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Article II.—CONTRIBUTIONS TO THE HERPETOLOGY OF THE BELGIAN CONGO BASED ON THE COLLECTION OF THE AMERICAN MUSEUM CONGO EXPEDITION, 1909–1915[1]

Part I. Turtles, Crocodiles, Lizards, and Chameleons

By Karl Patterson Schmidt

With Field Notes by Herbert Lang and James P. Chapin

Plates VII to XXXII, 22 Maps, and 27 Text Figures

CONTENTS

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

INTRODUCTION

The American Museum Congo Expedition, under the direction of Herbert Lang and James P. Chapin, returned from the Belgian Congo with an unusually large and well preserved collection of reptiles and batrachians, consisting of more than 4000 specimens. With 71 turtles, 13 crocodiles, and 1509 lizards, this is the largest collection, in number of specimens, ever brought from Africa by a single expedition.

These specimens are distributed among the following families:

Turtles

		Number of specimens
Testudinidæ	1 genus, 2 species	49
Pelomedusidæ	2 genera, 3 species	22

Crocodiles

Crocodylidæ	2 genera (1 new), 3 species (1 new)	13

LIZARDS

		Number of specimens
Geckonidæ	3 genera, 10 species (3 new)	246
Agamidæ	1 genus, 2 species	147
Varanidæ	1 genus, 2 species	32
Lacertidæ	6 genera, 7 species (3 new)	195
Gerrhosauridæ	1 genus, 2 species	29
Scincidæ	3 genera, 12 species (1 new)	540
Anelytropidæ	1 genus, 1 species	6

CHAMELEONS

Chamæleontidæ	2 genera, 8 species (2 new)	314

All of the Central African families of lizards are represented, with the exception of the Amphisbænidæ. Ten of the fifty-two species are described as new. In addition to these, fifteen are rare forms, many for the first time collected in adequate series.

The chief value of the present paper must be credited to Messrs. Lang and Chapin. It is impossible adequately to express the admiration due these men for their field work. The field notes, the exact locality labels, and the remarkably fine condition of the specimens are the evidence of the highest degree of enthusiasm and efficiency. Through the courtesy of Dr. Wm. T. Hornaday, Director of The New York Zoological Society, we have been able to reproduce the photographs of *Crocodylus niloticus* Laurenti and *Osteolæmus tetraspis* Cope (Plates XII and XIII). All other photographs were taken in the field by Mr. H. Lang, and the figures on Plate XXXII have been selected from seventeen color sketches made from life by Mr. J. P. Chapin. The drawing of the head of *Algiroides alleni* (Text Figure 16) has been kindly contributed by Dr. Thomas Barbour. The other illustrations were made under the author's direction: Figs. 1, 6, 7, 12 to 15, 18 to 24, 27, and the two figures on Plate XV by Mr. M. Nishimura; the others by Mrs. Helen Ziska.

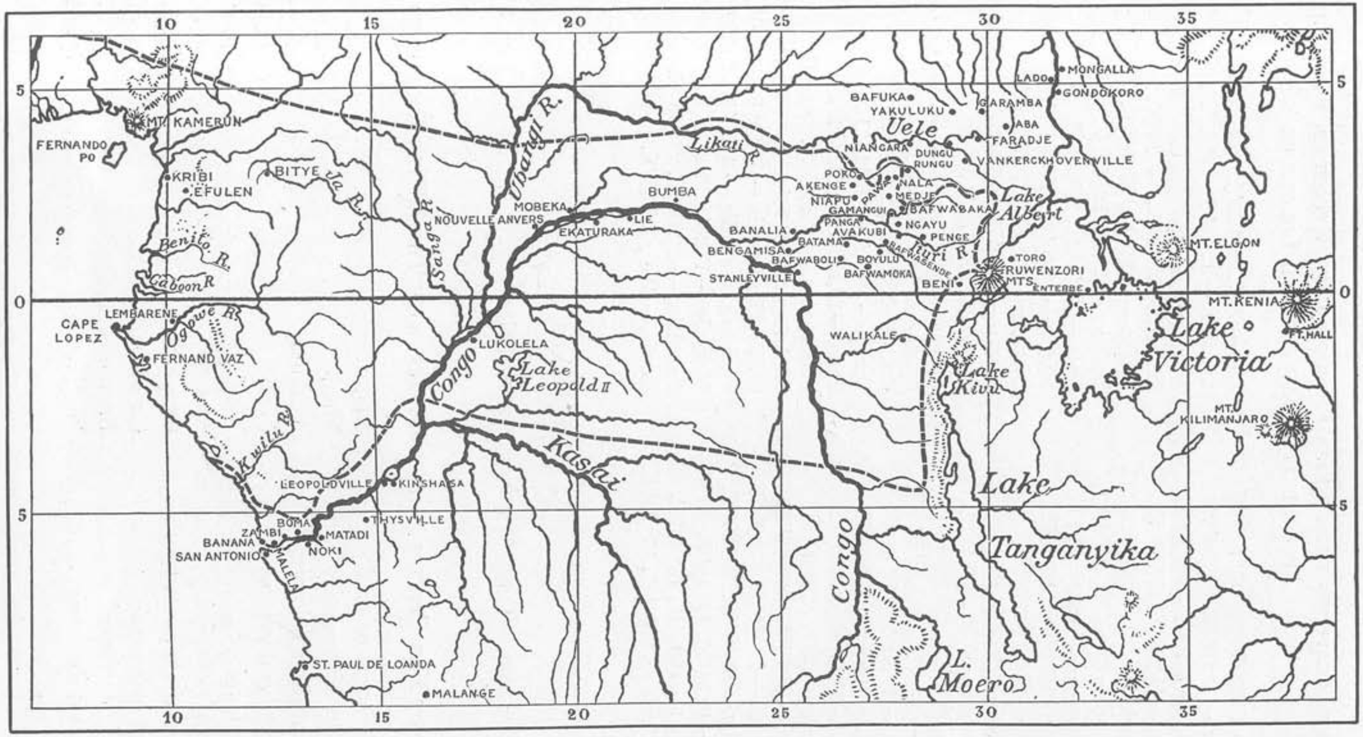
A large amount of bibliographical work has been necessary in the course of the present study. The literature for the turtles was brought down to 1909 by Siebenrock and the references here added complete the bibliographies of the species considered to 1916. No comprehensive work on African lizards has been done since 1887, the date of the last volume of Dr. Boulenger's Catalogue. In the hope of facilitating reference to the voluminous literature of African herpetology for other workers, the full bibliography examined has been quoted in most cases. Unfortunately, these bibliographies are in no sense complete. Many works and some periodicals have been inaccessible and, as attention has been directed chiefly to distributional and systematic papers, morphological works have not been included. Available records of localities of the species dealt with have been used in mapping the ranges. The deductions to be drawn from the data introduce a geographical element, showing a certain correlation between the distribution of these species and the great uniformity of the botanical regions (Map 2, p. 399), whose limits practically coincide with the large faunal areas. In the main, however, the acceptance of locality records from the literature without examination of specimens has of necessity been uncritical.

The systematic work was greatly handicapped by the lack of African material for comparison. The large series of most species in the present collection have accordingly been of the greatest value, the collection, to a degree, carrying its own "comparison material" with it. With the single exception of the small collections from East Africa at the Field Museum in Chicago, nearly all of the African material available in the United States which could in any way relate to the species of the present collection has been examined. The writer's thanks are due to the authorities of The Academy of Natural Sciences of Philadelphia and to Henry W. Fowler of that institution for the loan of West African specimens, including the types of species described by Edward Hallowell. Dr. A. G. Ruthven has loaned a small but interesting collection of lizards from Kamerun. Dr. Leonhard Stejneger, Curator of Herpetology at the United States National Museum, kindly permitted the writer to examine a part of the East African material of the Roosevelt Expedition. Dr. Thomas Barbour of the Harvard Museum of Comparative Zoology has furthered the present work with valuable advice and cooperation, as well as by giving the writer access to the fine collections of that museum.

Within The American Museum of Natural History, the cooperation of Messrs. Lang and Chapin, whose intimate knowledge of African conditions has been constantly available, has been cordial and invaluable. Dr. J. Bequaert has made many careful identifications of stomach contents, has assisted the writer in the technical details of the manuscript, and has supplied important suggestions, from his field knowledge of African botany, for the present studies of distribution. In the figures of *Varanus* and crocodile skulls the nomenclature in use by Dr. W. K. Gregory has been followed.

The field notes of the collectors are of unusual value because of their long stay in the Ituri region and their consequent familiarity with the environment. Ecological notes for many of the species are here presented for the first time.

Much of the material is available for morphological study, which has not been attempted in the present paper.



Map 1. The Central African region traversed by The American Museum Congo Expedition, showing the localities from which specimens are recorded in the present paper, as well as some others mentioned. The limits of the continuous Rain Forest are indicated, as in the succeeding maps of distribution, by a broken line.

List of Localities from which Specimens are Recorded, with Their Approximate Latitude and Longitude

Aba.— 3° 50′ N., 30° 10′ E.
Akenge.— 2° 55′ N., 26° 50′ E.
Avakubi.— 1° 20′ N., 27° 40′ E.
Bafuka.— 4° 20′ N., 27° 50′ E.
Bafwabaka.— 2° 10′ N., 27° 50′ E.
Bafwaboli.— 0° 40′ N., 26° 10′ E.
Bafwasende.— 1° 10′ N., 27° E.
Banalia.— 1° 30′ N., 25° 40′ E.
Banana.— 6° S., 12° 20′ E.
Batama.— 1° N., 26° 40′ E.
Bengamisa.— 1° N., 25° 10′ E.
Beni.— 0° 30′ N., 29° 30′ E.
Boma.— 5° 50′ S., 13° 10′ E.
Boyulu.— 1° N., 27° 30′ E.
Bumba.— 2° 10′ N., 22° 30′ E.
Dungu.— 3° 30′ N., 28° 30′ E.
Ekaturaka.— 2° N., 20° 30′ E.
Faradje.— 3° 40′ N., 29° 40′ E.
Gamangui.— 2° 10′ N., 27° 20′ E.
Garamba.— 4° 10′ N., 29° 40′ E.
Irebu.— 0° 35′ S., 17° 50′ E.
Kinshasa.— 4° 20′ S., 15° 20′ E.
Leopoldville.— 4° 25′ S., 15° 20′ E.
Lie.— 2° N., 21° 20′ E.
Lukolela.— 1° 10′ S., 17° 10′ E.
Malela.— 6° S., 12° 40′ E.
Matadi.— 5° 50′ S., 13° 35′ E.
Medje.— 2° 25′ N., 27° 30′ E.
Mobeka.— 2° N., 19° 50′ E.
Nala.— 2° 50′ N., 27° 50′ E.
Ngayu.— 1° 40′ N., 27° 40′ E.
Niangara.— 3° 40′ N., 27° 50′ E.
Niapu.— 2° 15′ N., 26° 50′ E.
Noki.— 5° 50′ S., 13° 30′ E.
Nouvelle Anvers.— 1° 40′ N., 19° 10′ E.
Panga.— 1° 45′ N., 26° 15′ E.
Pawa.— 2° 25′ N., 27° 50′ E.
Penge.— 1° 25′ N., 28° 15′ E.
Poko.— 3° 10′ N., 26° 50′ E.
Stanleyville.— 0° 30′ N., 25° 15′ E.
St. Antonio.— 6° 10′ S., 12° 20′ E.
St. Paul de Loanda.— 8° 55′ S., 13° 10′ E.
Vankerckhovenville.— 3° 20′ N., 29° 20′ E.
Walikale.— 1° 25′ S., 28° E.
Yakuluku.— 4° 20′ N., 28° 50′ E.
Zambi.— 6° S., 12° 50′ E.

New Genus

Osteoblepharon. Type, *O. osborni,* new species .... p. 420

List of New Species and Subspecies, with Their Type Localities

Osteoblepharon osborni	Niapu	p. 421
Gonatodes dickersoni	Medje	p. 436
Hemidactylus ituriensis	Avakubi	p. 455
Lygodactylus depressus	Medje	p. 466
Lacerta langi	Medje	p. 492
Ichnotropis chapini	Aba	p. 508
Eremias nitida garambensis	Garamba	p. 511
Mabuya sudanensis	Garamba	p. 536
Chamæleon etiennei	Banana	p. 574
Chamæleon ituriensis	Medje	p. 589

Preliminary Note on the Distribution of African Lizards

Plates VII–X

It is hoped that a more exhaustive study of the distribution of African reptiles and batrachians may be undertaken on the completion of the systematic account of the collections of the Congo Expedition in these groups. The work on distribution for the present paper is chiefly a collection of data for such a future study, consisting of an examination of the distribution of individual species. This material is presented graphically by means of maps, which have been so constructed as to admit the interpolation of future locality records. This work is, accordingly, quite independent of the general conclusions reached and is placed in the body of the paper under the species in question. Certain of the general conclusions, however, appear sufficiently definite to warrant the preliminary account here included, though it is of necessity confined to the species of the present collection and is made without reference to the distribution of other groups.

To a student previously unfamiliar with the African fauna, the first characteristic of the distribution of African reptiles and batrachians that attracts attention is the enormous range of certain species in every group. *Bufo regularis*, *Crocodylus niloticus*, and *Varanus niloticus* are examples in point, ranging from Cairo to the Cape and from Senegambia to Somaliland, while many other species have a range only slightly less extensive. This feature of African distribution relates, of course, to the absence of physical barriers in Africa, none of the divides between river systems being an important factor in the distribution of land animals.

The second characteristic, which is the main thesis of the present discussion, is the vital influence of the plant distribution in determining that of African animals. Two climatic-botanical barriers have influenced distribution much as mountain ranges do on other continents — the barren Sahara Desert, which, itself little explored, is effective in isolating Barbary from the rest of Africa; and the dense and continuous tropical Rain Forest of the Congo Basin. Lines of equal rainfall, evidently, and not isotherms, are the chief climatic factors in African distribution.

Attention is drawn to the plates illustrating these various zones. Four photographs illustrate the typical aspect of the two principal zones, the Rain Forest and the Savannah Region. Plate VIII presents the characteristics of the moist Ituri Forest and Plate VII of its extension into the Uele watershed, while the open and dry savannah of the northeastern Uele and Congo-Nile divide is well shown in Plates IX and X.

PLATE VII

The Border of a Clearing in the Ituri Forest toward Nala. A swampy depression in the foreground with typical plants of the secondary growth in the space cleared for the road: at the right of the bridge, elephant grass (*Pennisetum benthami*) and a young musanga (*Musanga smithi*); the slender tree in the left center is a *Uapaca,* and the broad-leaved bush in front of it a *Vernonia conferta*. Primary Rain Forest in the background, the majority of the trees being *Cynometra alexandri,* often reaching 150 feet. A few oil palms are visible toward the road.

The Lang-Chapin Expedition collected in the Lower Congo region, in the Ituri region at the northeast corner of the Rain Forest, and in the open country to the north of the Ituri watershed, reaching the divide between the Congo and Nile basins, a part of the Sudan. These three areas were inhabited by the following species:

I. Lower Congo	II. Ituri	III. Uele
Hemidactylus mabouia	*Gonatodes dickersoni*	*Hemidactylus brookii*
Hemidactylus longicephalus	*Hemidactylus muriceus*	*Lygodactylus gutturalis*
**Agama colonorum*	*Hemidactylus fasciatus*	**Agama colonorum*
**Varanus niloticus*	*Hemidactylus ituriensis*	**Varanus niloticus*
Gerrhosaurus nigrolineatus	*Hemidactylus richardsoni*	*Varanus exanthematicus*
**Mabuya maculilabris*	*Lygodactylus depressus*	*Ichnotropis chapini*
**Mabuya raddoni*	**Agama colonorum*	*Eremias garambensis*
Mabuya acutilabris	*Agama atricollis*	*Gerrhosaurus zechi*
Ablepharus cabindæ	**Varanus niloticus*	**Mabuya maculilabris*
Chamæleon etiennei	*Lacerta langi*	**Mabuya raddoni*
Chamæleon dilepis	*Lacerta vaueresellì*	*Mabuya sudanensis*
	Bedriagaia tropidopholis	*Mabuya perrotetii*
	Algiroides africanus	*Mabuya quinquetæniata*
	Holaspis guentheri	*Lygosoma sundevallii*
	**Mabuya maculilabris*	*Chamæleon gracilis*
	Mabuya polytropis	*Chamæleon lævigatus*
	**Mabuya raddoni*	
	Lygosoma reichenowii	
	Lygosoma breviceps	
	Lygosoma fernandi	
	Feylinia curarori	
	Chamæleon owenii	
	Chamæleon adolfi-friderici	
	Chamæleon ituriensis	
	Rhampholeon boulengeri	

Out of eleven species from the Lower Congo, twenty-five from the Ituri, and sixteen from the Uele region, four are common to all three areas — *Agama colonorum, Varanus niloticus, Mabuya maculilabris, Mabuya raddoni* (see below for the discussion of the ranges of these species) — and this is the extent of the interrelationships, sufficient evidence of the distinctness of the faunæ. The forest fauna is equally distinct from the Sudanese and from the Angolan.

Analysis I.— Lower Congo

Exclusive of the four widespread forms (marked with an asterisk), the seven remaining may be divided as follows.

1. *Hemidactylus mabouia* is probably an import, occurring in the plantations along the West African coast from Angola to Kamerun.

PLATE VIII

Interior of the Rain Forest on the Watershed between the Ituri and Uele Rivers, between Nala and Rungu. Tree ferns (*Cyathea*, probably *C. laurentiorum*), some of which reach 20 feet, in the swampy depression at the center. The heavily buttressed tree at the left is a muhindi (*Cynometra alexandri*) and that with a columnar trunk on the right is a mambao (*Macrolobium dewevrei*). The left front corner shows typical ground cover of the Rain Forest with large-leaved *Phrynium* and the broad-bladed forest grass (*Leptaspis conchifera*). Note also the huge creepers (*Landolphia*, *Lonchocarpus*, and others), hanging down from the crowns of the trees. The Rain Forest represents one of the primary divisions of the Ethiopian Region, both in its flora and fauna.

