; has the ventrals strongly dark-edged; and has an unusually long tail. This specimen probably represents an extreme of individual variation in the Sudanese specimens. In specimens from Natal, in The American Museum of Natural History, the labials are always black-edged, and in two the venter is entirely dark on its middle half. These also lack the dorsal band, a row of narrow elongate spots taking the place of the line on the tail in the northern specimens.

The food of this species appears to consist of frogs and toads, two of the series under discussion having swallowed frogs and one a toad, while frequent mention of the frog-eating habit is to be found in the literature. Fitzsimons (1912, p. 233) speaks of the abundance of night adders in houses and woodsheds in search of mice. Specimens in captivity, however, were fed upon frogs and toads.

"Common along roads about Niangara; ten specimens were rejected as too badly damaged for preservation. Common near Faradje. Said to be abundant in gardens at Irebu" (H. Lang).

One specimen was found to be badly infested with ticks.

***Causus lichtenstenii* (Jan)**

Plate XIX

Aspidelaps lichtensteinii JAN, 1859, Rev. Mag. Zool., p. 511.

Causus lichtensteinii BOULENGER, 1896, 'Cat. Snakes,' III, p. 470; WERNER, 1899, Ver. Zool. Bot. Ges. Wien, XLIX, p. 142. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 216. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 416; IV, p. 245. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 615. PERACCA, 1910, in 'Il Ruwenzori,' p. 9. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 277. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 221, 637; 1919, Rev. Zool. Africaine, VII, p. 28; 1920, Proc. Zoöl. Soc. London, p. 296.

Represented in the collection by twenty-seven specimens: A. M. N. H. No. 11767 (September 1913) is from Akenge; 11763 (February 1914), 11764 (October 1909), Avakubi; 11773-79, 11780-88 (April and June 1914), Medje; 11765-66 (December 1909), N'Gayu; 11768-69, 11770-72 (November and December 1913), Niapu.

Causus lichtensteinii (Jan) is the most distinct of the four members of the genus, and is confined to the Rain Forest, while *C. resimus* and *C. defilippi* are found in the Savannah Province, and *C. rhombeatus* in both Savannah and Forest.

This species is one of the least variable of snakes, certain characters being almost absolutely stable. The greatest length observed is 572 mm. The proportionate tail length varies from .08 to .10 in the male (average .090), and from .07 to .08 in the female (average .074). The ventrals number from 133 to 149, the subcaudals in the male from 18 to 22, in the female from 17 to 19. The normal dorsal scale count is 15-15-11, and this is deviated from in only four specimens of the twenty-seven, and in these only near the base of the tail, where three of them have 10 scales and the other 9. The labials are constantly 6 above and 9 below. The oculars are usually 6, 5 in three specimens, and 7 in one. The temporals are in every specimen 2-3, the loreals 1-1 in all except one specimen, which has 2 on one side. The first and second upper temporals are about as long together as the first lower, while in *Causus rhombeatus* the first upper temporal is nearly as long as the lower.

Müller (1910, p. 616) has described the coloration in this species for both adult and juvenile stages. The narrow dark chevrons described by Boulenger as pointing forward and by Müller as directed backward are in most cases indistinct. In one or two specimens, however, these cross-

bands reach a more complete development as rhombic markings, so that both descriptions may be correct, though a backward direction of the chevrons is normal.

The juvenile coloration is even more distinct than in Müller's description. The smallest specimen (137 mm.) is dark brown above; a white line from the rostral over the canthus, above the eye, across the temporals to the corner of the mouth, joining a second on the border of the upper labials. A prominent white V, with the apex at the parietal suture, on the nape, edged anteriorly with darker brown. About 18 dark chevrons, the points directed backward, most distinct at mid-body. Venter anteriorly with dark crossbands the light interspaces invading the sides. Three of these are distinct and subequally spaced, while the remainder are indicated only by symmetrical white notches reaching the third scale row, the notch as wide as 2 ventrals, the interspace about 14. The tail has a white band, 5 dorsal scales in width, at its base, and another, 2 scales wide, near the tip. No. 11788, 171 mm. in length, agrees perfectly with this description while in a specimen of 248 mm. the tail bands are entirely lost.

Of the characters of the juvenile color pattern, the white V on the nape is most persistent, although in many of the adults of the present series (unfortunately much darkened by preservation in formalin) it is entirely invisible. The dark chevrons are frequently entirely obscured, the dorsal color being a uniform glossy bluish olive. As in *Causus rhombeatus*, the presence of white marks on the edges of the scales, originally probably as outlines of the dark chevrons, is an inconstant character; these crossrows of white spots may persist after the entire disappearance of any other color pattern.

ATRACTASPIS Smith

Atractaspis irregularis (Reinhardt)

Plate XVIII, Figure 2

Elaps irregularis REINHARDT, 1843, Danske Vidensk. Selsk. Afh., X, p. 264, Pl. III, figs. 1-3.

Atractaspis irregularis JAN, 1858, Rev. Mag. Zool. p. 518. BOULENGER, 1896, 'Cat. Snakes,' III, p. 513; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 280. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 84. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 143. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447. JOHNSTON, 1906, 'Liberia,' II, p. 808, fig. 306. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1886. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, p. 222. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 167. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 223, 640. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 382.

LOVERIDGE, 1916, Journ. E. Africa Uganda Nat. Hist. Soc., V, No. 10, p. 80.
 CHABANAUD, 1917, Bull. Mus. Hist. Nat., Paris, XXIII, p. 14. BOULENGER,
 1919, Rev. Zool. Africaine, VII, p. 29; 1920, Proc. Zool. Soc. London, p. 298.
 CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française,
 p. 472.

Four specimens from the forest border: A. M. N. H. No. 12353 (November 1910), 12355-56 (April and May 1913), Niangara; 12357 (June 1913), Rungu.

The distribution of the species of *Atractaspis* is interesting, although the scarcity of individuals and records introduces an element of uncertainty into deductions of range, counterbalanced, perhaps, by the recognized value of burrowing forms for the discussion of distributional problems. *Atractaspis irregularis* appears to be a forest border species, ranging from Liberia and Togo to Uganda and thence to San Salvador du Congo and Chinchoxo on the southern border. The two localities added by the present collection link the Nigerian records with those from the lake region.

The four specimens are very uniform in essential characters. The largest measures 578 mm., tail 34 mm., .06 of the length. The ventrals number from 231-244, the subcaudals 22-25. The dorsal scales are 25-25-31, in two specimens, 25-27-21 and 25-27-23 in the others. The upper labials are 5, the lower 5 in one specimen, 6 in three.

No field notes regarding the habits of this species are available, the specimens having been secured by natives.

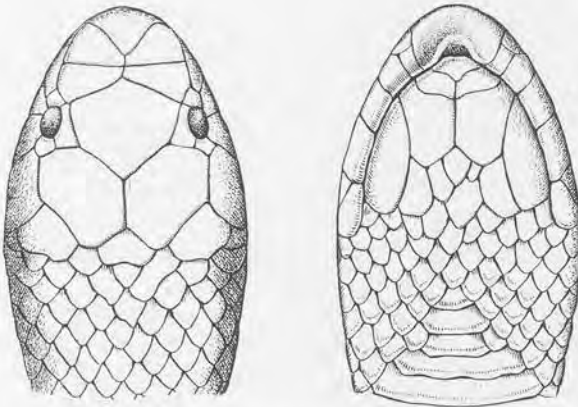


Fig. 15. Dorsal and ventral views of head of *Atractaspis corpulenta* (Hallowell), (12358, $\times 2$).

Atractaspis corpulenta (Hallowell)

- Brachycranion corpulenta* HALLOWELL, 1854, Proc. Acad. Nat. Sci. Phila., p. 99.
Atractaspis corpulentus HALLOWELL, 1857, Proc. Acad. Nat. Sci. Phila., p. 70.
Atractaspis corpulenta BOULENGER, 1896, 'Cat. Snakes,' III, p. 514. JOHNSTON, 1906, 'Liberia,' II, p. 808. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 417. WERNER, 1913, Mitt. Nat. Mus. Hamburg, XXX, p. 32. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 223; 1919, Rev. Zool. Africaine VII, p. 29; 1920, Proc. Zoöl. Soc. London, p. 298.