2. *Hemidactylus longicephalus, Gerrhosaurus nigrolineatus, Ablepharus cabindæ,* and *Chamæleon etiennei* are of restricted range, not occurring either in the forest or in German Southwest Africa. The affinities of *Gerrhosaurus,* however, are South African.

3. *Mabuya acutilabris* extends into German Southwest Africa, probably restricted to sandy areas.

4. *Chamæleon dilepis* (in an inclusive sense) is a species characteristic of the whole of the open country of Africa south of the Sahara.

The total relationship of the Lower Congo fauna is, therefore, inconclusive, somewhat isolated, and with general South African affinities.

Analysis II.— Ituri

Exclusive of the four widespread species, the twenty-one remaining are divided as follows.

1. Ten are identical with species of the Gaboon-Kamerun forest:

Hemidactylus muriceus	*Lygosoma reichenowii*
Hemidactylus fasciatus	*Lygosoma breviceps*
Hemidactylus richardsoni	*Lygosoma fernandi*
Holaspis guentheri	*Feylinia currori*
Mabuya polytropis	*Chamæleon owenii*

2. Ten are known only from the Ituri:

Gonatodes dickersoni	*Lacerta langi*
Hemidactylus ituriensis	*Lacerta vaueresell i*
Lygodactylus depressus	*Chamæleon ituriensis*
Bedriagaia tropidopholis	*Chamæleon adolfi-friderici*
Algiroides africanus	*Rhampholeon boulengeri*

Three of these are of obviously West African affinity. *Hemidactylus ituriensis* with *H. fasciatus, Lacerta langi* with *Lacerta echinata,* and *Rhampholeon boulengeri* with *R. spectrum.*

Three are of eastern relationship: *Gonatodes dickersoni* with *G. quattuorseriatus, Lygodactylus depressus* with *L. picturatus,* and *Algiroides africanus* with (?) *A. alleni.*

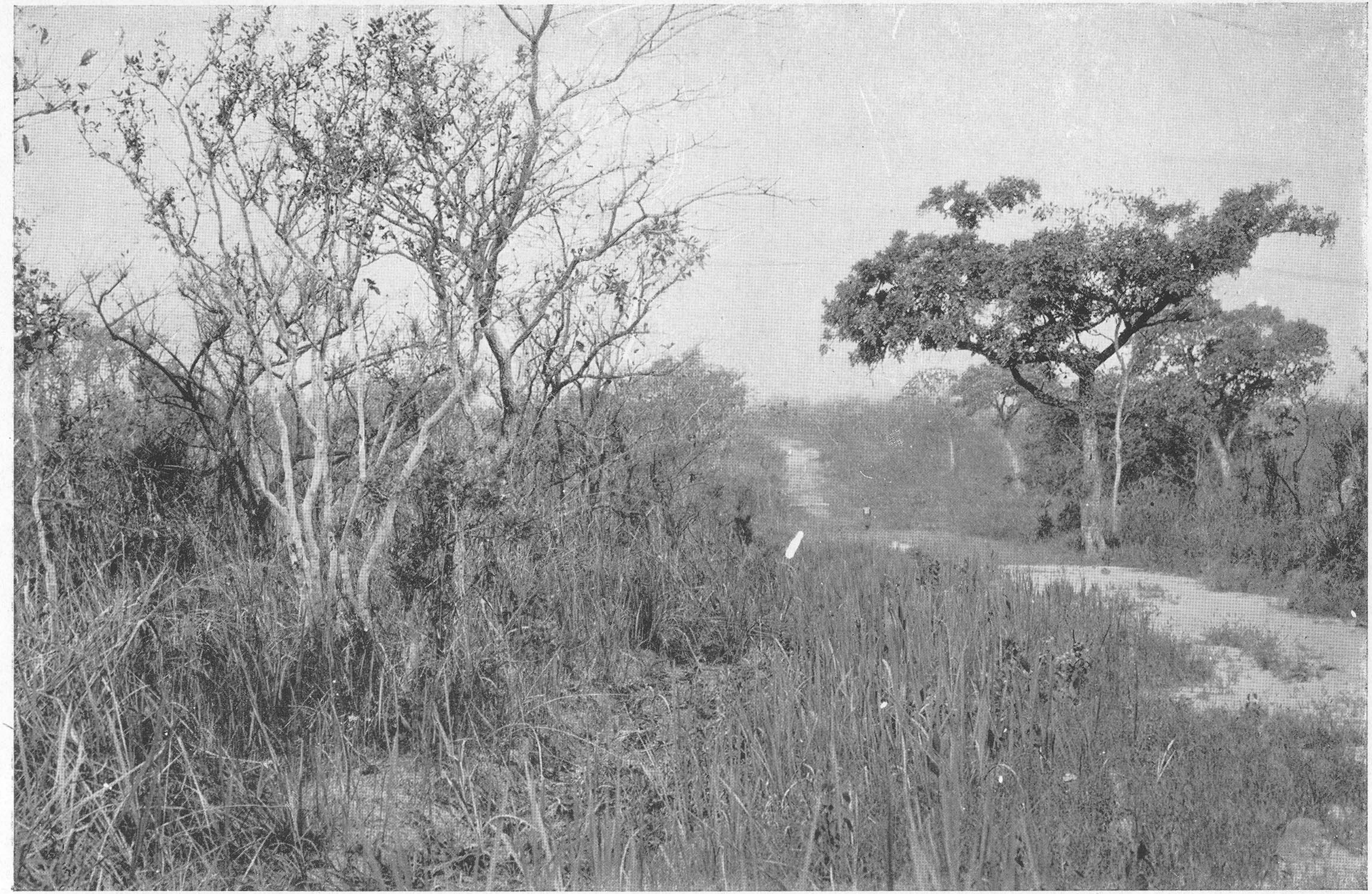
The four remaining are not obviously of either eastern or western relationship.

3. One species has invaded the forest from East Africa, *Agama atricollis.*

From these considerations it appears that, while there is a considerable eastern element in the Ituri fauna (4 species), its chief relationship should be considered western (13 species). The term "West African," previously applied to such species as *Hemidactylus fasciatus, Lygosoma fernandi,* and

PLATE IX

Typical Aspect of Open Country in the Northeastern Uele, along the Road from Niangara to Faradje. The flat or slightly rolling country is covered with moderately high grass (*Imperata cylindrica* and various species of *Andropogon*); scattered, medium-sized trees from 20 to 30 feet high (*Dombeya*, *Kigelia*, etc.); and irregular scrubby bushes (*Bauhinia*, *Combretum* and others). A thorny element is represented by a few species of *Acacia* and the widely distributed *Zizyphus jujuba*.



Chamæleon owenii, is obviously due to a false point of view. These species should be referred to as Forest species.

Analysis III.—Uele

Exclusive of the four forms in common with the other areas, the twelve remaining are classed as follows.

1. Seven are identical with species known from the open country of West Africa, i. e., the Senegal-Togo region:

Hemidactylus brookii
Lygodactylus gutturalis
Varanus exanthematicus
Gerrhosaurus zechi
Mabuya perrotetii
Mabuya quinquetæniata
Chamæleon gracilis

2. Three are known only from the Uele:

Ichnotropis chapini
Eremias nitida garambensis
Mabuya sudanensis

The first with South African relationships, the last two strongly western.

3. Two are known from East Africa (and *not* in West Africa): *Lygosoma sundevallii*, widely distributed in East and South Africa; and *Chamæleon senegalensis lævigatus*, an East African subspecies of a Senegambian form.

In all, ten out of twelve species are of western origin or affinity.

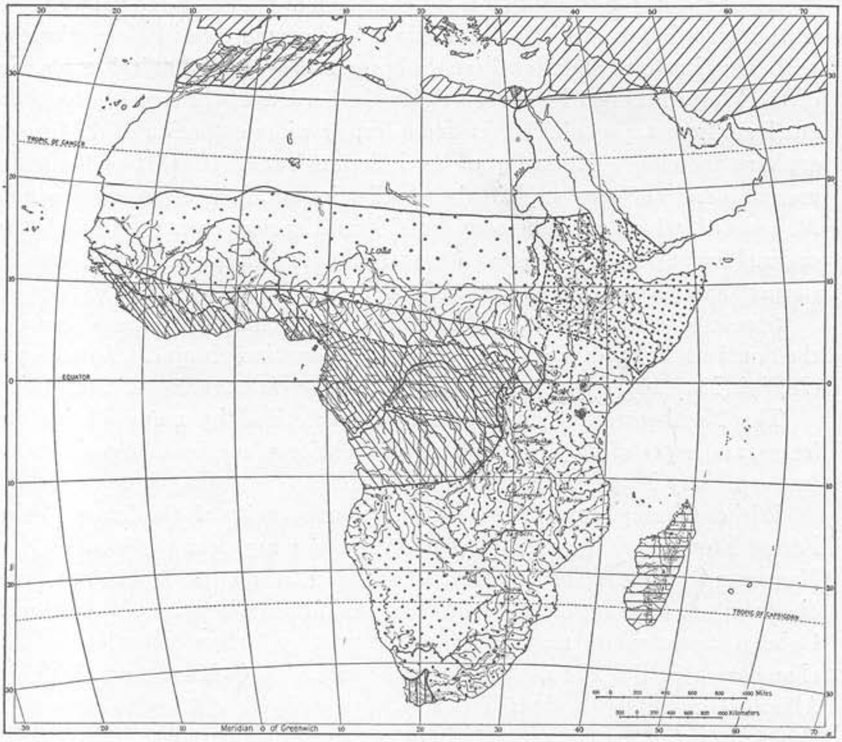
For the sake of simplification, in the above analyses of the Ituri and Uele faunæ, attention has not been directed to species like *Holaspis guentheri* and *Hemidactylus brookii* which occur also in East or Northeast Africa. These species present no difficulty, if it is borne in mind that it is not so much a relationship of the Central African species with the West African that is actually indicated as it is the reciprocal relation.

Corresponding to the term "Forest species" the term "Sudanese species" must be adopted for the very characteristic fauna between the Sahara and the Rain Forest. It is unfortunate that "Sudan" recalls to most people the Anglo-Egyptian Sudan rather than the Sudan proper, which covers the Sudanese Subprovince very exactly.

Turning now to the map of the botanical regions of Africa, prepared by Messrs. Lang and Chapin and Dr. Bequaert, it is at once evident that the distribution of the lizards is in much more exact accordance with the botanical distribution than is that of the fishes (Bull. Amer. Mus. Nat. Hist., XXXVII, p. 741, Map 2). All of the botanical subprovinces hold good for the lizards, with slight modification and the possible exception of the Southwestern Cape Region, which the writer has been unable to examine.

PLATE X

The Savannah North of Garamba, on the Watershed between the Nile and Congo Basins. The vegetation is typical of the transition zone between the mixed Uele flora and that of the Sudanese Subprovince (cf. Map 2). The grass is shorter and is chiefly composed of smaller *Andropogons*. Larger trees (such as *Lophira alata*) are very rare. The smaller woody plants include a great variety of species: *Protea, Sarcocephalus, Bauhinia, Dombeya, Uapaca, Grewia, Gardenia thunbergia* and others. In the depressions of the rocks, where moisture and humus accumulate, grow various grasses and a dwarf species of *Aloe*. Plates IX and X may be taken as representing an aspect of the second faunal and floral division of the Ethiopian Region, the Savannah Province; they also represent the first of the faunal subdivisions, the Sudanese Subprovince, which extends somewhat further toward the forest border than does the botanical division.



Map 2. The Botanical Regions of Africa, after Engler. Nearly coincident with faunal areas.

BOTANICAL REGIONS OF AFRICA

(After Engler)

I. MEDITERRANEAN REGION........................

II. NORTH AFRICAN-ARABIAN DESERT REGION........

III. ETHIOPIAN REGION

A. SAVANNAH PROVINCE

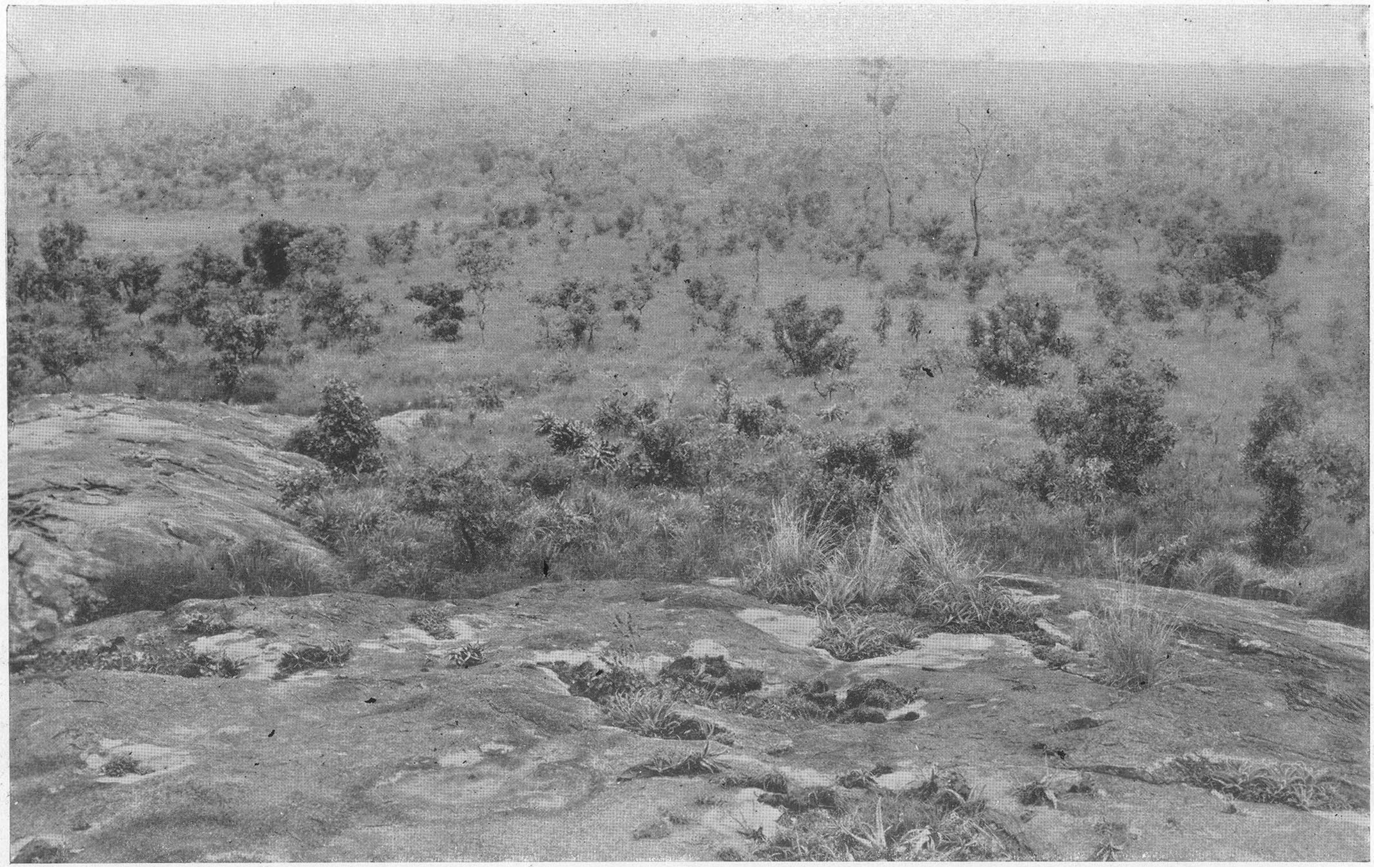
1. Sudanese Subprovince......................
2. Northeastern Subprovince..................
3. Eastern and Southern Subprovince..........

B. WESTERN FOREST PROVINCE..............

Extent of Rain Forest indicated thus...........

IV. SOUTHWESTERN CAPE REGION................

V. MALAGASY REGION..............................



The necessary modification is the extension of the Sudanese Subprovince to the forest border, which at once brings into prominence its close relations with the Eastern and Southern Subprovince. The botanical extension of the Western Forest Province outside the borders of the actually continuous Rain Forest, probably indicating a former wider extension of the forest, explains the close relationship of the Liberian fauna with that of the main area of forest and may explain the distribution of *Mabuya maculilabris* and *M. raddoni*, which could be considered Forest species coextensive with the original forest that have been able to meet the conditions of the open country (in part at least) after the retreat of the forest.

Species of the Sudan which best show the Sudanese relationship with the Southern Subprovince are *Varanus exanthematicus* (Map 12), *Ichnotropis chapini* (Map 14), *Lygosoma sundevallii*, and *Gerrhosaurus zechi* (Map 16).

The Northeastern Subprovince is characterized by many distinctive forms, and especially by the striking multiplicity of species of *Hemidactylus* (see especially Maps 12 and 16).

Without losing sight of the essential homogeneity of the fauna of the Forest Province, it may be pointed out that many forms present in the Kamerun-Gaboon region are absent in Liberia (the opposite has not been observed), and that there is a considerable difference between the Ituri and Gaboon faunæ, which may be bridged in part by further collections. The chameleons with a dorsal "fin" and *Poromera* in Gaboon, and the East African element in the Ituri fauna, with *Bedriagaia* distinctive, illustrate this subdivision (see Maps 4 and 13).

Similarly, there is some justification for a division of the Eastern and Southern Subprovince of the botanical map into East African and South African faunal areas, the former characterized by the great number of species of chameleon, the latter by the greater abundance of species and individuals of the Zonuridæ and Gerrhosauridæ. With these families of lizards the larger problems of zoogeography, which are beyond the scope of the present discussion, are touched upon.