A single specimen, A. M. N. H. No. 12358, taken at Medje, in April 1914, extends the range of this species throughout the forest area. It has been previously recorded from Liberia, Cameroon, and Gaboon.

The specimen, a male, measures 521 mm., of which the tail occupies 46 mm. (.09 of the total length). Ventral plates, 1915, subcaudals, 25; dorsal scales 23-25-20; five upper and six lower labials.

Atractaspis bibroni Smith

- Atractaspis bibroni* SMITH, 1849, Ill. Zoöl. S. Africa, Rept., Pl. LXXI. BOULENGER, 1896, 'Cat. Snakes,' III, p. 515; 1908, Ann. Natal Mus., II, p. 231. ODHNER, 1908, Ark. Zool., Stockholm, IV, No. 8, p. 6. BOULENGER, 1910, Ann. S. African Mus., V, p. 523. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 5. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 58; 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 251. NIEDEN, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 450. WERNER, 1913, Mitt. Nat. Mus. Hamburg, XXX, p. 34. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 640.
Atractaspis rostrata GÜNTHER, 1868, Ann. Mag. Nat. Hist., (4) I, p. 429, Pl. XIX, fig. 1. BOULENGER, 1896, 'Cat. Snakes,' III, p. 514. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 100. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 640.

A single juvenile specimen, A. M. N. H. No. 12354, taken at Garamba in June 1912, is referred to this species.

Whether identified as *Atractaspis rostrata* or *bibroni* this specimen extends the range of the species to the northeast, and adds a species of distinctly East African origin to the Sudanese fauna. The overlapping of East African species into the Sudanese Subprovince is in fact a much less frequent phenomenon than the reverse.

The writer follows Werner (1913, p. 33) in uniting *Atractaspis rostrata* with *A. bibroni*, although with some hesitation. Unfortunately there is no available material of the latter species for comparison, and the single juvenile specimen at hand does not suffice for a definite conclusion. In one respect, however, and in what Werner regards as the most important for a possible distinction of the two species, the present specimen completes his argument for uniting the two. He finds that the northern (Tanganyika Territory) specimens (*rostrata*) have 23 dorsal scale rows, the southern (typical *bibroni*), 21. The present specimen agrees with

bibroni in having 21 dorsal scales and with *rostrata* in having a well-defined horizontal edge on the rostral.

Total length 205 mm., tail 13 mm. The ventral plates number 246, the subcaudals 24. The dorsal scale count is 19-21-19. Labials 5 above and below.

The color is brown, the scales distinct.

***Atractaspis aterrima* Günther**

Atractaspis aterrima GÜNTHER, 1863, Ann. Mag. Nat. Hist., (3) XII, p. 363. BOULENGER, 1896, 'Cat. Snakes,' III, p. 515. MOCQUARD, 1896, Bull. Mus. Hist. Nat., Paris, II, p. 60. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 216. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, Pl. I, p. 1886. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 417; 1910, IV, p. 222. BOULENGER, 1915, Proc. Zoöl. Soc. London, p. 640; 1920, p. 298. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 472.

A single specimen, A. M. N. H. No. 12352, collected at Niangara in November 1910, links the west African records (Portuguese Guinea to Cameroon) with the central African (Uganda), and the species illustrates a consistent Sudanese range, as *Atractaspis corpulenta* does a forest distribution.

The specimen measures 569 mm., tail 32 mm. The ventral plates number 277, the subcaudals 24. The dorsal scales are 19-21-19. The labials number 5 above and 6 below. It agrees with the description of Boulenger (1896, p. 575) in every respect except for the extension of the large temporal to the labial border, between the fourth and fifth upper labials; an anomaly readily enough accounted for as an individual character.

"Was tied to a stick and appeared to be lifeless. Intending to take it behind the head, I was surprised at the extraordinary rapidity of its movements. It succeeded in stabbing me with one of its fangs near the finger nail; but immediate application of permanganate of potash probably prevented serious developments. The natives regard them as very poisonous" (H. Lang).

***Atractaspis heterochilus* Boulenger**

Atractaspis heterochilus BOULENGER, 1901, Ann. Mus. Congo, (1) II, p. 13, Pl. v, fig. 1; 1915, Proc. Zoöl. Soc. London, p. 223; 1919, Rev. Zool. Africaine, VII, p. 29; 1920, Proc. Zoöl. Soc. London, p. 298.

The second specimen, A. M. N. H. No. 11901, of this distinct species was collected at Medje, the type locality being Albertville on the Tanganyika. Although the latter locality is outside the actual limit of the

Rain Forest, there can be no question that it is to be considered a forest species, particularly as its closest relations are with *Atractaspis reticulata* from the forest of Cameroon.

The specimen recorded by Werner (1913, Mitt. Nat. Mus. Hamburg, XXX, p. 32) appears to be more closely related to *Atractaspis reticulata* than to *A. heterochilus*. The present specimen has 353 ventral plates, the one recorded by Boulenger 341, and it agrees in having 23 dorsal scale rows. *A. reticulata* has 308-330 ventrals and 21 dorsal scales. Werner's specimen agrees with the latter in number of ventrals (328) and with *A. heterochilus* in having 23 dorsal scales. Taking into account the type locality of each species it seems simplest to amend the diagnosis of *A. reticulata* to "dorsal scales 19-23," rather than to extend the range of ventrals in *heterochilus* from 353 to 328. Indeed, on the latter basis, the two species must be united. It seems preferable to emphasize the difference in number of ventrals between the specimens from the Gaboon-Cameroon area, and those from the eastern part of the Rain Forest, although the two forms are certainly closely related, and may prove to be subspecies.

The specimen is a male of 816 mm. length, of which the tail measures 30 mm., Boulenger's specimen measuring 520 mm. The ventrals number 353, the subcaudals 23; the dorsal scales are 19-23-19, as in the Tanganyika specimen. In every character of head scales it agrees perfectly with Boulenger's figure and description. The pink mental and supralabials appear to be a unique and distinctive color character, still plainly marked in the alcoholic specimen.

"General color dark bluish gray, the dorsal scales light-edged, making them very evident. Ventrals similarly edged with gray. Mental and first lower labials pink, as are the first upper labials. Taken on the ground in the forest" (H. Lang).

BITIS Gray

Bitis arietans (Merrem)

Plate XXII, Figure 1

Vipera (Echidna) arietans MERREM, 1820, 'Tent. Syst. Amphib.,' p. 152.

Bitis arietans GÜNTHER, 1858, 'Cat. Snakes,' p. 268. BOULENGER, 1896, 'Cat. Snakes,' III, p. 493; 1897, Proc. Zoöl. Soc. London, p. 801; Ann. Mag. Nat. Hist., (6) XIX, p. 280. JOHNSTON, 1897, 'British Central Afrika,' p. 361a. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 401. FERREIRA, 1898, Journ. Sci. Lisboa, (2) IV, p. 245. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' 447; Proc. Zoöl. Soc. London, II, p. 18. LAMPE, 1902, Jahrb. Nassau. Ver. Naturk., LV, p. 42. SHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 178. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 336, 348. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 216; Proc. Zoöl. Soc. London, p.