The following papers (in the recent literature) deal with the extension of the Sudanese Subprovince: WERNER, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1823; MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 547; and NIEDEN, 1910, Arch. Naturg., LXXVI, Bd. I, Heft 1, p. 234.

Papers dealing with the relations of the Ituri and the Gaboon-Kamerun region: STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 197; and MÜLLER, 1913, Zool. Anz., XLI, p. 234.

Index to maps by provinces and subprovinces for which the distribution of a characteristic species is illustrated:

I.	Mediterranean Region	Map	12.
III. A.	Ethiopian Region, Savannah Province.	"	3, 12, 16, 19, 20.
III. A. 1.	Sudanese Subprovince	"	6, 9, 10, 12, 16, 18, 21.
III. A. 2.	Northeastern Subprovince	"	12, 16.
III. A. 3.	Eastern and Southern Subprovince	"	11, 12, 14.
III. B.	Western Forest Province	"	3, 7, 8, 15, 22.

Note on the Distribution of the African Turtles

The primary key to the understanding of the present distribution of reptiles in Africa has been found in the distinction between the Forest and Savannah Provinces. This division holds good with startling distinctness for the turtles collected by the present expedition in the Upper Congo region and the Sudan.

The Savannah Province is characterized by the genera *Testudo* and *Pelomedusa,* with *Cyclanorbis* restricted to the Sudanese Subprovince and *Homopus* to the Southern Subprovince. The distinctness of the ranges of *Kinixys belliana* on one hand and *Kinixys erosa* and *homeana* on the other, the first ranging over nearly the whole Savannah Province, the latter two confined to the Rain Forest, accords well with the natural subdivision of the genus. The Southern Subprovince is remarkable for the unique development of the genus *Testudo* which is differentiated into twelve species, only one of which (*Testudo pardalis*) ranges north of the Zambesi. *Testudo tornieri* is known only from German East Africa, and *Testudo calcarata* is Sudanese and Northeast African. Two Mediterranean species reach North Africa, making sixteen species of *Testudo* for the Continent.

Cycloderma, like *Kinixys,* occurs in both the forest and the savannah, but with a distinct species in each — *Cycloderma aubryi* in Gaboon, *Cycloderma frenatum* in the Eastern Subprovince.

Amyda triunguis, if really occurring throughout the Congo Basin, may be regarded as one of the species, like *Agama colonorum* and *Varanus niloticus* among the lizards, whose virility and adaptability make them more independent of their environment than are species more nearly in equilibrium. It might be thought that the water turtles would be less influenced by the presence or absence of the forest than the land turtles but, in the eastern end of the Rain Forest at least, this is not the case.

The distribution of the genus *Pelusios* is less consistent, though in the Ituri the only representative is *Pelusios gabonensis,* which appears to be confined to the continuously forested area. *Pelusios sinuatus* and *Pelusios nigricans* are evidently characteristic of the Eastern and Southern Subprovince, and *Pelusios adansonii* of the Sudanese Subprovince. The two species *niger* and *derbianus*, however, are recorded from Liberia to the Congo and from Gambia to Angola, respectively. The single record of *derbianus* from Uganda (Boulenger, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162) may possibly indicate that it is a species of the Savannah Province, surrounding the forest.

Further records of *Amyda triunguis, Pelusios derbianus,* and *Pelusios niger* will have especial interest to students of the distribution of African reptiles.

TESTUDINATA

Key to the Genera of Turtles in Africa South of the Sahara

A. Shell with horny shields.
- B. Neck bending in a vertical plane; no intergular shield; digits not webbed. (Land turtles).
  - C. Alveolar surface of the upper jaw with a median ridge. *Testudo.*
  - CC. Alveolar surface of upper jaw without median ridge.
    - D. Carapace hinged in adult, closing posteriorly; a submarginal shield present anteriorly............ *Kinixys.*
    - DD. Carapace not hinged behind; no submarginal. *Homopus.*
- BB. Neck bending sidewise; an intergular shield; digits more or less webbed. (Water turtles occasionally on land).
  - C. Front lobe of plastron hinged in the adult....... *Pelusios.*
  - CC. Front lobe of plastron not hinged............ *Pelomedusa.*

AA. Carapace and plastron without horny shields. ("Soft shelled turtles").
- B. Plastron with a cutaneous femoral valve under which the hind limb may be concealed.
  - C. Postorbital arch narrower than the orbit; neurals forming an incomplete series........................ *Cyclanorbis.*
  - CC. Postorbital arch wider than the orbit; neurals in a continuous series.................................. *Cycloderma.*
- BB. No cutaneous femoral valves........................ *Amyda.*

TESTUDINIDÆ

Kinixys Bell

Kinixys erosa (Schweigger)

Plate XI, Figure 1; Map 3

Testudo denticulata (*non* Linnæus) SHAW, 1802, Zoology, III, p. 59, Pl. XIII.
Testudo erosa SCHWEIGGER, 1814, Prodr. Monogr. Chelon., p. 52.
Kinixys castanea BELL, 1827, Trans. Linn. Soc. London, XV, p. 398, Pl. XVII, fig. 1.
Kinixys erosa GRAY, 1831, Syn. Rept., p. 16.
Cinixys erosa DUMÉRIL AND BIBRON, 1835, Erpétol. Gén., II, p. 165.
Kinixys erosa GRAY, 1844, Cat. Tort., p. 12; 1855, Cat. Shield Rept., I, p. 13. DUMÉRIL, 1856, Rev. Mag. Zool., (2) VIII, p. 372. COPE, 1859 (1860), Proc. Acad. Nat. Sci. Phila., p. 294.
Cinixys erosa DUMÉRIL, 1861, Arch. Mus. Hist. Nat. Paris, X, p. 162. STRAUCH, 1862, Mém. Acad. Sci. St. Pétersbourg, (7) V, No. 7, p. 24.
Kinixys erosa GRAY, 1863, Proc. Zool. Soc. London, p. 196.
Cinixys erosa STRAUCH, 1865, Mém. Acad. Sci. St. Pétersbourg, (7) VIII, No. 13, p. 39. BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 40. GRAY, 1870, Suppl. Cat. Shield Rept., I, p. 13. PETERS, 1878, Monatsber. Akad. Wiss. Berlin, p. 611. SAUVAGE, 1884, Bull. Mus. Hist. Nat. Paris, IX, p. 200. BOETTGER, 1888, Ber. Senck. Ges., p. 12. BOULENGER, 1889, Cat Chelon., p. 141. STRAUCH, 1892, Mém. Acad. Sci. St. Pétersbourg, (7) XXXVIII, No. 2, p. 61. BOCAGE, 1895, Herpétol. Angola, p. 1. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 6. BOULENGER, 1900, Proc. Zool. Soc. London, p. 447. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 665. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 197. SIEBENROCK, 1907, Ann. Hofmus. Wien, XXII, p. 3, text-fig., Pl. I; 1909, Zool. Jahrb. (Suppl.), X, p. 509. NIEDEN, 1910, Fauna Deutschen Kol., Reihe 1, Heft 2, p. 4, fig.
Kinixys denticulata HALLOWELL, 1839, Proc. Acad. Sci. Phila., p. 161, Pls. VIII, IX.

Twenty-five specimens were collected, as follows: A. M. N. H. Nos. 10025 (September 1913), 10001–6, 10010, and 10024 (October 1909), and 10007–9 (November 1909) are from Avakubi; 10011 (January 1910), Bafwabaka; 10023 (November 1914), Banalia; 10012–13 (January and February 1910), Gamangui; 10014 (April 1910), 10019–22 (June and July 1914), 10015–18 (August 1910) Medje; and 10071 (November 1913), Niapu.

Sternfeld (1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 200) has recorded *Kinixys homeana* from the Ituri Forest. His specimen consists of head and limbs only, and he regards it as "eventuell *Cinixys erosa* angehörig." In view of the fact that *homeana* was not taken by the present expedition, it seems probable that *erosa* is the only species of *Kinixys* reaching the Ituri. The distribution of the genus is more fully discussed below, under *Kinixys belliana*.

The progressive simplification of the reverted border of the carapace, and the appearance and increasing distinctness of the carapacial hinge are excellently illustrated in the present series, which includes all stages from a juvenile without concentric sculpture on the shields, in which "egg-tooth" and umbilicus are still present, to an extremely old individual, with entirely smooth shields and the maximum hinge development.

A carapace and plastron (No. 10023) measuring 323 mm. in median length of carapace probably represents the maximum size recorded for the species. Siebenrock (1907, p. 4) mentions a male specimen 270 mm. long. The average size of an adult is probably between 200 and 230 mm.

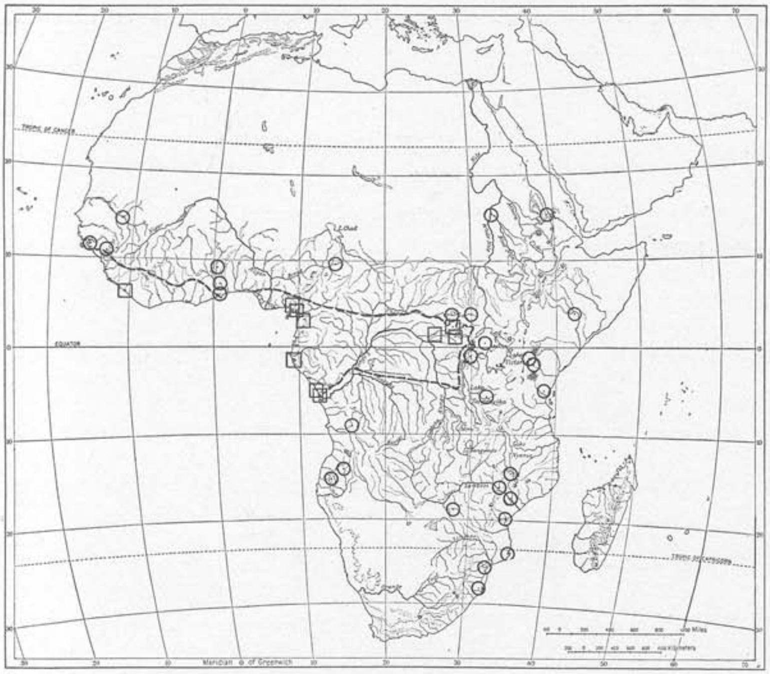
An egg, laid by a specimen in captivity during November 1913 (four were laid in all), has a rather calcareous shell. The shape is a somewhat flattened oval, measuring 40 × 36 × 31 mm.

The coloration is nearly uniform brown in the juvenile specimens, lighter in the oldest specimens, in which the pattern is often obscure. The medium-sized individuals show the distinctly *radiate* type of coloration which has been excellently figured by Siebenrock (*loc. cit.*).

The measurements of twenty-one specimens are arranged below in order of size. The length of the carapace and plastron are measured in the median line with calipers; the width and depth are maxima.

A. M. N. H No.	Sex	Length Carapace	Width Carapace	Length Plastron	Width Plastron	Depth
10019	♀	46 mm.	42 mm.	43 mm.	32 mm.	20 mm.
10013	♀	47	43	42	33	18
10016	♀	55	50	47	39	22
10014	♀	60	53	53	41	23
10015	♀	61	55	54	45	24
10002	♀	68	55	64	49	30
10022	♀	72	62	66	54	29
10021	♀	81	63	71	57	30
10010	♀	84	64	72	55	32
10001	♀	94	71	85	62	39
10009	♀	112	84	111	78	47
10025	♀	131	94	120	89	55
10003	♂	159	111	146	102	62
10004	♀	159	113	152	103	58
10024	♀	164	120	157	106	68
10007	♂	170	118	155	108	61
10006	♂	192	123	172	112	68
10005	♂	192	123	173	108	65
10011	♂	210	140	191	131	66
10012	♂	210	146	195	126	70
10023	♂?	323	236	289	222	122

"*Kinixys erosa* is the only land turtle found in the part of the Rain Forest we visited, and, like its relative (*Kinixys belliana*) in the northern savannah, is fond of marshy sites. During the day it hides beneath logs, roots, and heaps of dead and living vegetation, sometimes completely covering itself with débris. The projecting forked gular portion of the plastron and the slightly upturned edges of the carapace are very useful in this task; the head is partly retracted, and the feet then push and wedge until the turtle is hidden from view. This turtle is highly prized as a titbit by the natives, and therefore is never allowed to escape. Dogs, so commonly used for hunting in these regions, are undoubtedly attracted by the odor which this species emits.



Map 3. Distribution of *Kinixys*.
□ *Kinixys erosa*. Characteristic of the Western Forest Province.
○ *Kinixys belliana*. A species of the Savannah Province.

"The yellowish-brown, radiate pattern on the slightly ridged or smooth shields, the anteriorly depressed, strongly arched carapace, with its hinged rear portion and everted border, are typical of this species (Plate XI, Figure 1).

"After seeing more than one hundred and fifty adult specimens, we thought the length of the carapace would not exceed eight and a quarter inches (210 mm.), and we were therefore surprised to find a huge shell, measuring 12.75 inches (323 mm.), in the hands of Mr. Van de Voorde, a

Belgian official, who kindly contributed it to our collection. He had received it from the Wangelima who had caught it in the forests near Banalia, on the Aruwimi.

"The natives claim that this turtle lays as many as a dozen eggs in the sandy ground, so common in the marshy parts of these regions, and covers them with dead leaves. A female we kept alive for a while in November laid one night four oval eggs an inch and a quarter in length (32 mm.); the shells were slightly calcareous, yet leathery enough to stand indentation without breaking. Dissection of this specimen revealed four well-formed and two smaller eggs which would have added six to the set. The various stages of the young (characterized by strongly denticulate carapaces), observed throughout the year, would indicate that there is no definite breeding season" [H. L.].

Kinixys belliana Gray

Plate XI, Figure 2; Map 3

Kinixys belliana Gray, 1831, Synopsis Rept., p. 69.
Cinixys belliana Duméril and Bibron, 1835, Erpétol. Gén., II, p. 168.
Kinixys (Cinothorax) belliana Fitzinger, 1835, Ann. Wiener Mus. Naturg., I, p. 111.
Cinixys (Cinothorax) bellianus Fitzinger, 1843, Syst. Rept., p. 29.
Kinixys belliana Gray, 1844, Cat. Tort., p. 12; 1855, Cat. Shield Rept., p. 13, Pl. ii.
Cinixys belliana Strauch, 1862, Mém. Acad. Sci. St. Pétersbourg, (7) V, No. 7, p. 24; 1865, (7) VIII, No. 13, p. 40. Blanford, 1870, Zool. Abyssinia, p. 444.
Kinixys belliana Gray, 1870, Suppl. Cat. Shield Rept., I, p. 13.
Cinixys belliana Sclater, 1871, Proc. Zool. Soc. London, p. 544. Peters, 1879, Monatsber. Akad. Wiss. Berlin, p. 202; 1882, Reise nach Mossambique, III, p. 5. Boulenger, 1889, Cat. Chelon., p. 143. Boettger, 1889, Ber. Senck. Ges., p. 295. Strauch, 1892, Mém. Acad. Sci. St. Pétersbourg, (7) XXXVIII, No. 2, p. 62. Günther, 1894, Proc. Zool. Soc. London, p. 85. Bocage, 1895, Herpétol. Angola, p. 2. Del Prato, 1895, Atti Soc. Italiana Sci. Nat., XXXV, p. 19. Johnston, 1897, British Central Africa, p. 356. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 2; 1900, Zool. Jahrb. (Syst.), XIII, p. 582; 1901, Beiheft, Arch. Naturg., LXVII, p. 66; 1902, Zool. Jahrb. (Syst.), XV, pp. 580, 665. Boulenger, 1902, in Johnston, Uganda Protectorate, p. 445; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 197; 1905, Proc. Zool. Soc. London, II, p. 252; 1906–7, Mem. Proc. Manchester Lit. Philos. Soc., LI, p. 6. Siebenrock, 1906, in Voeltzkow, Reise in Ost-Afrika, II, p. 2. Boulenger, 1907, Proc. Zool. Soc. London, p. 483, fig. 140. Siebenrock, 1907, Ann. Hofmus. Wien, XXII, p. 4. Chubb, 1908, Ann. Mag. Nat. Hist., (8) II, p. 220. Ohdner, 1908, Arkiv Zool. Stockholm, IV, No. 18, p. 2. Chubb, 1909, Proc. Zool. Soc. London, p. 592. Siebenrock, 1909, Zool. Jahrb. (Suppl.), X, p. 510. Meek, 1910, Publ. Field Mus. Zool., VII, p. 414. Roux, 1910, Rev. Suisse Zool., XVIII, p. 100. Boulenger, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162. Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 200. Nieden, 1913, Mitt. Zool. Mus. Berlin, VII, p. 54.

Homopus nogueyi LATASTE, 1886, Le Natur., III, p. 286. BOULENGER, 1889, Cat. Chelon., p. 148. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 66. DUERDEN, 1906, Rec. Albany Mus., I, p. 408.

Cinixys nogueyi SIEBENROCK, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, part 1, p. 442; Ann. Hofmus. Wien, XX, p. 6.

Cinixys belliana nogueyi BOULENGER, 1906, Ann. Mus. Stor. Nat. Genova, (3) II, p. 197.

Homopus darlingi BOULENGER, 1902, Proc. Zool. Soc. London, II, p. 15, Pl. IV; 1907, p. 483.

Twenty-three specimens of *Kinixys belliana* were collected in the Uele region: A. M. N. H. Nos. 10041–42 (February and October 1912) are from Faradje; 10047 (June 1912), Garamba; 10026–40, 10046 (December 1910), Niangara; 10043–45, 10048, Uele region.

The range of *Kinixys belliana* circumscribes the forest, entering it only in Liberia, if at all (Map 3). *Kinixys erosa* and *homeana* are rarely recorded outside of the Rain Forest, and never outside of the Forest Province of the botanical map.