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255; 1907, p. 487; Mem. Proc. Manchester Lit. Philos. Soc., LI, part 3, p. 12. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 740. WERNER, 1907, Sitzber. Akad. Wiss. (math.-natur.), Wien, CXVI, part 1, p. 1885. BOULENGER, 1908, Ann. Natal Mus., I, p. 230. GOUGH, 1908, Ann. Transvaal Mus., I, p. 39. ODHNER, 1908, Ark. Zool., Stockholm, IV, No. 18, p. 6. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, IV, pp. 221, 245, 247. WERNER, 1908, 'Rept. Wellcome Res. Lab. Khartoum,' p. 182, Pl. xviii, fig. 1. BOULENGER, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 303. CHUBB, 1909, Extr. C. R. Soc. Linn. Bordeaux, p. cvi. PELLEGRIN, 1909, Bull. Mus. Hist. Nat., Paris, XV, p. 414. BOULENGER, 1910, Ann. S. African Mus., V, p. 522. LÖNNBERG, 1910, in Sjöstedt, 'Kilimandjaro-Meru Exp.,' I, part 4, p. 18. MEEK, 1910, Publ. Field Mus., Zool., VII, p. 405. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 5. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 99. STERNFELD, 1910, Mitt. Zool. Mus. Berlin, V, p. 385. WERNER, 1910, Denschr. Med. Naturw. Ges. Jena, XVI, p. 366. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 167. LÖNNBERG, 1911, Svenska Vetensk.-Akad. Handl., Stockholm, XLVII, No. 6, p. 24. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 251. FITZSIMONS, 1912, 'Snakes of South Africa,' p. 220, figs. 89-94. PERACCA, 1912, Ann. Mus. Zool. Napoli, (2) III, p. 7. STERNFELD, 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 277. BOETTGER, 1913, 'Wiss. Ergeb. Reise Ostafrika, Voeltzkow,' III, pp. 354, 362, 364. HEWITT AND POWER, 1913, Trans. Roy. Soc. S. Africa, III, p. 165. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 287. WERNER, 1913, in Brehm's 'Tierleben,' 4th Ed., V, p. 518. PELLEGRIN, 1914, in 'Doc. Sci. Miss. Tilho,' III, p. 126. BOULENGER, 1914, Proc. Zoöl. Soc. London, pp. 221, 638, 657. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, pp. 80, 382; 1917, XXIII, p. 13; 1918, XXIV, p. 166. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 316. CHABANAUD, 1919, Bull. Mus. Hist. Nat., Paris, XXV, p. 568. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 28. WERNER, 1919, Denkschr. Akad. Wiss. Wien, math. naturw. Kl., XLVI, p. 509. BOULENGER, 1920, Proc. Zoöl. Soc. London, p. 296. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 472.

Vipera arietans TERNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 86.

Fifteen specimens of the puff adder were collected as follows: A. M. N. H. No. 11794 (February 1911), 11795-96 (March 1911), 11797 (April 1911), 11798 (July 1912), Faradje; 11789-93 (November 1910), 11802-03 (June 1913), Niangara; 11800 (August 1913), Poko; 11799 (June 1913), Rungu; 11801 (tag corroded), Uele District, Belgian Congo.

Bitis arietans is scarcely less common and even more widespread than *Causus rhombeatus*, but does not occur within the borders of the Rain Forest. Its range covers almost the whole of Africa except the forest, extending nearly to the forest border, as at Poko. Its occurrence in Barbary and Arabia is of especial interest. For further discussion of the distribution of this genus, see below, under *Bitis nasicornis*.

The fifteen specimens examined are very uniform in coloration and in scale characters. The largest specimen measures 808 mm. The tail

length varies in the males from .10 to .14 of the total, in the females from .06 to .08. The ventrals number from 137 to 147; the females from 17 to 19. 29-33-23 may be accepted as the most usual scale count, with extremes at 27-29-21 and 31-35-23. Uniformly 1 scale between nasal and rostral, 2 between the nasals, 2 between the oculars and labials. 8-10 scales from eye to eye, 12-15 about the eye. Upper labials 12-14, lower, 15-18.

The color and marking of the specimens from the Uele District is in every way normal and not distinguishable from that of either more southern or more northern specimens.