Siebenrock (1907, p. 4) has added to the knowledge of the remarkable structural differences between *belliana* and the other two species, and the retention of Fitzinger's section *Cinothorax* for *belliana* is natural and logical. The differences may be summarized as follows:

	Kinixys, s. str.	*Cinothorax*
Habitus	Flattened	High
Shell border	Reverted, denticulate in young	Not reverted, not denticulate
Gular shields	Large, projecting, quadrangular	Small, nearly triangular
Pectoral suture	Long	Short
Postorbital arch	Well developed	Greatly reduced
Windpipe	Elongate, reverted	Normal, straight
Coloration	Radiate	Zonary
Range	Forest Province	Savannah Province

One specimen in the present series (No. 10048) has only three claws on each hind foot, all the others having four. The development of the fifth claw on the fore limb is variable, when present; it is absent in two specimens, while a third has five claws on one side, four on the other.

The distinction from *Homopus*, with which juvenile specimens have been repeatedly confounded, is rendered easy even before the development of the carapacial hinge by the presence of the submarginal shield beneath the anterior border of the carapace, as demonstrated by Siebenrock (*loc. cit.*).

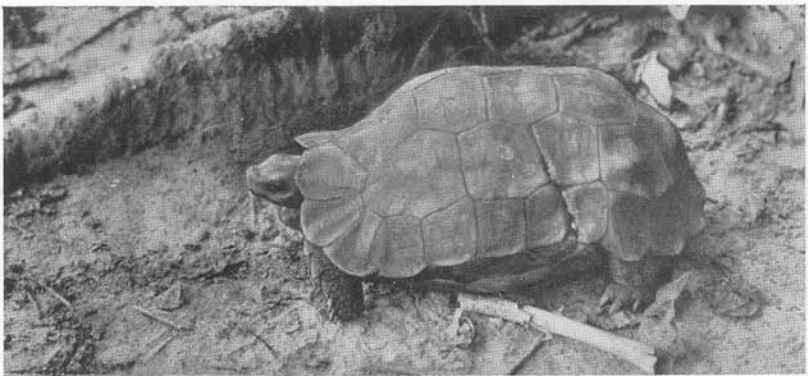
In one specimen, No. 10029, the pectoral shields do not form a suture.

PLATE XI

Figure 1. *Kinixys erosa* (Schweigger). The average size of the adult is probably 200–230 mm.

Figure 2. *Kinixys belliana* Gray. A. M. N. H. No. 10042; length 230 mm.

Figure 3. *Pelusios nigricans* (Donndorff). A. M. N. H. No. 10063; ♂; length 290 mm.



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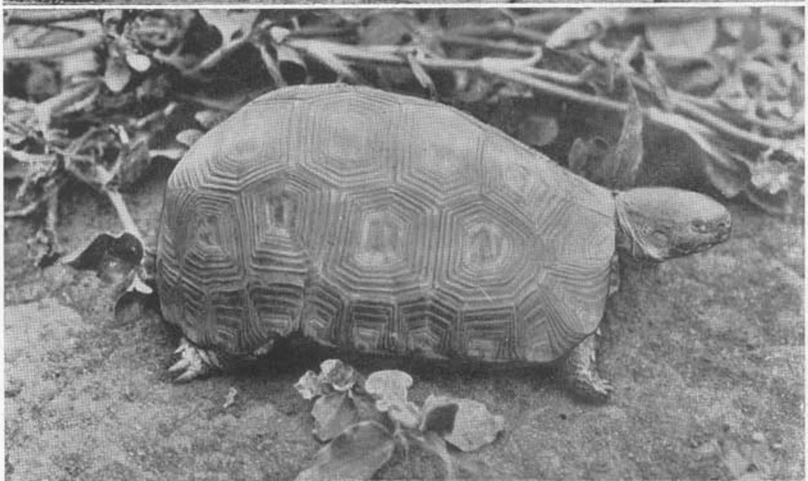

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3

No. 10047 is abnormal in having one of the anterior costal plates fused with the first neural; and a supernumerary marginal is introduced on the same side.

The coloration is very variable, usually darker in the females; the pattern in the young specimens is typically zonary, becoming secondarily radiate in the older individuals.

The measurements of nine specimens are arranged below in order of size.

A. M. N. H. No.	Sex	Length Carapace	Width Carapace	Length Plastron	Width Plastron	Depth
10047	♀	47 mm.	44 mm.	41 mm.	37 mm.	24 mm.
10026	♂?	86	60	71	56	35
10030	♀	90	64	78	56	39
10045	♀	159	92	132	90	66
10028	♂	163	93	139	87	66
10040	♂	174	108	152	100	69
10048	♀	177	111	159	101	79
10027	♀	187	118	162	109	86
10029	♀	194	112	164	113	85

"Our largest specimen of *Kinixys belliana* has a shell 7.65 inches long. The carapace is always more vaulted, usually with more clearly marked ridges on the shields and a better defined, zonary yellowish pattern than its relative of the Rain Forest, which it otherwise resembles (Plate XI, Figure 2).

"These land turtles are fairly common in the savannah of the northeastern Uele, but are scarcer in the still drier part of the Sudan adjoining the Congo-Nile divide. They are fond of the moist areas bordering swamps or shallow watercourses, where they find food and shelter in the dense undergrowth. Like most land turtles, they are nocturnal in habit and are seldom seen during the day. In the rainy season they shift and cannot be found in places where the natives are wont to look for them in the dry period.

"In June, at the beginning of the rainy season, a shallow pool, only fifteen feet in length, but overgrown with aquatic vegetation, contained at least three of these turtles. The barefooted natives are afraid of being bitten by the small crocodiles which sometimes infest such water-holes, and therefore use the reverse end of their spears to prod the bottom. As soon as the plants are moved by an escaping turtle or one is actually hit by a spear, the natives make a rush for it. When it has been thrown on land, with the plastron up, the turtle has no difficulty in righting itself and walks away, for ten or fifteen feet, as fast as a man; when halted, it may skulk for a time, with feet and head partly drawn inside the carapace, or may feign death. One carried to the river, walked to the edge of the steep bank and without hesitation dropped into the water, where it seemed at ease, although powerless against the strong current. Reaching shore, it rested awhile and then hobbled off toward the shelter of some roots. Another specimen had been drowned in an eel-pot set in a barrage across a rapid into which it had evidently been swept when attempting to cross the river.

"When handled, this species tries to scratch, withdraws its head into the shell and snaps the beak, hisses, and sometimes gives off through the cloaca small quantities of a strong smelling fluid. When further annoyed, it expels the air from the lungs and protects its more vulnerable parts by drawing the forelimbs over the head and shutting down the hinged posterior portion of the carapace. How timid this turtle is may be shown by the fact that for days at a time it makes no attempt to move when the natives carry it either in a basket or suspended by a string fastened to its hind limbs.

"*Kinixys belliana* is the only turtle in this region that estivates during the dry season, from December to May in the Uele, thus escaping the annual grass fires; it may be found beneath roots of trees, in the cavities of large termite hills, or perhaps several inches below the surface of the ground. This habit probably has little connection with lack of food since it is known that most turtles can live for many months without nourishment. In February and March after the grass fires, the Logo and Azande, near Faradje, arrange turtle-hunting parties and secure as many as half a dozen in one day. Spears, with a heavy, pointed, or chisel-like iron on the reverse end, are used to unearth the turtles, which small hunting dogs usually locate. The natives of the northeastern Congo consider land turtles greater delicacies than even the aquatic species — perhaps on account of the strong musky odor; in fact, they prefer this turtle to chicken. The rear portion of the carapace is easily cut off at the hinge, and the meat is carefully removed from the shell and stewed with pepper for a considerable time. Many parasites, especially nematodes, are found in the intestines, which the natives do not remove, believing they add to the flavor. The stomach and cloaca, however, are usually emptied, but the other parts are thrown into the pot uncleaned.

"These turtles seem to have few enemies aside from man. Once, however, on the plains we found portions of shell of one recently killed. From the tracks and from the teeth marks on both plastron and carapace, it could easily be ascertained that a leopard had satisfied its hunger; and the natives then said that neither the lion nor leopard would pass a turtle.

"On account of the protection turtles derive from the shell, the facility with which they withdraw therein, their proverbial slowness and endurance, the ability to remain immovable for a long time and to escape when unobserved, they play an active part in native superstition. Their skulls, vertebræ, leg bones, and parts of the shell are worn extensively by natives in the belief that they transmit the qualities cited. The story of the race between the turtle and the elephant, with the generally accepted ending, has wide circulation in the Ituri and Uele districts" [H. L.].

PELOMEDUSIDÆ

Pelusios Wagler[1]

Pelusios nigricans (Donndorff)

Plate XI, Figure 3; Text Figure 1

Testudo nigricans DONNDORFF, 1798, Zool. Beitr., III, p. 34.
Sternothærus nigricans BOULENGER, 1889, Cat. Chelon., p. 195. SIEBENROCK, 1909, Zool. Jahrb. (Suppl.), X, pp. 557, 558. MASI, 1911, Boll. Soc. Zool. Italiana, (2) XII, p. 131. STERNFELD AND NIEDEN, 1911, Mitt. Zool. Mus. Berlin, V, p. 385. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 201. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 59.

The further bibliography and synonymy of this species will be found in Boulenger, 1889, p. 195, and Siebenrock, 1909, p. 557.

The difficulty in distinguishing *Pelusios nigricans* and *Pelusios sinuatus* leads the writer to record the present specimens under the older name. From the discussion of Nieden, (1913, p. 55 *et seq.*) it appears not unlikely that *sinuatus* will have to be placed in the synonymy of *nigricans*. The relations of the present specimens will be discussed more fully below.

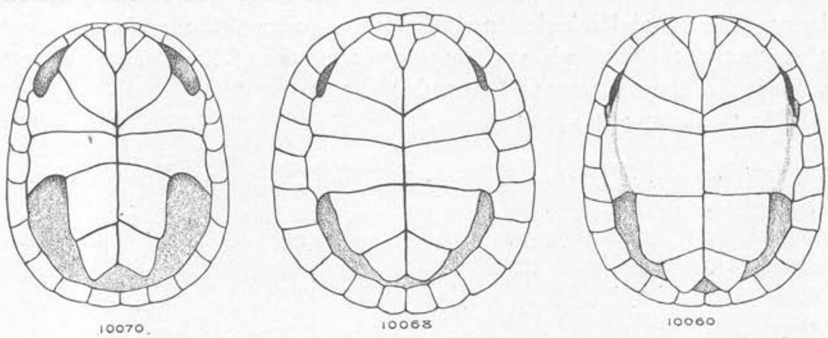

Fig. 1. Plastral views of juvenile *Pelomedusa galeata* (10070, × .48), *Pelusios gabonensis* (10068, × .73) and *Pelusios nigricans* (10060, × .56). Compare the extent to which the pectoral shields enter the bridge.

Six specimens were taken at Faradje: A. M. N. H. Nos. 10060–61 (February 1911), 10062 (March 1911), 10063 (January 1912), 10064–65 (October 1912). All of these specimens were taken in the Dungu River.

[1] Stejneger, 1902, Proc. Biol. Soc. Wash., XV, p. 237.

The presence of an essentially East African species in this part of the Sudan is not without precedent (cf. *Ichnotropis*, *Lygosoma sundevallii*, and *Chamæleon lævigatus*, below). The occurrence of the present species is anomalous, however, for Werner's expedition to the Sudan, collecting at Gondokoro on the Nile, less than 150 miles to the northeast, secured only *Pelusios adansonii* (Schweigger), a form well known from the Senegambian area. (Previously recorded from the White Nile by A. Duméril.) Since the faunal affinities of the Uele region are more distinctly Senegambian than those of the area reached by Werner, *adansonii* would have been expected in the Uele, where it may yet be found. *Pelusios nigricans*, furthermore, is restricted by Siebenrock (1909, p. 557) to a somewhat more southern range, the genus being represented by *sinuatus* in the headwaters of the Nile, so that, of the two, *sinuatus* would be expected in the Uele. Geographical considerations thus lead to the union of *sinuatus* with *nigricans*. The absence of *Pelusios adansonii* from the Uele is unexplained and probably accidental, as is also the absence of *sinuatus* at Gondokoro. The eastward extension of the range of *adansonii* is normal, contrary to Siebenrock's impression, the discontinuity between the eastern and western records being simply an unexplored region. Future collections from the Niger, the Benue, and probably the Ubangi, may be expected to bridge the gap.

The six specimens agree with the older descriptions of *Pelusios sinuatus* in the strongly bicuspid character of the upper jaw, but this has been shown to be an insufficient distinction. They agree with Siebenrock's revised description of *Pelusios nigricans* in having the front lobe of the plastron longer than the abdominal suture, the outer border of the humerals longer than that of the pectorals, and the posterior border of the carapace entire; while in size they correspond best with *sinuatus*.

The measurements appear below.

A. M. N. H. No.	Sex	Length Carapace	Width Carapace	Length Plastron Ant. Lobe	Length Plastron Post. Lobe	Width Plastron	Depth
10060	?	67 mm.	55 mm.	25 mm.	36 mm.	42 mm.	30 mm.
10065	♀	241	173	82	129	124	
10058	♀	250	177		137	132	106
10062	♂			83	126	117	
10063	♂	290	185	89	136	130	92

"These water turtles have a depressed, smooth carapace of dirty greenish brown, and are further differentiated by a comparatively blunt head and paddle-like feet; the black claws are especially sharp on the hind limbs (Plate XI, Figure 3). The species attains much larger proportions than specimens in the collection would indicate, sometimes reaching a length of 15 inches. The shallow watercourses and their lakelike expanses, quiet coves, open stretches of papyrus swamp, and stagnant pools, perhaps miles from running water, are the habitual haunts of the turtles, which, however, are not gregarious — at least most of the thirty or so captured were taken singly. It is probable that they travel great distances at the height of the rainy season, when inundations often connect widely separate swamps and water-holes. On land they proceed as easily as their terrestrial relatives. Those I saw were not basking but were resting in submerged débris or aquatic vegetation, with head or shell partly out of the water. They are shy, and of those collected by the expedition all were taken in traps or nets by fishermen, except a very few gathered in shallow pools.

"In February, at low water, I found the nest of one of these turtles at the edge of an island in the Dungu River near Faradje. It was situated more than two feet above water-level and contained seven oval eggs about an inch and a half in length. Although the eggs had been laid only recently, the slightly flexible shells, originally white, had been tinted brown by the two-inch layer of dry sand covering them" [H. L.].

Pelusios gabonensis (A. Duméril)

Text Figure 1

Pentonyx gabonensis Duméril, 1856, Rev. Mag. Zool., (2) VIII, p. 373; 1861, Arch. Mus. Hist. Nat. Paris, X, p. 164, Pl. xiii, figs. 2, 2a.

Pelomedusa gabonensis Strauch, 1862, Mém. Acad. Sci. St. Pétersbourg, (7) V, p. 45.

Pelomedusa (*Pentonyx*) *gabonensis* Strauch, 1865, Mém. Acad. Sci. St. Pétersbourg, (7) VIII, p. 107.

Sternothærus gabonensis Boulenger, 1889, Cat. Chelon., p. 197; 1900, Proc. Zool. Soc. London, p. 447. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 665. Siebenrock, 1903, Zool. Anz., XXVI, p. 197; 1905, XXVII, p. 461; 1907, Ann. Hofmus. Wien, XXII, p. 6; 1909, Zool. Jahrb. (Suppl.), X, p. 560.

Sternothærus derbianus (part) Gray, 1863, Ann. Mag. Nat. Hist., (3) XIII, p. 167; 1863, Proc. Zool. Soc. London, p. 194.

Sternothærus steindachneri Siebenrock, 1901, Zool. Anz., XXV, p. 6; 1903, XXVI, p. 197.

There are fifteen specimens, readily identified with this species, all from the streams of the Ituri Forest except the first mentioned, which is from the Poko, an affluent of the Bomokandi-Uele. A. M. N. H. No. 10067 (September 1913) is from Akenge; 10051–52 (January 1910), 10053 (February 1910), Gamangui; 10054–57 (August 1910), 10058–59 (September 1910), Medje; 10068 (January 1914), Niapu; 10069 (July 1913), Pawa; 10066 (August 1913), Poko; 10049–50 (August 1909), Stanleyville.

Pelusios gabonensis has hitherto been recorded from the West African forest region, from Liberia to Gaboon (absent in Togo). It is of great interest to find it abundant in the Ituri region, evidently a species characteristic of the entire Rain Forest. The influence of the Rain Forest in determining distribution is even more strikingly shown in this case than in that of *Kinixys*, for the difference in habitat for the fluviatile turtles is much less pronounced.

The imperfect development of the plastral hinge in this species and *adansonii*, which distinguishes them from the other species of *Pelusios*, is of interest. All stages in the postembryonic development of *gabonensis* are represented in the present series, from a specimen of 42 mm., with umbilicus and egg tooth and no plastral hinge, to a presumably adult individual of 192 mm. In the younger specimens the pectoral shields enter strongly into the bridge, in fact to practically the same extent as in *Pelomedusa galeata*, which never develops a hinge. These relations are exhibited in the accompanying figures of the plastra of juvenile *Pelusios nigricans*, *Pelusios gabonensis*, and *Pelomedusa galeata* (Fig. 1).

The measurements of fifteen specimens are tabulated below.

A. M. N. H. No.	Sex	Length Carapace	Width Carapace	Length Plastron	Width Plastron	Depth
10069	♀	41 mm.	33 mm.	35 mm.	25 mm.	15 mm.
10059	♀	45	41	41	30	15
10068	♀	53	47	46	33	20
10049	♀	59	52	54	40	23
10058	♀	61	53	57	42	24
10050	♀	68	58	65	45	28
10067	♀	69	58	65	44	25
10054	♀	93	73	91	59	37
10052	♀	117	84	110	68	40
10066	♂	117	87	109	68	36
10051	♀	126	90	118	72	45
10056	♀?	141	105	128	88	
10057	♀?	168	120		97	
10055	♂	184	132	170	110	49
10053	♂	192	140	168	118	58

"*P. gabonensis* resembles *P. nigricans* in essential features, with the exception of its imperfectly developed plastral hinge. Although typical of the extensive river system of the Rain Forest, very large specimens are more fluviatile in habit than the young or half grown, which may be found singly everywhere in the sufficiently swampy parts of their habitat. They are eaten by all natives. One huge specimen, with a shell more than a foot in length, was caught by the Medje in the Nepoko River; in the folds of its hind limbs many small leeches were fastened. Another, equally large, was seen in the fish market at Coquilhatville. They are often drowned in fish traps" [H. L.].

Pelomedusa Wagler

Pelomedusa galeata (Schoepff)

Text Figure 1

Testudo galeata SCHOEPFF, 1792, Testud., p. 12, Pl. III, fig. 1.

Pelomedusa galeata WAGLER, 1830, Syst. Amph., Pl. III, figs. 36–38. BOULENGER, 1889, Cat. Chelon., p. 197. SIEBENROCK, 1909, Zool. Jahrb. (Syst.), X, p. 561. LÖNNBERG, 1910, in Sjöstedt, Kilimandjaro-Meru Exp., I, part 4, p. 2. MEEK, 1910, Publ. Field Mus. Zool., VII, p. 414. NIEDEN, 1910, Fauna Deutschen Kolon., Reihe 1, Heft 2, p. 7, fig. 14. SIEBENROCK, 1910, Sitzber. Akad. Wiss. Wien (math.-natur.), CXIX, part 1, p. 734. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XV, p. 305. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162. STERNFELD, 1911, Fauna Deutschen Kolon., Reihe 4, Heft 2, p. 53, fig. 65; 1911, Mitt. Zool. Mus. Berlin, V, p. 411; 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 201. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 64.

The further bibliography of this species, probably the most extensive for any African turtle, may be found under Boulenger (1889, p. 197) and Siebenrock (1909, p. 561).

There is only a single specimen in the collection: No. 10070 (June 1912) from Garamba.

The distribution of *Pelomedusa galeata* is distinctly that of an "open country" species. Locally it may enter the forest border as in Kamerun, but the writer is unable to find a definite record from Gaboon, which is included in its range by Siebenrock (1909, p. 562). The range may be fairly well defined as Africa south of the Sahara Desert, exclusive of the continuous rain forest. The extreme records are Senegambia (Steindachner, 1870, Sitzber. Akad. Wiss. Wien math.-natur., LXII, part 1, p. 326), Eritrea (Peracca, 1904, Boll. Mus. Torino, XIX, No. 467, p. 1), Cape Colony (Boettger, 1887, Ber. Senck. Ges., p. 140), Lower Congo (Boettger, 1889, Ber. Senck. Ges., p. 13), and Sennar (Peters, 1863, Monatsber. Akad. Wiss. Berlin, p. 271).

The measurements of the single female juvenile specimen (A. M. N. H. No. 10070) are as follows: length carapace, 78; width carapace, 61; length, plastron, 69; width plastron, 50; depth, 28 mm.

"At the edge of a plateau, half a mile from the nearest brook, was a huge swamp. In June most of the surface was cracked and barren, but at the lowest point high sedges and reeds indicated the presence of water. Here we found not only the specimen described but another of its kind, nearly twice as large, and a land turtle (*Kinixys belliana*). Undoubtedly *Pelomedusa galeata*, like its relatives, wanders from pool to pool at the height of the rainy season" [H. L.].

LORICATA (CROCODILIA)

Crocodylidæ

Synopsis of the African Crocodiles

The African crocodiles may be distinguished by means of external characters as follows:

A. Snout greatly elongate, gavial-like................*C. cataphractus*.
AA. Snout moderate; teeth $\frac{18\text{–}20}{15}$; four large nuchal shields forming a square, with a lateral shield on each side; keels of the nuchals directed upward................................*C. niloticus*.
AAA. Snout short; teeth $\frac{17}{15}$; a large bony plate in the eyelid; nuchals 6, in 3 pairs longitudinally placed; keels of the nuchals very strong, laterally directed.
  B. Snout strongly upturned in front..........*Osteolæmus tetraspis*.
  BB. Snout not upturned anteriorly..........*Osteoblepharon osborni*.

By means of skull characters they may be separated as follows:

A. Nasal bones anteriorly produced, dividing the nasal aperture; a large bony plate in the eyelid; supratemporal fossæ small.
Osteolæmus (one species, *O. tetraspis*).
AA. Nasals not produced into a nasal septum, entering the nasal aperture or excluded from it by the premaxillaries.
  B. A large bony plate, composed of two pieces, in the eyelid; frontal entering the supratemporal fossæ which are small.
  Osteoblepharon (one species, *O. osborni*).
  BB. A small anterior bony plate in the eyelid; frontal not entering the supratemporal fossæ which are large............*Crocodylus*.
    C. Snout elongate, mandibular symphysis reaching the 8th tooth; nasals usually separate from the nasal aperture.
    C. cataphractus.
    CC. Snout moderate, mandibular symphysis reaching the 4th tooth; nasals usually entering the nasal aperture.
    C. niloticus.

Crocodylus Laurenti

Crocodylus cataphractus Cuvier

Plate XII, Figure 1; Text Figures 3, 4, and 5

Crocodilus cataphractus CUVIER, 1825, Ossemens Fossiles, V, part 2, p. 58, Pl. v. figs. 1 and 2. BOULENGER, 1889, Cat. Chelon., p. 279. BOCAGE, 1895, Herpétol. Angola, p. 9. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 7. BOULENGER, 1900, Proc. Zool. Soc. London, p. 447. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 348. JOHNSTON, 1906, Liberia, II, p. 817, fig. 309; 1908, George Grenfell and the Congo, II, pp. 929, 950.

Mecistops cataphractus TORNIER, 1901, Beiheft, Arch. Naturg, LXVII, p. 66; 1902, Zool. Jahrb. (Syst.), XV, pp. 579, 663. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 53.

For the earlier bibliography and synonymy of this species, reference may be made to Boulenger (1889, p. 279).

Seven specimens were secured by the Lang-Chapin Expedition: A. M. N. H. Nos. 10072 (October 1909), 10076 (August 1914) are from Avakubi; 10078 (August 1915), Banana; 10075 (April 1911), Dungu River at Faradje; 10077 (July 1915), Malela; 10073 (April–May 1910), Nepoko River near Medje; 10074 (December 1910), Niangara.

The distribution of *C. cataphractus* appears to be definitely West African, the only East African record being from a tributary of Lake Tanganyika at Ujiji, i. e., within the Congo Basin. As in the case of *Crocodylus niloticus*, the distribution does not seem to be materially affected by the Rain Forest, since the species occurs in Togo, in the Lower Congo, in the Uele, and at Ujiji, as well as in the forest (Liberia, Kamerun, Ituri).

The coloration of a juvenile specimen, in life, is "Dorsally yellowish brown, with irregular dark markings, nearly black. Venter milky white from neck to anus. Iris a bronzy brownish gray." Older specimens are somewhat darker and more obscurely colored.

A. M. N. H. Nos. 10074 and 10073 had a total length, when alive, of 106 and 207 cm.; their tails measured 51 and 85 cm. respectively. Skull No. 10075 measures as follows: length, tip of snout to quadrate, 429; snout to orbit, 295; snout to pterygoid, 385; breadth at quadratojugals, 164; breadth at pterygoids, 106; breadth of snout at orbit, 88; breadth of cranial "table," 90; interorbital width, 22; depth, squamosal to pterygoid, 98 mm. Dorsal and ventral views of skull, Figs. 3 and 4, 10075, pp. 422 and 423; nuchal plates, Fig. 5, 10075, p. 424.

PLATE XII

Figure 1. *Crocodylus cataphractus* Cuvier. A. M. N. H. No. 10072; juvenile.

Figure 2. *Crocodylus niloticus* Laurenti, the common African crocodile. Photograph used by courtesy of the New York Zoölogical Society.

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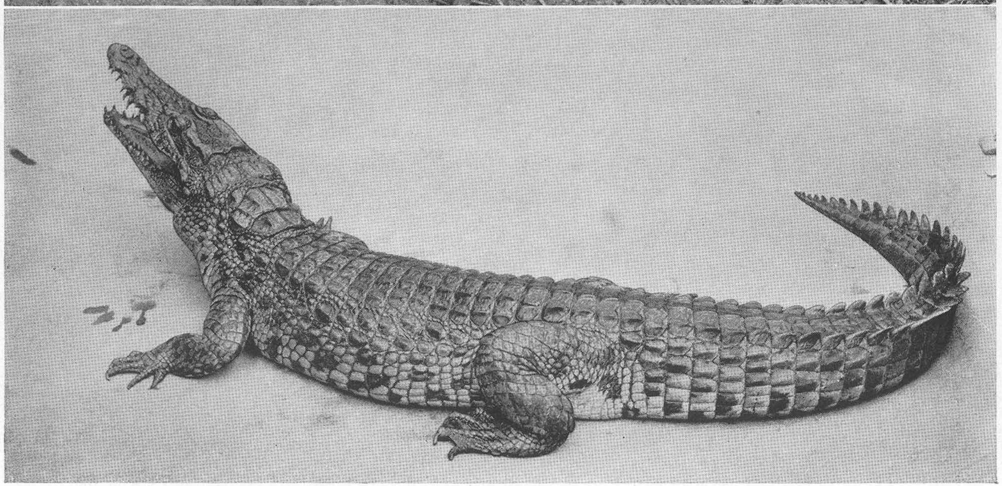

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Crocodylus niloticus Laurenti

Plate XII, Figure 2; Text Figures 3, 4, and 5

Crocodylus niloticus LAURENTI, 1768, Syn. Rept., p. 53.

Crocodilus niloticus BOULENGER, 1889, Cat. Chelon., p. 283. STEJNEGER, 1893, Proc. U. S. Nat. Mus., XVI, p. 713. BOULENGER, 1897, Proc. Zool. Soc. London, p. 800; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277. JOHNSTON, 1897, British Central Africa, p. 355. ANDERSON, 1898, Zool. Egypt, I, p. 10, Pl. I. BOULENGER, 1900, Proc. Zool. Soc. London, p. 447. FLOWER, 1900, Proc. Zool. Soc. London, p. 967. LAMPE, 1901, Jahrb. Nassau. Ver. Naturk., LIV, p. 197. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 66. BOULENGER, 1902, in Johnston, Uganda Protectorate, p. 445. JOHNSTON, 1902, Uganda Protectorate, p. 406, Pl. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 664. JOHNSTON, 1906, Liberia, II, p. 816, fig. 308. SIEBENROCK, 1906, Sitzber. Akad. Wiss. Wien (math.-natur.), CXV, part 1, p. 819. JOHNSTON, 1908, George Grenfell and the Congo, II, p. 494, fig. 483. PATTERSON, 1908, Man-eaters of Tsavo, p. 151, fig. CHUBB, 1909, Proc. Zool. Soc. London, p. 592. NIEDEN, 1910, Fauna Deutschen Kol., Reihe 1, Heft 2, p. 2, fig. 3. LÖNNBERG, 1913, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 4, figs. 1 and 2. STERNFELD, 1911, Fauna Deutschen Kol., Reihe 4, Heft 2, p. 54, fig. 54; 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 198. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 288. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 54. SIEBENROCK, 1913, in Voeltzkow, Reise in Ost-Afrika, III, p. 221.

Crocodilus vulgaris CUVIER, 1810, Ann. Mus. Hist. Nat. Paris, X, p. 40, Pl. I, figs. 5, 12, Pl. II, fig. 7. BOETTGER, 1889, Ber. Senck. Ges., p. 19. BOCAGE, 1895, Herpétol. Angola, p. 8. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 1; 1900, Zool. Jahrb. (Syst.), XIII, p. 581; 1902, XV, p. 578.

Crocodilus robustus GRANDIDIER AND VAILLANT, 1872, C. R. Acad. Sci., LXXV, p. 150. SIEBENROCK, 1903, in Voeltzkow, Reise in Ost-Afrika, III, p. 221.

Three specimens of the common African crocodile were taken: A. M. N. H. Nos. 10079 and 10081 (April 1911 and November 1912) are from Faradje; 10080 (June 1912), Garamba.

Crocodylus niloticus ranges over the whole of Africa, except Barbary and the Sahara, and reaches Madagascar and Syria. It is well known to frequent brackish and even salt water, which may in part account for its occurrence in Madagascar. On the continent it is one of the species whose distribution appears to be little influenced by the forest. Messrs. Lang and Chapin report that these crocodiles are relatively scarce in the Dungu River.

No. 10079, when freshly killed, measured 192.5 cm., the tail length 91 cm. Skull No. 10081 measures as follows: Length, snout to quadrate, 513; snout to orbit, 316; snout to pterygoid, 449; breadth at quadratojugals, 265; breadth of pterygoids, 174; breadth of snout at orbit, 180; breadth of cranial "table," 119; interorbital width, 54 mm. Dorsal and ventral views of skull, Figs. 3 and 4, 10081, pp. 422 and 423; nuchal plates, Fig. 5, 10079, p. 424.

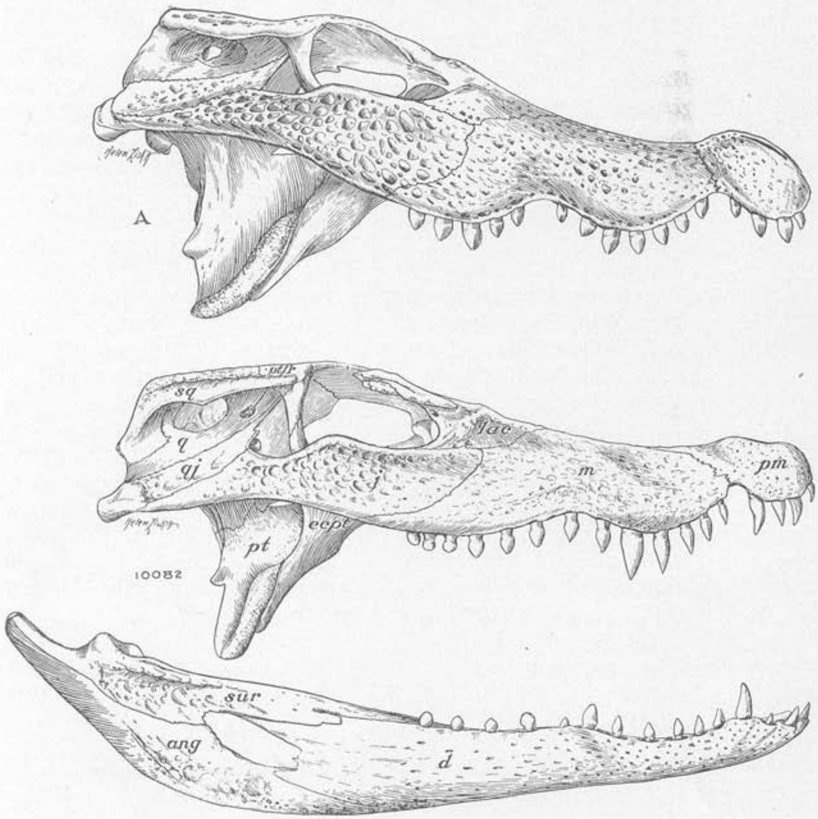

Fig. 2. Lateral views of skulls of *Osteoblepharon osborni* (type 10082, × .57) and *Osteolæmus tetraspis* (A, after Gray), and external view of the mandible of *Osteoblepharon osborni* (10082, type). Ang, angular: D, dentary; Ecpt, ectopterygoid; Fr, frontal; J, jugal; Lac, lacrimal; M, maxillary; Pm, premaxillary; Ptfr, postfrontal (? postorbital); Q, quadrate; Qj, quadratojugal; Sq, squamosal; Sur, surangular.

Osteoblepharon, new genus

Nasal bones entering the nasal aperture, not produced as a bony nasal septum. Splenial elements not entering the mandibular symphysis, which extends to the fourth tooth. Fourth mandibular tooth fitting into a notch in the upper jaw.

Teeth $\frac{17-17}{15-15}$. Ventral armour not at all ossified (?). A large bony plate, composed of two pieces, occupying nearly the whole upper eyelid. Maxillo-premaxillary suture transverse, M-shaped. Palatines narrow, with parallel sides, not produced forward beyond the anterior end of the palatal fenestra. Pterygoid produced forward to meet the palatines. Pterygoids fused, with no trace of suture. Frontal entering the supratemporal fossæ, which are small and anteriorly situated.

Intermediate between *Osteolæmus* Cope and *Crocodylus* Laurenti. Related to *Crocodylus* by the absence of the bony nasal septum. Related to *Osteolæmus* by a number of minor characters: (1) conformation and pitting of the posterior part of the skull; (2) large bony plate in eyelid, in two pieces; (3) number of teeth; (4) palatine extending no further forward than the palatal fenestra.

Distinguished from both *Crocodylus* and *Osteolæmus* by the entrance of the frontal into the supratemporal fossæ. None of the crocodile skulls accessible to the writer has the pterygoids completely fused as in the specimen of the new form.

Externally scarcely distinguished from *Osteolæmus tetraspis* Cope, except by the flatter and slenderer snout (Fig. 2).

Type, *Osteoblepharon osborni*, new species.

Osteoblepharon osborni, new species[1]

Plate XIII, Figure 1; Text Figures 2, 3, 4, and 5

?*Osteolæmus* JOHNSTON, 1908, George Grenfell and the Congo, II, p. 929.

Three specimens of the new form from the forests of the northeastern Belgian Congo: A. M. N. H. Nos. 10082–84 (December 1913) from Niapu; a fourth, collected at Stanleyville, has not been found in the collection, but a photograph of this specimen is reproduced on Plate XIII, Fig. 1.