***Bitis gabonica* (Duméril and Bibron)**

Plate XX

Echidna gabonica DUMÉRIL AND BIBRON, 1854, 'Erpétol Gén.,' VII, p. 1428, Pl. LXXXb.
Bitis gabonica BOULENGER, 1896. 'Cat. Snakes,' III, p. 449. JOHNSTON, 1897 'British Central Africa,' p. 361a. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 142. BOULENGER, 1902, in Johnston, 'Uganda Protectorate,' p. 447. JOHNSTON, 1902, 'Uganda Protectorate,' pp. 94, 409, color plate. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 348. FERREIRA, 1903, Journ. Sci. Lisboa, (2) VII, p. 14. JOHNSTON, 1906, 'Liberia,' II, p. 807, fig. 306. BOULENGER, 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 12. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 416; IV, p. 221. VOSSLER, 1908, Zool. Beob. Frankfurt, XLIX, p. 167, Pl. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 617. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 167. MÜLLER, 1913, Zool. Anz., XLI, p. 234. WERNER, 1913, in Brehm's 'Tierleben,' 4th Ed., V, p. 524. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 221, 638; 1919, Rev. Zool. Africaine, VII, p. 28; 1920, Proc. Zoöl. Soc. London, p. 296. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 472.

Twenty-five specimens of the Gaboon viper were collected, of which fourteen are preserved in alcohol and eleven represented by dried skins and skulls. The following localities are represented: A. M. N. H. Nos. 11812-14, 11815-20 (September and October 1913), Akenge; 11808 (November 1909), 11809-10 (September and November 1913), Avakubi; 11804 (February 1910), Gamangui; 11805 (June 1910), 11825 (December 1913), Medje; 11806-07, 11811, 11826 (November 1910), Niangara; 11821-22, 11823-24 (October and December 1913), 10093 (January 1914), Niapu; 11827 (tag corroded), Belgian Congo.

This species ranges throughout the forest and is recorded from Togo, Angola, Northern Rhodesia, and Tanganyika Territory outside of the forest proper, closely paralleling the distribution of certain lizards, *Mabuya maculilabris* for example. The distribution of the species of this genus has been mapped in connection with the discussion of *Bitis nasicornis*, below.

Scale characters are fairly constant in this series. The extremes and means of length and proportionate tail length are, in seven males, 414–1100 mm., mean 682 mm., tail length .09 to .12, mean .10; in six females the extremes are 443–1297 mm., mean 782 mm., tail length .05 to .06, mean .06. The sexes are sharply distinguished by this character and also by the number of subcaudals, which is 18–20 in females, 27–32 in males. The ventrals number from 128 to 139. The scales about the body are normally 39, varying from 35 to 43. The extremes in scale count are 33–35–25 and 39–43–27. The upper labials vary from 13–16, the lower from 16–19.

Stomach contents are recorded in two specimens, No. 11812 contained a large bird (a rail) about the size of a pigeon, No. 11823, a water rat. Frogs are also taken.

***Bitis nasicornis* (Shaw)**

Plate XXI

Coluber nasicornis SHAW, 1802, 'Nat. Miscell.,' III, Pl. xciv.

Bitis nasicornis BÜTTIKOFER, 1890, 'Reisebilder aus Liberia,' II, p. 444. BOULENGER, 1896, 'Cat. Snakes,' III, p. 500. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 17. SJÖSTEDT, 1897, Bihang Svenska Vetensk.-Akad. Handl., Stockh. l'm, XXIII, part 4, p. 27. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 142. BOULENGER, 1900, Proc. Zool. Soc. London, p. 445. TORNIER, 1901, Zool. Anz., XXIV, p. 64. BOCAGE, 1903, Journ. Sci. Lisboa, (2) VII, p. 44. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 216. JOHNSTON, 1906, 'Liberia,' II, p. 807, fig. 306; 1908, 'George Grenfell and the Congo,' II, p. 950. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 416; 1912, 'Wiss. Ergeb. Deutsch. Zentr. Afrika Exp.,' IV, p. 199. BOULENGER, 1915, Proc. Zool. Soc. London, pp. 222, 638. CHABANAUD, 1916, Bull. Mus. Hist. Nat., Paris, XXII, p. 382. LOVERIDGE, 1918, Journ. E. Africa Uganda Nat. Hist. Soc., No. 13, p. 316. BOULENGER, 1919, Rev. Zool. Africaine, VII, p. 28; 1920, Proc. Zool. Soc. London, p. 296. CHABANAUD, 1921, Bull. Com. Études Hist. Scient. Afrique Occ. Française, p. 472.

Vipera nasicornis TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 85.

Thirty specimens of this species were collected, sixteen preserved in alcohol, fourteen represented by dried skins and skulls, from many localities in the forest: A. M. N. H. Nos. 11840–42, 11843 (September and October 1913), Akenge; 10090, 11831, 11854 (October 1909), Avakubi; 11830 (September 1909), Batama; 11832–36 (February 1910), Gamangui; 11837–38 (August 1910), 11851, 11852–53 (April and June 1914), Medje; 11844–49, 11850 (November and December 1913), Niapu; 11839 (August 1913), Poko; 11828–29 (August 1909), Stanleyville; 11855–56 (tags corroded), Belgian Congo.

Bitis nasicornis is practically confined to the continuous Rain Forest but has been recorded from Portuguese-Guinea by Boulenger. It is

unknown east or south of the forest, and must be considered a typical Rain Forest form.

The color patterns of *Bitis gabonica* and *B. nasicornis* distinguish them immediately from all other species of the genus, and it is natural enough that brown, purple and bright yellow should replace the more grayish hues of the Savannah species. In the case of vipers so formidable as these two species, their patterns are probably to be considered as a warning coloration, although in their natural habitat they are doubtless much less conspicuous than would be supposed.

The specimens range in length from 317 mm. to 1050 mm. The largest female measures 1050 mm., the largest male, 944 mm. The proportion of tail length to total length is .07 to .08 in females, mean .08, in the males, .10 to .15, mean .14. The ventral plates vary from 122 to 132, the subcaudals from 25 to 30 (mean 27) in males, and from 17 to 21 (mean 19) in females. The scale counts range from 29-35-23 to 33-41-25, the most usual being 33-39-23. The labials vary from 16 to 18 above and from 16 to 19 below. There are practically no variations of importance in the scutellation of the head.

A female taken at Gamangui February 16, 1920, contained thirty-one foetal young, arranged in two rows of fifteen and sixteen respectively. These young, coiled tightly on one side of the remains of the yolk, measure 200 to 210 mm. in length and show the color pattern very distinctly.

ATHERIS Cope

Atheris squamigera (Hallowell)

Plate XXII, Figure 2

Echis squamigera HALLOWELL, 1854, Proc. Acad. Nat. Sci., Phila., p. 193.

Atheris squamigera BOULENGER, 1896, 'Cat. Snakes,' III, p. 509; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 280. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 17. TORNIER, 1897, 'Kriechtiere Deutsch-Ost-Afrikas,' p. 85. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 401; 1899, XLIX, p. 142. BOULENGER, 1900, Proc. Zoöl. Soc. London, p. 456; 1902, in Johnston, 'Uganda Protectorate,' p. 447. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 348. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 114; Ann. Mus. Stor. Nat. Genova, (3) II, p. 216. FERREIRA, 1906, Jorn. Sci. Lisboa, (2) VII, p. 169. STERNFELD, 1908, Mitt. Zool. Mus. Berlin, III, p. 417. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 617. DESPAX, 1911, in Cottés, 'La Mission Cottés au Sud-Cameroun,' p. 240. BOULENGER, 1915, Proc. Zoöl. Soc. London, pp. 222, 639; 1919, Rev. Zool. Africaine, VII, p. 28; 1920, Proc. Zoöl. Soc. London, p. 297.

Forty-one specimens of *Atheris squamigera* were collected from localities in the Ituri forest: A. M. N. H. Nos. 11868-69 (October 1913), Akenge; 11857-58 (August and October 1909), Avakubi; 11859, 11861-

64 (August and September 1910), 11892-96 (June and July 1910), 11883, 11884-91 (March and April 1914), Medje; 11867 (July 1913), Nala; 11870-77, 11878-82 (November and December 1913), Niapu; 11865-66 (October 1910), Rungu.

This species ranges throughout the main area of the Rain Forest, but does not appear in the Liberian (western) area. It is recorded from Togo to the west and Tanganyika Territory to the east, but is rare in both these areas, where it doubtless occurs only in the forest islands. In the Cameroon and Gaboon region it is very abundant, and it evidently is one of the most common elements of the forest fauna.