The record of *Osteolæmus*, cited above, by Johnston is the only evidence of its occurrence in the Upper Congo Basin; and, in view of the very close external resemblance of the present form with *Osteolæmus*, it is not improbable that the new form was the one so recorded. Pending verification, then, the range of *Osteolæmus* is to be restricted to the West African rivers south of the Sahara and west of the Congo Basin, that of *Osteoblepharon* to the northern streams of the Congo system.

Diagnostic characters

Characters of the genus.

Detailed Description

Type: A. M. N. H., No. 10082 (skin and skull).

Habitus moderately stout, head short. Length of snout from anterior border of the orbit less than one and one-half its width at that point (reciprocal proportion .70). Interorbital width contained four and one-half times in the width of the flat cranial

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[1] *Osteoblepharon osborni*.—Named in honor of Professor Henry Fairfield Osborn, President of The American Museum of Natural History.

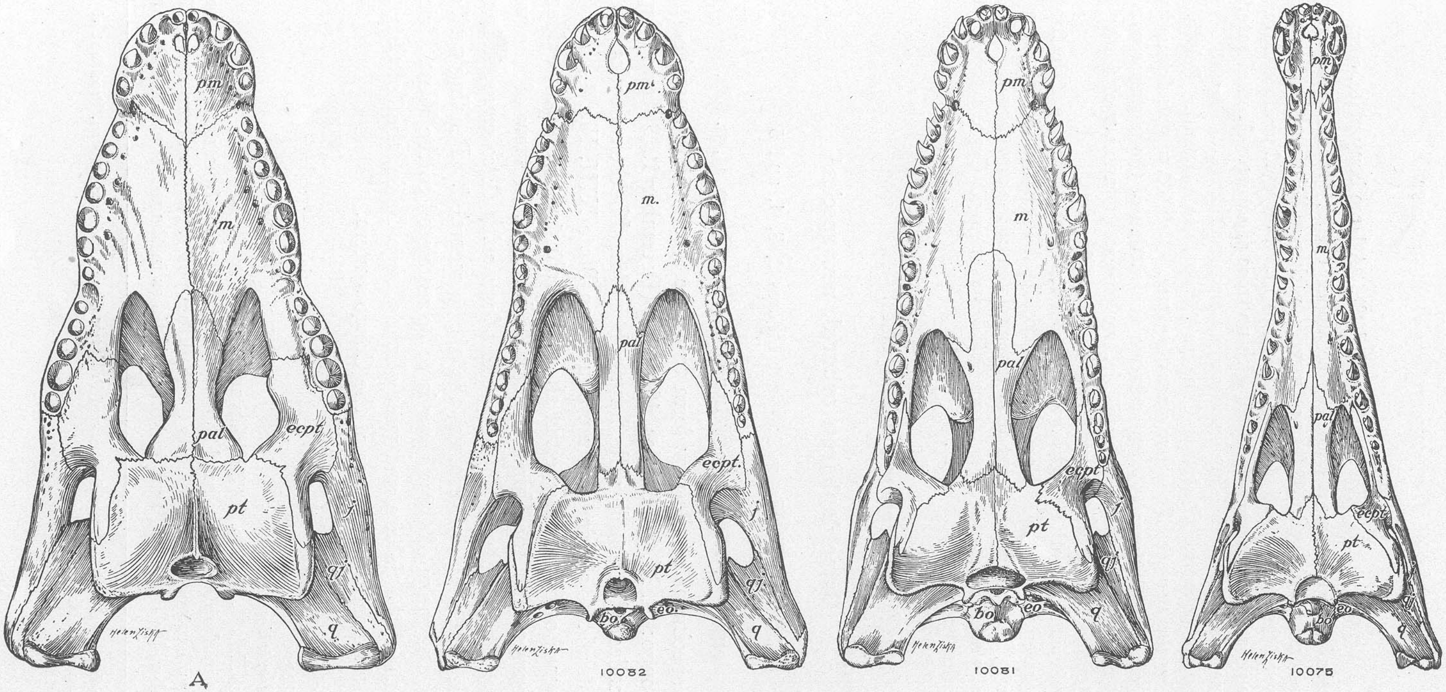
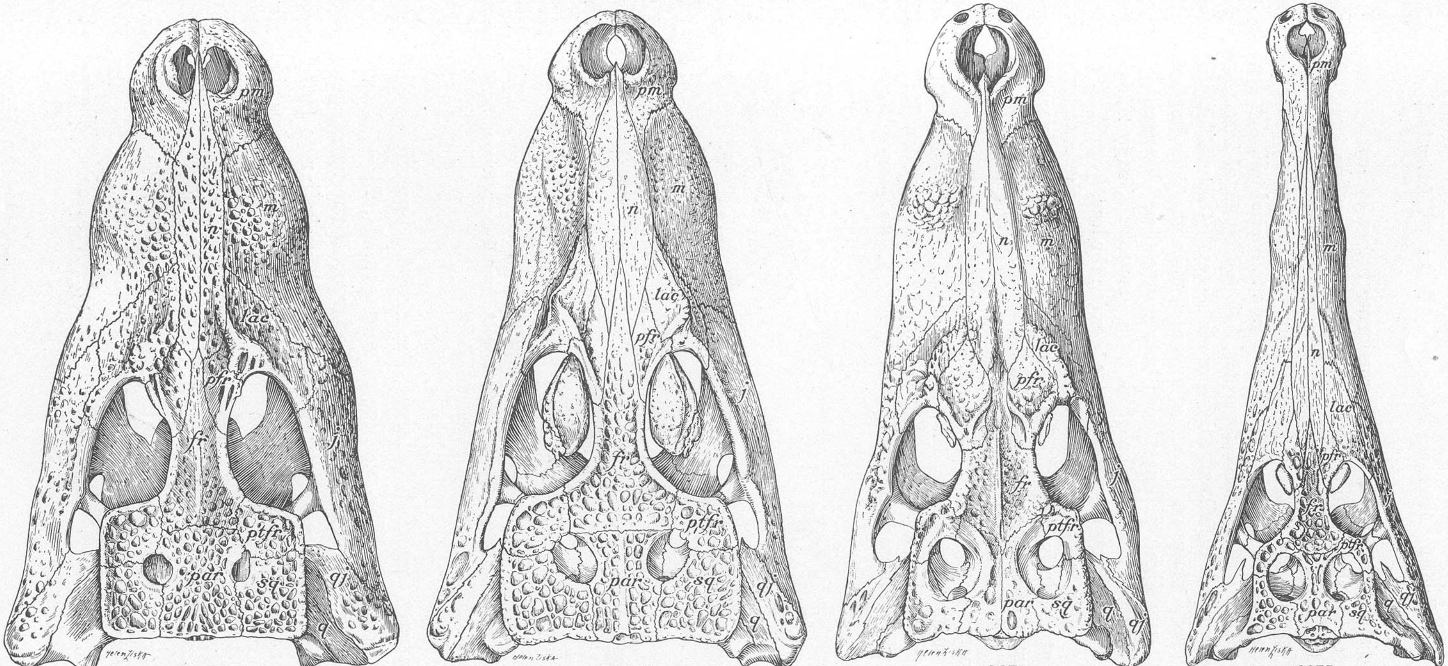


Fig. 3. Palatal views of the skulls of African crocodiles.

Crocodylus cataphractus (10075, × .21); *Crocodylus niloticus* (10081, × .18); *Osteoblepharon osborni* (10082, type, × .56); and *Osteolæmus tetraspis* (A, after Gray). Bo, basioccipital; Ecpt, ectopterygoid; Eo, exoccipital; J, jugal; M, maxillary; Pal, palatine; Pm, premaxillary; Pt, pterygoid; Q, quadrate; Qj, quadratojugal.



A 10082 10081 10075

Fig. 4. Dorsal views of the skulls of African crocodiles.

Numbers as in Fig. 3. Fr, frontal; J, jugal; Lac, lacrimal; M, maxillary; N, nasal; Par, parietal; Pfr, prefrontal; Pm, premaxillary; Ptfr, postfrontal (? postorbital); Q, quadrate; Qj, quadratojugal; Sq, squamosal.

"table." A distinct laterally directed prominence before the eye. Pitting of the dorsal surface of the skull as in *Osteolæmus*, relatively fine and uniform. Externally distinguished from *Osteolæmus tetraspis* by the lateral outline of the snout, which is not anteriorly raised. Six longitudinal dorsal rows of scutes, the two median widest, with lower keels than the lateral. Transverse rows to base of tail, eighteen; the two first anterior of four scutes, ten of six scutes, followed by six of four scutes. First four transverse rows of dorsal tail shields of six scutes. A lateral longitudinal row of about five keeled plates on the sides, separated from the dorsal armour. Web between the fingers slight, well developed between the toes. No serrated fringe on the posterior border of the leg. Fourteen transverse rows of supracaudal scutes to the union of the lateral row of ventral scutes between the legs.

Anterior nuchals in two transverse rows of four each, the anterior larger, all separate and prominently keeled. The large (posterior) nuchals six, in three pairs, anterior largest, second nearly as large, third much smaller, all with strong laterally directed keel. (Fig. 5, A. M. N. H. No. 10082).

Measurements of the skull of the type, No. 10082: length, snout to articular, 190; length, snout to quadrate, 169; length, snout to pterygoid, 142; snout to anterior border of orbit, 90; greatest breadth (at quadratojugals), 92; breadth of cranial "table," 59; interorbital breadth, 12; greatest depth, pterygoid to squamosal, 63 mm.

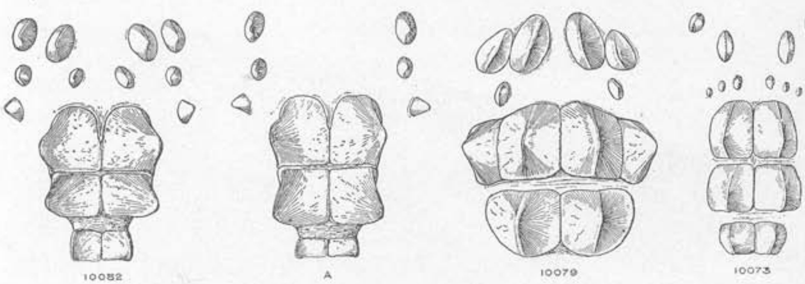


Fig. 5. Nuchal scutes of African crocodiles.

Osteoblepharon osborni (10082); *Osteolæmus tetraspis* (A, from living specimen, N. Y. Zool. Soc.); *Crocodylus niloticus* (10079); *Crocodylus cataphractus* (10073).

The paratypes, one slightly larger, the second a juvenile specimen, show very little variation. The number of supracaudals, 14 + 17 in the type, is 12 + 18 in the smaller, 13 + 12 in the larger of the paratypes.

The color of all three is very dark, probably similar to *Osteolæmus*.

The stomach contents of A. M. N. H. No. 10082 consisted chiefly of river crabs.

To facilitate comparison of the new form, figures of the skulls of the four African crocodilians are presented (Figs. 3 and 4) and the lateral views of *Osteolæmus* and *Osteoblepharon* with its mandible (Fig. 2). The figures of *Osteolæmus tetraspis* are after Gray, 1869, Trans. Zool. Soc. London, VI, Pl. xxxi, figs. 4, 5, and 6. For the comparison of external characters, the photographs of *Osteoblepharon* and *Crocodylus cataphractus* taken by Mr. Lang have been supplemented with photographs of living *Osteolæmus* and *Crocodylus niloticus*, through the courtesy of the New York Zoological Society.

Measurements of freshly killed specimens

A. M. N. H. No.	Total Length	Body	Tail
10082	1145 mm.	600 mm.	545 mm.
10083	1240	690	550
10084	655	340	315
(Field No. 139)	1300	690	610

Ecological Notes on Congo Crocodiles

The following observations are contributed by Mr. Herbert Lang.

The discovery of a new species of crocodile, *Osteoblepharon osborni*, in the interior of the Congo Basin, and the paucity of records of specimens actually identified from these regions reveal the lack of careful study of these huge reptiles in that large and interesting territory. For more than six years, while traveling in the Belgian Congo as far as the Congo-Nile divide, I had a great opportunity to gather data bearing on the ecology of crocodiles. They are distinctly scarce in all parts of the Congo visited, especially when compared with the numbers recorded from the Nile, the Zambesi, the rivers of Upper Guinea, or even as small a stream as the Tana River in East Africa. On the trip up the main river of the Congo Basin to Stanleyville it is an extraordinary event to see half a dozen at one time; two or three may be sighted together, but even single specimens are scarce. It is, of course, impossible to ascertain to what species the crocodiles thus observed belong, and these notes are written in the hope of encouraging observations based on collected material and correctly identified specimens.

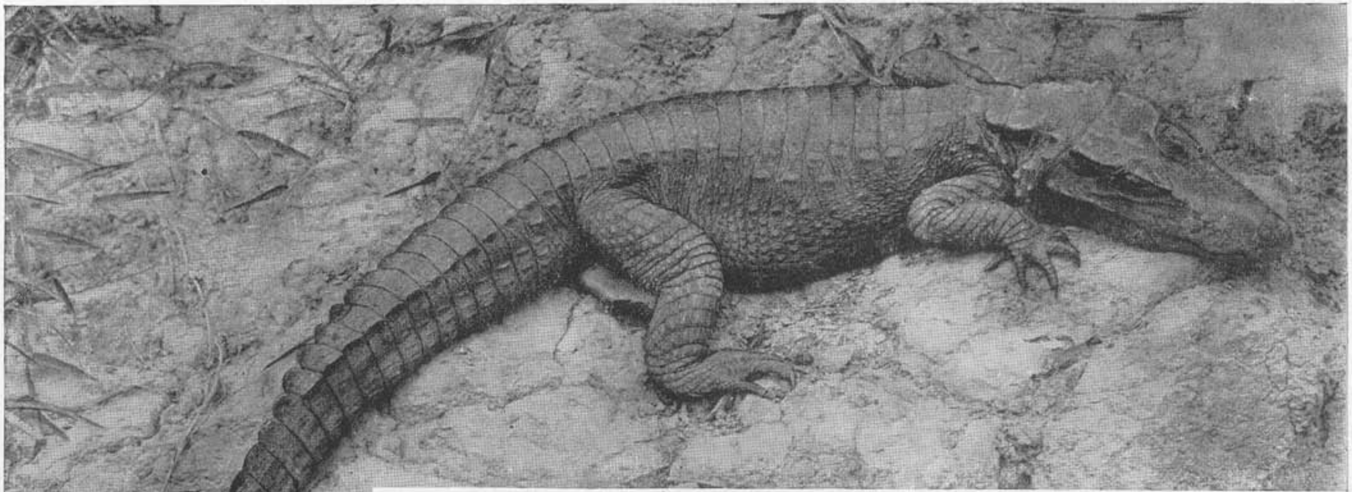
In relatively recent times man has exterminated crocodiles from a large part of South and North Africa, although a few Nile crocodiles still survive in Syria. At present not many will venture beyond Khartum, Lake Chad, and the Senegal in the north, and they seldom enter the regions south of the Kunene, the Kalahari, and the Tugela.

The tropical and subtropical climate and the general physiographical conditions have placed few obstacles in the way of their dispersal throughout Africa and, in their present range, there is practically no body of water that at one time was not, or may not become again, their home. Lake Kivu, so far as known, is one of the exceptions, for no crocodiles have been recorded there. Its mountainous surroundings, an altitude of 1460 m., and a cor-

PLATE XIII

Figure 1. *Osteoblepharon osborni,* new species. Total length 130 cm.

Figure 2. *Osteolæmus tetraspis* Cope. Total length 142 cm. Photograph by courtesy of the New York Zoölogical Society.



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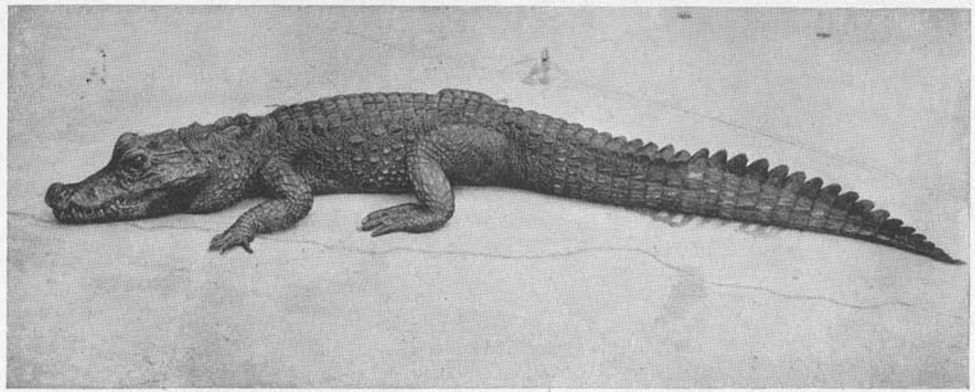

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respondingly low temperature may account for their absence; but why Lake Albert Edward, at an altitude of only 914 m., should not be visited is difficult to understand, especially as the outflowing Semliki is one of their favorite sporting grounds.

That the ecological conditions in the Western Forest Province and the more humid portions of the Sudanese Subprovince are by far more favorable than elsewhere in Africa is demonstrated by the presence of all four Ethiopian species, *Crocodilus niloticus*, *C. cataphractus*, *Osteoblepharon osborni* and *Osteolæmus tetraspis*, the latter three being the typical West African forms. Furthermore, the Nile crocodile is the only form recorded from any other part of Ethiopia.

The following short résumé of the hydrographic conditions influencing the dispersal of crocodiles in the Belgian Congo will shed some light on the problems involved. From geological evidence we know that the great, roughly square basin with only slight, peripheral elevations, was formerly a flat lake bottom, which was drained into the Atlantic through a cleft in the Crystal Mountains. The river system subsequently formed has dug innumerable shallow beds producing one of the best-watered tropical regions in the world, and its wide and tranquil stretches are elements that make it apparently the most ideal for crocodiles, especially as rapids and swifter currents are confined to short sections. This enormous river-system, with an estimated length of 3000 miles, drains an area of about 1,450,000 square miles and is second in volume only to the Amazon. Of the large bodies of water it is unparalleled in not receiving a single affluent from glaciers and in its fairly even spread to both sides of the equator. Indeed, the headwaters of the Congo, more or less intermittent and at times torrential, reach to 8° N. and 13° 30′ S. and exercise considerable influence on the life history of crocodiles, for a few degrees north of the equator the seasons are the reverse of those the same distance south. The southern affluents, including the sources of the Congo, are hydrographically by far the most important, for in April and May they may cause a rise of from twenty to twenty-five feet in the Lower Congo, at Matadi; but in October those in the north flood the central section of the main river just in time to prevent the drying out of many sand-covered banks or islands, a condition requisite for the breeding sites of the Nile crocodile.

It is surprising that *C. niloticus*, eminently adapted to regions with well regulated dry and wet seasons, should occur in the humid equatorial area of the Rain Forest. This would seem to prove that the Nile crocodile is hardier and more adaptable than other forms, but there is no obstacle to its dispersal along the regular waterways, its eggs hatching in any region with a dry season of at least two months, that is, in all sections bordering the Congo or its affluents three degrees north or south of the equator. Through generalization from the well-known life history of this species it has been maintained that sunny basking places are a necessity to the welfare of all African crocodiles. In the low-lying equatorial zone, however, excessive heat and moisture have fostered an uninterrupted and luxuriant forest from the Atlantic 1800 miles inland, covering most of the river banks as well as thousands of islands and extending as forest galleries along many of the affluents far out into the savannah. Dry, sunny places are therefore not numerous, which may partly account for the scarcity of crocodiles here, although this is perhaps of only secondary importance to the typical West African species, whose breeding habits are adapted to the moisture of the Rain Forest and of the large Guinean estuaries. Unlike the Nile crocodile, the hatching of their eggs is not dependent on an extended dry season.

It has long been known that *C. cataphractus* builds a nest of dead vegetable matter and the same was observed of *O. osborni.* About the nesting habits of *O. tetraspis* I could secure no definite information, although I am inclined to believe the native statement that they, too, deposit their eggs in mounds pushed together from what can be found near the ground. It is doubtless the females that scratch together the dead leaves and other vegetable matter in which the eggs are imbedded; the hatching is abandoned to the heat of fermentation, which also equalizes the cooling effect of occasional rains. Of importance is the selection of a place in inundated areas so swampy that termites, which are the rapid transforming agency of dead vegetable matter into humus, are barred therefrom and cannot effect this process. Such a practice can have been evolved only in a forest country and the distribution of other animals would indicate that these forest crocodiles formerly had a much wider range and only became less extended with the gradual deforestation and drying up of Africa. Owing to the general scarcity of paleontological data in most regions of Africa, it is, however, impossible to furnish conclusive proof.

The lone occurrence of crocodiles in Congo waters, in contrast with their gregariousness in other regions, makes a clearer conception of their individual habits possible. The tendency to remain stationary during certain hours of the day is well known and single crocodiles especially are apt to appear at a place very regularly, a habit traceable to their liking for basking when the heat is greatest, and special excursions are made for this purpose. They may remain for months in a locality where food is abundant, but difficulties arise at the height of the rainy season when the fish, their principal food, are also more widely scattered by the periodical inundation. In the dry season they return to the larger streams, but a few are stranded in water-holes; although some undertake long journeys by land, others are credited with enduring excessively dry periods by estivating several months in the dried-out ground.

In the northwestern Belgian Congo we found the Nile system connected with that of the Congo during the rainy season. At the end of July 1912 a large swamp near Garamba, then sufficiently flooded, allowed the passage of fishes from the headwaters of the Nile, through the Tore, to those of the Congo. A similar junction of the Tondji (Nile) and the Aka (Congo) was observed in October 1911. In this connection it is interesting to note that the Congo has 21 fishes in common with the Nile, 47 with the Niger, 25 with the Zambesi, and 29 with the Chiloango, proving, if not a present, at least a relatively recent, inter-relationship of all these river-systems. The raptorial tendency in crocodiles is strong enough to overcome reptilian sluggishness and is partly responsible for their wide distribution, exercising on them the same influence as on other predatory forms. Among fishes, the African characins may be cited as an example, and the most voracious of all, the "water-leopard" *Hydrocyon,* shows the widest distribution; among semi-aquatic mammals, the clawless otter *Aonyx,* and, within the Congo, the fish and crab-eating insectivore, *Potamogale.*

In general, it is difficult to discover crocodiles in the brownish waters of the Congo, for the forested shores, driftwood, and half-submerged boulders help conceal the small portion of the head carried above the surface; and the animal floats in silence. Snapping the jaws, hissing, and croaking are with them, as with the Felidæ, merely the expression of momentary emotion, especially in captivity. The loud intermittent bellowing of large solitary specimens may be correctly interpreted as the most forceful expression by which a sluggish reptilian communicates to great distances the longing for companionship. Though I never had conclusive proof that females were not endowed with so strong a vocal organ, in several instances bullets snuffed out the lives of actual performers and they proved to be males. At Faradje in October, a large solitary crocodile regularly announced its presence late in the afternoon by a series of intermittent bellowing sounds, and a few weeks later was joined by two others. Although at first we thought the cause of the noise might have been a hippopotamus, none had been seen in that region for the last ten years; an old lion was next suggested, but the true source was finally discovered, a crocodile that abandoned itself to the current and could hardly be distinguished from the many emerging rocks of granite.

No small amount of traveling must be done by crocodiles under the influence of sexual attraction, and two pairs of large odoriferous musk glands probably have the sole purpose of aiding this instinct by making the trail easy to follow. The two gular pouches on the inner sides of the mandible and the large excretory organ on either side of the longitudinal cloacal slit are practically always in contact with the surface upon which the crocodiles rest, imparting to these places a strong peculiar stench, and undoubtedly the whiffs carried off are a sure indication of their whereabouts to others of their kind, although they themselves remain unseen. Their sense of smell is so keen as to need the assistance of neither eyesight nor hearing and, judging from the behavior of crocodiles in localities where they have learned to fear man and his firearms, one soon finds that it is not merely the need of fresh air that prompts them to let only the nostrils emerge, but really their wariness.

In their struggles captives sometimes turn out the pockets near the chin and discharge through the cloacal opening an ill smelling fluid, showing, thereby, readiness to respond to reflexes causing excitement. It is not likely that these glands are used as a means of defense, for that is naturally left to the powerful, lacerating jaws and the forceful, well directed blows of the muscular heavily-armored tail. Young specimens play dead and sometimes secure freedom by suddenly rushing off. With legs well straightened and body and tail carried high from the ground, they run surprisingly fast, even through undergrowth dense enough to halt a man and where they often come to a sudden stop, which makes pursuit difficult and dangerous. Besides man, the greatest enemy of crocodiles is the Nile Monitor (*Varanus niloticus*), which, however, destroys only their eggs, a feat also accredited to a mongoose. In a specimen of *C. cataphractus* large numbers of leeches fastened around the cloacal slit and to the folds about the fore and hind limbs surely must have produced great inconvenience though they would never have caused death. Their intestines are singularly free from parasitic worms, due perhaps to the presence in the stomach of large stones that help crush even the bones softened by the strong digestive action undergone in the peculiar gullet.

Observations by Mr. R. L. Ditmars, curator of reptiles at The New York Zoological Park, show that in the common alligator (*Alligator mississippiensis*), attaining a maximum length of sixteen feet, the young at birth measure eight inches and weigh one and three-quarter ounces, and in the twelfth year reach nine feet three inches and weigh one hundred and ninety pounds. From the experiences of Stevenson-Hamilton (1912, Animal Life in Africa, p. 305), it appears that the rate of growth of the Nile crocodile is approximately the same up to the fourth year, that is, about one foot a year. According to Boulenger, alligators are considered sexually mature in about the eighth year, but no observations alone this line on the Nile crocodile are available.

The long-snouted crocodile, *C. cataphractus* (Plate XII, Fig. 1), attaining a length of about 12 feet, exceeds in size the other West African forms, *Osteolæmus* and *Osteoblepharon,* and is without doubt the predominant species in its habitat, occurring even in brackish water. Like the gavial of India, it represents the ideal fishing type, for the elongated snout not only stirs the fish below boulders in quieter stretches but also is easily inserted into the cavities and among roots and overhanging branches of the generally forested banks.

In view of the fact that during the last 30 years sleeping sickness has considerably decreased the number of natives in the Lower Congo, especially about the estuary, one might think that, with the principal enemy removed, crocodiles would be more numerous than ever. In addition, fish entering from the sea offer here a more abundant food supply than in any other region of the Congo I have seen. Yet, during three months of collecting in the creeks near Banana, Malela, Kunga, Moanda, Bulabemba and St. Antonio, only eleven specimens were observed, although canoe trips brought me many times to the forests of mangroves and Raphia swamps where they would naturally occur. None were found on the islands, neither on those covered with vegetation nor those resembling sandbanks or mud-flats. Those observed were lying singly in the shade near the shore, several feet above the water-level, and either ran farther into the swamps, or, as more often happened, plunged into the river. On these occasions the natives had no fear of them but at other times would not ford a creek in which they were known to occur.

Neither the Nile crocodile nor *Osteolæmus tetraspis* (Plate XIII, Fig. 2) was observed in the Lower Congo, although Pechuel-Loesche reports the latter there and natives spoke of a short-snouted species with the same breeding habits as *C. cataphractus.* Definite evidence on this point would be desirable.

The results of our collecting show that the range of *C. cataphractus* extends into the savannah as far to the northeast as Faradje, but its presence there is no more difficult to explain than that of *C. niloticus* in regions without sandbanks or other places dry enough for breeding purposes. Forest galleries along the Uele-Dungu River, its affluents, and most other streams offer suitable nesting places, accounting for the presence of *C. cataphractus* beyond the Congo-Nile divide; records from Ujiji and Togo may be traced to similar conditions and it is likely to be found in the Semliki also.

It is generally assumed that wherever established, crocodiles occur in numbers, and the many eggs in one set would partly justify such an idea, but in the inhabited areas, which in the Congo the crocodiles prefer, such broods are rapidly decimated. The difficulty the young experience in finding food at the time when ample nourishment is probably much desired was illustrated by the numbers, not yet a foot in length, the natives caught in their fish traps. They force their way into eel-pots so small that only part of the body can enter and are naturally drowned.

Stomach contents prove that they feed on anything they can find; shrimps (Palæmonidæ), crabs (Thelphusidæ), batrachians, water-snakes, fish and even grasshoppers had been eaten by young *C. cataphractus.*

The Nile crocodile, *C. niloticus* (Plate XII, Fig. 2), probably never more than 16 feet in length, proves to be the most widely distributed species, is more common outside the forest region, and is, as a rule, less timid than the typically West African forms.

On a sandy island in the Dungu River near Faradje, at the end of February, we came across a nest nearly 2 feet above water-level, and the 32 fresh eggs were covered with only 10 inches of dry sand. From other African regions come records of sets of from 20 to 90, either imbedded in one and a half feet of sand or humus or else so close to the surface as to be exposed. A. Voeltzkow, who made many interesting observations on crocodiles in Madagascar, has stated that the noise made by the mother coming to watch her nest induces the young, ready to emerge, to make a hiccup-like sound that indicates to her the proper moment for scraping from the eggs the layer of sand nearly 20 inches deep, thus helping them to hatch, after which the brood is led to the water. He also says that freshly laid eggs are extremely sensitive to moisture, probably the cause of the difference in breeding seasons in the various districts. The need for perfectly dry nesting sites prevents the Nile crocodile from gaining a foothold in the equatorial portion of the Congo where, unable to breed, it must be considered an immigrant from the northern and southern affluents.

Osteoblepharon osborni (Plate XIII, Fig. 1) is a small forest crocodile, probably never more than five feet in length, and, while resembling the short-snouted *Osteolæmus tetraspis* so greatly that in the field we considered it such, differs from it externally by its less elevated nasal region and the anterior set of dorsal scutes (Fig. 5, No. 10082); the important generic and specific characteristics can only be seen in the skull (p. 422). The largest specimen, measuring 3 feet 9 inches in total length, was caught by the Lukele near Stanleyville, 1200 miles inland, in the low-lying forests on the left bank of the Congo River; the other 3 specimens came from the Bima River (Uele) and its affluents near Niapu.

Probably the many small brooks in the Rain Forest throughout the interior of the Congo Basin are the haunts of this newly described form. Its range would therefore extend from the region of the Cataracts (Stanley Pool) to the valleys bordering the Ruwenzori. *C. cataphractus* should be considered typical of the larger rivers, whereas *Osteolæmus tetraspis,* as Mr. Schmidt suggests, would be the estuarine Guinean form, since its greatly elevated nasal region may allow it to keep floating in the choppy water in part of its habitat.

My frequent excursions along the Bima River near Niapu during January and February 1914 enabled me to become better acquainted with the habits of *O. osborni.* Here it is the principal form and usually occurs singly, is extremely timid, and loves to frequent the more extended shallow portions of the river bordered with swamps. From stomach contents it is clear that fish are the principal food. During the dry season, lasting nearly three months in 1914, from December to the end of February, few islands and even fewer sandbanks were visible, but many of the brooks had been reduced to large, scattered, muddy pools. At the beginning of the dry season, when the water-level is rapidly sinking, the Makere erect barriers containing huge eel-pots from which the fish are taken as fast as they arrive. In several villages natives were busy day and night for about a month and incidentally caught a dozen or so of these crocodiles. On a high, rocky point, completely surrounded by almost impenetrable Raphia swamps, I also saw a freshly looted nest near which a native had killed a large specimen. In a natural hollow a heap of dead vegetable matter, not more than 5 feet across and somewhat higher in the center, had evidently been pushed together with a sweep of the tail. Another old nest looked more like a quantity of accidentally heaped detritus, but a few fragments of egg-shell clearly proved the contrary.

The oft recurring accounts of large numbers of crocodiles in the Congo and their depredations are probably based on the information of natives, which is always exaggerated in direct proportion to the interest shown by the questioner. To this source can be traced the gruesome tales of man-eating crocodiles that terrified whole regions, which were delivered by a hero usually chosen at the narrator's fancy. Though ordinary precautions are taken, it is an error to think that the average Congo native, whose cannibalistic inclinations alone stamp him a warrior, could be terrified by crocodiles lingering for a while in the waters near the village, nor is his intelligence of such low order that he would suffer injury without thinking of a preventive. As a rule semicircular palisades are erected in the river near villages where crocodiles occur, providing places of safety for purposes of bathing or securing water. Then, too, each neighborhood has its hunters and fishermen, and few crocodiles could long escape the many traps, which are as cleverly adapted to the different animals as to the surroundings.

The most widely favored method of capturing them is with a hardwood stick, pointed at both ends and baited with fish or meat, and fastened to a rope in the middle. When swallowed, the stick sets itself across the body, lacerating the internal organs at every pull of the struggling and infuriated beast. Or they may be crushed in traps set near the shore by the descent of a log released as they attempt to steal the bait. The natives also show exceptional cleverness in arranging nooses, sometimes as many as three, in which the crocodiles are caught as they endeavor to secure some living, but well-protected, bait.

In native superstition crocodiles play an important rôle and there is a general belief that persons with powers of witchcraft can enter into an agreement with them and incite them to attack their unfortunate victims. This was the case with the Logo near Faradje. I was told that the Nilotic peoples near Lado, where the Nile is over 800 feet in width, daily cross in safety on rafts made of dried papyrus stalks, with their legs dangling into the water. In many tribes, such as the Mangbetu, Azande and the Logo, they become the totem of individuals, who then need not fear attack and cannot be induced to kill nor eat them, though the meat is generally highly prized. The Mangbetu at Niangara save the claws, which are worn as talismans and are said to remove all danger from injury by crocodiles, and the large teeth become pendants, and are supposed to confer powers of tenacity; stones found in the stomach and often three inches in length are used by natives of the Ituri as an aid to sorcery.

Discarding all rumors, our inquiries of officials who had resided ten years or more in the Congo failed to bring to light a dozen actual cases, and I can furnish no better proof of the scarcity of accidents from this cause than the fact that the Congo Expedition, during six years, employed over 38,000 porters and had dealings with several hundred thousand natives, and yet in all that time not one authentic case of loss of human life due to crocodiles came to our notice. Death caused by poisonous snakes is equally rare, but in the Congo leopards are responsible for more fatalities than either crocodiles or snakes. An Azande chief, in traversing a papyrus swamp near Faradje on one of the open, and often deep, elephant crossings, also used by other game, was attacked by a crocodile, which when poked with spears freed its prospective victim, having inflicted no greater damage than about twenty scratches, only a few of them deep. In another instance, cattle crossing the Dungu River at Faradje were pestered by a large crocodile which wounded a few, clipping off the tail of a cow; a similar case was observed by Dr. J. Bequaert in the Manyema.

It is worth mentioning that in the forest in the course of a day's march, 15 or 20 miles, one comes to twenty or even forty watercourses, mostly unimportant, and only the larger ones are crossed with rafts or canoes. In the savannah, half a dozen or more brooks or swamps are traversed daily, even in the dry season, and porters bathe therein without fear and when in pursuit of game seldom hesitate to enter.