The present series is much more uniform than the series referred to by Boulenger (1896, p. 509) from the western part of the forest. The maximum length in twenty males is 657 mm., in twenty females, 712 mm. The proportion of tail length to total varies from .15-.19, mean .18, in the males, and from .14-.18, mean .16, in the females. The ventrals number from 153-163; the subcaudals in males from 50-65 (mean 59), in females from 45-57 (mean 50). The dorsal scale count ranges from 15-15-11 to 23-23-17, the usual count at mid-body being 19, but the number of rows is frequently even. Scales across the head from eye to eye 6-9; scales in the ocular ring 12-18; labials 7-12 above, usually 10, 10-13 below, usually 11. The median scale above the rostral is divided in nine specimens. The scales from the mental to the first ventral plate are usually 6; the gulars from the angle of the mouth to the first ventral 5 or 6.

The suboculars rest directly on the labials without an intervening scale row. The first part of lower labials forms a suture behind the mental in thirty-five specimens, a separate chin-shield being cut off in six.

The coloration is very uniform, and indeed characteristic. The dorsum is dark green, with yellow-tipped scales arranged in about thirty-two crossrows on the body. These crossrows are frequently entirely obscured, but usually persist in a pair of light spots at the edge of the venter. The venter is dark green like the dorsum, the throat yellow.

Stomach contents are recorded as rats and mice in three specimens, and a mass of hair was found in the posterior part of the intestine in two specimens.

***Atheris læviceps* BËTTGER**

Atheris læviceps BËTTGER, 1887, *Zool. Anz.*, X p. 651; 1888, *Ber. Senck. Ges.*, p. 92, Pl. II, Fig. 7. BOCAGE, 1895, '*Herpétol. Angola*,' p. 153.

Atheris squamiger (part) BOULENGER, 1896, '*Cat. Snakes*,' III, p. 509.

Two specimens, A. M. N. H. Nos. 11898-99, taken at Banana, Lower Congo, in July 1915.

Comparison of these two specimens with the large series of *Atheris squamigera* from the Ituri leads to the conclusion that they represent a very distinct form. Unfortunately there is no material available for comparison with Gaboon or Cameroon *squamigera*; and in reviving Bœttger's species, described from the identical locality, it is merely desired to emphasize the observed distinction. It seems probable that a subspecific rank may prove the best expression of the relations of *Atheris chloroechis*, *squamigera*, and *læviceps*.

Atheris læviceps is known only from the limited area near the mouth of the Congo.

The chief characters on which *læviceps* is based are (1) a group of smooth scales on top of the head, (2) a row of scales between the suboculars and supralabials, (3) distinctive coloration. Both specimens agree excellently in these characters, but the number of keeless scales on the head is 3-5 instead of 10.

In addition to these characters, direct comparison with *squamigera* establishes a number of other differences, chiefly in minor characters, but apparently correlated. These are (1) distinctive habitus, body more compressed, head smaller, and orbit well arched above the canthus; (2) scales about the body 23-23-15 and 25-25-19, as described by Bœttger; (3) two symmetrical suprarostrals, in both specimens; (4) seven scales from first ventral to the angle of the mouth; (5) seven scales from mental to first ventral (six scales in both directions in *squamigera*); (6) lateral scale rows more oblique; (7) a slightly higher number of supralabials, 11-13 in one, 13-13 in the other.

Both specimens are males, measuring 427 and 407 mm. respectively, of which the tail occupies 64 and 59 mm. Ventral plates 159 and 161, subcaudals 50 and 47. Scales from eye to eye on top of head, 8, in the ocular ring, 15-17.

The color of the dorsum is a light yellow mottled over all with green spots (scales), venter immaculate yellow. Müller (1910, p. 617) has described a similar coloration in Cameroon specimens; and Boulenger (1896, p. 509) refers to this coloration in *squamigera*, but bases it possibly on his inclusion of *Atheris læviceps* with that species.