In all probability the number of crocodiles has never been great in the Congo Basin, for the food supply is decidedly limited. Fish are relatively scarce, although represented by an enormous variety, some 750 species being known at present. In the forest region, large herds of game frequenting streams are unknown, and in the northeastern Uele, troops of cob or waterbuck seldom exceed a dozen or two and other animals are still scarcer; the general lack of flocks of large aquatic birds in this enormous river system is a great surprise. In certain districts of the Katanga, however, game is more abundant and Dr. J. Bequaert, who traveled for four years in the Congo, informed me that in one instance he saw as many as twenty crocodiles at Kasenga, on the sandbanks of the Luapula River, where colonies of water birds are also more common.

SQUAMATA

LACERTILIA

Geckonidæ

Key to the Genera of Geckonidæ Known from the Rain Forest

A. Digits straight, not dilated........................ *Stenodactylus.*
(An Egyptian form (*S. elegans*), the single Kamerun record possibly accidental; more probably the range extends via the Lake Chad area and the Egyptian Sudan; in any case, accidental in the Rain Forest.)

AA. Digits angularly bent, not or only slightly widened at the base.
- B. Pupil round; toes once angularly bent. Ituri...... *Gonatodes.*
- BB. Pupil round; toes twice angularly bent. Kamerun. *Ancylodactylus.*

AAA. Digits dilated.
- B. Dilation distal, the apex of the digit having two plates inferiorly, separated by a longitudinal groove.
  - C. Scales of dorsal surface of digital expansion uniform with those of the undilated basal part............ *Diplodactylus.*
  - CC. Scales above digital expansion heterogeneous. *Phyllodactylus.*

BB. Digits dilated, the distal phalanges compressed.
  C. Distal compressed joint long, arising within the extremity of the dilated portion; subdigital lamellæ in two series; inner digit well-developed. . . . . *Hemidactylus.*
  CC. Distal compressed joint very short, rising from the extremity of the dilation; digits not dilated basally; inner digit much reduced; tail-tip with adhesive lamellæ inferiorly. *Lygodactylus.*

Gonatodes Fitzinger

Synopsis of the African Species of *Gonatodes*

A. (?) Subdigital lamellæ of the angulate distal part of the digits, uniform, transverse.
(Asiatic and American species)
AA. (?) Subdigital lamellæ of the angulate part of the digits heterogeneous, transverse distally, broken up proximally.
  B. Ten to fourteen longitudinal rows of dorsal tubercles, no tubercles on the tail. . . . . *africanus.*
  BB. Four rows of tubercles or less.
    C. Four rows of tubercles on the tail. . . . . *quattuorseriatus.*
    CC. Tail without tubercles. . . . . *dickersoni.*

Gonatodes dickersoni, new species [1]

Text Figure 6; Map 4

Two specimens represent an undescribed form from the Ituri region: A. M. N. H. Nos. 10101 (April 1914) and 10102 (May–June 1914) are from Medje.

The discovery of a species of *Gonatodes* in East Africa (Werner, 1895, Verh. Zool.-Bot. Ges. Wien, XLV, p. 190) was an interesting event in African herpetology. To the original *Gonatodes africanus*, Sternfeld has recently added a second very distinct species, *Gonatodes quattuorseriatus*, from the lake region (1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exped., IV, p. 202). The present form, which is more closely related to the latter,

[1] Named in honor of Miss Mary Cynthia Dickerson, Associate Curator of Herpetology in The American Museum of Natural History.

extends the African range of the genus far to the northwest and adds a distinctly East African species to the Ituri fauna, confirming still further the endemic nature of *Gonatodes* in Africa.

Map 4. Distribution of *Gonatodes* in Africa.

□ *Gonatodes africanus.*
○ *Gonatodes quattuorseriatus.*
△ *Gonatodes dickersoni.* An eastern element in the fauna of the Ituri Forest.

The distribution of these three species presents some peculiarities. *Gonatodes africanus* is well known from Usambara and the Kilimanjaro. Mocquard (1902, Bull. Mus. Hist. Nat. Paris, VIII, p. 405) records it from the Athi Plain, British East Africa. The record from Mt. Kenia (Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 10) has been transferred to *Gonatodes quattuorseriatus* by Nieden (1913, Mitt. Zool. Mus. Berlin, VII, p. 64). This species occurs in the lake region from the northern end of Lake Tanganyika to the borders of Lake Kivu. The species here described comes from the Ituri, within the limits of the continuous Rain Forest. The accompanying map illustrates this somewhat anomalous distribution.

Diagnostic characters

Closely allied to *quattuorseriatus* Sternfeld, with very similar color pattern, differing in (1) more slender habitus; (2) absence of the tubercles on the tail; (3) lateral tubercles conic or high conic, instead of flat, nail-shaped; (4) only one row of tubercles on each side, the four, posterior, dorsal tubercles not paired with the lateral; (5) larger ventral scales, three times the size of the dorsal tubercles.

Detailed Description

Type: A. M. N. H., No. 10101, ♂.

Habitus more slender, neck more elongate and narrowed than in *quattuorseriatus*, the snout equalling or slightly exceeding the distance between eye and ear, slightly more than twice the diameter of the eye. Tail much enlarged at base, with a large conical tubercle on each side beneath, tapering regularly for the remainder of its length, exceeding the body length. Limbs and digits slender, the latter strongly angulate distally. Eye with round pupil.

Rostral broader than high, with distinct median cleft above. Nostril bordered by the rostral, the first labial, two small posterior and a large superior nasal, the latter meeting its fellow on the other side, and appearing as if cut off from the cleft portion of the rostral. Labials 5–6 above, and 5–5 below. Mental large, triangular, followed by a pair of large postmentals, which are separated by two small median postmentals in the type, by one in the paratype. Granular scales on the snout larger than those of the back of the head.

The ventral scales are rather large, three times the size of the dorsal tubercles, smooth and imbricate, 20 or 22 in a transverse series. The dorsal granules are small, with a row of conical tubercles on each side, 5 to 7 between arm and leg, and several above the swollen portion of the base of the tail, these flat and nail-like. Four tubercles posteriorly on the back, not paired with the lateral. No tubercles on the tail, which is covered above with small, smooth, slightly imbricate scales, larger on the sides, and below with a median row of transverse scales enlarged to about one-third the width of the tail.

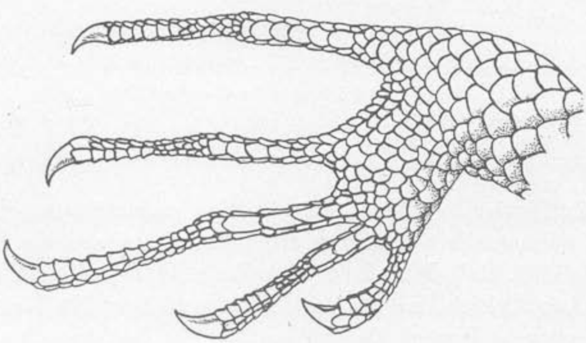


Fig. 6. Plantar view of foot of *Gonatodes dickersoni* (type, 10101, × 8). To show heterogeneity of subdigital scales of the distal part of the toes.

Color pattern as illustrated by Sternfeld (1912, Pl. vi, fig. 1) but less distinct. A fairly distinct horseshoe-shaped dark band from eye to eye over the occiput, bordered behind by a lighter band, and dark marks from eye to eye and from eye to nostril. The colors in life are pale gray on the throat and venter, lower side of tail pinkish; gray above with light brown triangular dorsal markings, 6 on the tail, 8 on the body.

There are enlarged subdigital plates on the proximal straight portion of the toes and fingers. The outer half of the distal curved part is covered below with transverse scales, while the inner half, to the angle, is covered with small elongate scales, scarcely in pairs. (Fig. 6). The non-African species of *Gonatodes* which have been accessible to the writer have uniform subdigitals on the distal part of the digits, (cf. also Boulenger, 1885, Cat. Lizards, I, Pls. V and VI) and it seems possible, as the other African species have not been explicitly described in this respect, that this character may prove distinctive of the African members of the genus.

Measurements and Scale Characters

A. M. N. H.	No. 10101, ♂	No. 10102, ♂
Anal Pores	8	7
Length	78 mm.	
Body	34	31 mm.
Tail	44 mm.	
Tail/Length	.56	
Axilla to Groin	18	16 mm.
Snout to Arm	14	13 mm.
Arm	12	11 mm.
Leg	17	16 mm.
Head Length	9	8 mm.
Head Breadth	6.5	6 mm.
Snout	3.5	3.7 mm.
Eye	1.5	1.5 mm.
Imbricate Ventrals, Transversely	22	20
Labials	$\frac{5-6}{5-5}$	$\frac{5-5}{5-5}$

Hemidactylus Cuvier

Artificial Key to the Species of *Hemidactylus* Known to Occur in the Rain Forest

A. Digits webbed at base.
  B. A lateral fold; tail laterally denticulate.
    C. Femoral pores none, preanal pores 8 . . . . *echinus.*
    CC. 21–24 femoral pores on each side . . . . *richardsoni.*
  BB. No lateral fold, tail round, without tubercles.
    C. Subdigital lamellæ 8–10 . . . . *fasciatus.*
    CC. " " 10–13 . . . . *ituriensis.*
AA. Digits not webbed at base.
  B. Subcaudal scales transversely enlarged, dorsal tubercles rounded, femoral pores continuous . . . . *mabouia.*

BB. Subcaudals enlarged, irregular, keeled dorsal tubercles in 8 rows. *ansorgii.*

BBB. Subcaudals small. Dorsal tubercles keeled, in more than 8 rows.

C. No lateral fold............................*longicephalus.*

CC. Lateral fold present, or at least a row of lateroventral tubercles.

D. Tubercles small, sharp pointed, weakly keeled. *muriceus.*

DD. Tubercles larger, keeled................*steindachneri.*

Hemidactylus mabouia (Moreau de Jonnès)

Map 5

Gecko mabouia Moreau de Jonnès, 1818, Bull. Soc. Philom. Paris, p. 138.

Hemidactylus mabouia Bianconi, 1850, Spec. Zool. Mossambicana, p. 21, Pl. i, fig. 1. Boettger, 1879, Abh. Senck. Ges., XI, p. 478, Pl. xxv, figs. 9–16; 1881, XII, p. 467. Peters, Reise nach Mossambique, III, p. 27, Pl. v, fig. 3. Boulenger, 1885, Cat. Lizards, I, p. 122. Mocquard, 1887, Bull. Soc. Philom. Paris, (7) XI, p. 133. Strauch, 1887, Mém. Acad. Sci. St. Pétersbourg, (7) XXXV, p. 31. Mocquard, 1888, Mém. Cent. Soc. Philom. Paris, p. 112. Boulenger, 1891, Proc. Zool. Soc. London, p. 306; 1891, Ann. Mus. Stor. Nat. Genova, (2) XII, p. 6. Pfeffer, 1892, Jahrb. Hamburg. Wiss. Anst., X, p. 72. Günther, 1893, Proc. Zool. Soc. London, p. 618. Stejneger, 1893, Proc. U. S. Nat. Mus., XVI, p. 714. Günther, 1894, Proc. Zool. Soc. London, p. 85. Bocage, 1895, Herpétol. Angola, p. 10. Jeude, 1895, Notes Leyden Mus., XVI, p. 227. Werner, 1895, Verh. Zool.-Bot. Ges. Wien, XLV, p. 191. Boulenger, 1896, Ann. Mus. Stor. Nat. Genova, (2) XVI, p. 550; 1896, (2) XVII, p. 17; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277; 1897, Proc. Zool. Soc. London, p. 800. Sjöstedt, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 9. Boulenger, 1898, Ann. Mag. Nat. Hist., (7) II, p. 130; 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 716; 1900, Proc. Zool. Soc. London, p. 448. Tornier, 1900, Zool. Jahrb. (Syst.), XIII, p. 586; 1901, Arch. Naturg., LXVII, p. 69. Mocquard, 1902, Bull. Mus. Hist. Nat. Paris, p. 405. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 581. Werner, 1902, Verh. Zool.-Bot. Ges. Wien., LII, p. 342. Boulenger, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 198; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 110. Johnston, 1906, Liberia, II, p. 833. Boulenger, 1907, Proc. Zool. Soc. London, p. 483. Roux, 1907, Zool. Jahrb. (Syst.), XXV, p. 405. Boulenger, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 310; 1910, Ann. S. African Mus., V, p. 458. Meek, 1910, Publ. Field Mus. Zool., VII, p. 406. Nieden, 1910, Arch. Naturg., LXXVI, p. 235. Hewitt, 1911, Ann. Transvaal Mus., III, p. 46. Lönnberg, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 10. Sternfeld, 1911, Mitt. Zool. Mus. Berlin, V,

p. 415; 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 245; 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 203. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 65.

Hemidactylus mercatorius GRAY, 1831, Zool. Misc., p. 58; 1845, Cat. Lizards, p. 155. BOETTGER, 1877, Abh. Senck. Ges. XI, p. 23, Pl. I (VI), fig. 4.

Hemidactylus platycephalus PETERS, 1854, Monatsber. Akad. Wiss. Berlin, p. 615. BOCAGE, 1873, Jorn. Sci. Lisboa, IV, p. 209. GÜNTHER, 1879, Ann. Mag. Nat. Hist., (5) III, p. 217.

Hemidactylus frenatus BOETTGER, 1878, Abh. Senck. Ges., XI, p. 275, Pl. I, fig. 1.

There are seventy-five specimens of *Hemidactylus mabouia* in the collection, all from the Lower Congo: A. M. N. H. No. 10176 (August 1915) is from Banana; 10103 (January 1915), Boma; 10177 (September 1915), St. Paul de Loanda; 10110–10175 (June–July 1915), Zambi.

The distribution of this cosmopolitan species in Africa is suggestive of

Map 5. Distribution of *Hemidactylus mabouia* in Africa. A house gecko, probably imported into Africa from the Western Hemisphere.

colonization. Both East and West African records are usually confined to the coast, though it extends to the interior in British Central Africa and even to the Lualaba (Nyangwe, Boulenger, 1897, p. 277). In South Africa, where it appears to be confined to Portuguese East Africa and the Transvaal, it is the only species of the genus which reaches its greatest diversification in North East Africa, with not fewer than fifteen species in the Somali region.

The series is very uniform in all essential characters. The dorsal tubercles are in 14–18 irregular rows and no variation in their abundance, such as that described in Madagascan specimens by Boettger (1879, p. 478), is observable. These tubercles are about one-half to one-third the diameter of the interspaces dorsally, somewhat more closely set on the sides. They may be rounded, conical, (often striate) or weakly keeled, with considerable variation in the same individual. The tubercles on the sacral region, on the whole, appear to be most frequently and most distinctly keeled. The subdigital lamellæ are constant in number within the limits given by Boulenger (1885, p. 122). The tail of the younger individuals appears to be somewhat shorter than in the adult, the head slightly longer. In no specimen do the postmentals fail to meet. In their usual disposition the first pair form a broad suture, while the second pair are rather widely separated; in eight specimens one of the anterior pair is in contact with both postmentals on the opposite side, and in three the second pair meet symmetrically behind the first.

The coloration is constant and characteristic, although the dorsal cross-bars may be entirely faded in some specimens, which are then uniform light gray with a white venter and dark digital lamellæ. Most specimens show about five dark cross-bars on the back and ten on the tail, the latter often more distinct than the dorsal. The venter is immaculate white in all save one specimen, which has the belly scales punctate with brown dots. Sjöstedt (1897, p. 9) has described a similar but more pronounced coloration in three specimens from Kamerun.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	11	109–145	120.2 mm.
	♀	11	91–128	112.7 mm.
Body	♂	25	42–64	55.0 mm.
	♀	27	38–64	51.8 mm.
Tail	♂	11	60–79	67.4 mm.
	♀	11	51–70	62.4 mm.
Tail/Length	♂	11	.54–.60	.56
	♀	11	.53–.60	.55

		Sex	No. of Specimens	Extremes	Average
	Axilla to Groin	♂	25	23–36	30.2 mm.
		♀	27	22–36	29.0 mm.
	Arm	♂	25	14–23	18.8 mm.
		♀	27	14–21	17.4 mm.
	Leg	♂	25	18–31	24.8 mm.
		♀	27	18–28	23.0 mm.
	Length Head	♂	25	12.2–18.0	15.6 mm.
		♀	27	11.8–17.5	14.6 mm.
	Ventrals, Transversely	♂	24	36–42	38.8
		♀	27	37–47	40.2
Subdigital Lamellæ	1st Finger	♂	25	5–6	5.5
		♀	27	5–6	5.4
	3rd Finger	♂	25	7–8	7.6
		♀	27	7–9	7.7
	1st Toe	♂	25	5–6	5.5
		♀	27	5–6	5.5
	3rd Toe	♂	25	8–9	8.2
		♀	27	7–9	8.2
	Femoral Pores	♂	25	12–18	15.5

"These geckos resemble *H. brookii* although the tubercles on the back as well as those of the cross-rows on the slender tail are considerably smaller. On dark wood they appear dusky, and on whitewashed walls pale white, the dark cross-bands and mottlings discernible in the extremes of both phases. In the field they hide in any dark, dry, convenient place on the ground, as well as in the hollows of trees and beneath loose pieces of bark.

"Nearly all of the sixty-five specimens from Zambi were collected in a small wooden latrine where hundreds of flies swarmed. Here, in relative darkness, they fed at all hours of the day, but in other buildings remained in hiding until nightfall. Probably the hours of their activity are dependent on the facility with which they can procure prey. After we had taken the first specimen, a thorough search resulted in the gathering of seven others, and within a fortnight more than thirty were taken from the same shed. At the sound of footsteps they ran as fast as lizards to their habitual retreat, a dark space between boards above the door, from which most of the others had been removed, passing by equally dark cracks closer to the food supply, which ordinarily consists chiefly of spiders" [H. L.].

Hemidactylus muriceus Peters

Hemidactylus muriceus PETERS, 1870, Monatsber. Akad. Wiss. Berlin, p. 641; 1881, Sitzber. Ges. Naturf. Freunde Berlin, p. 147. BOULENGER, 1885, Cat. Lizards, I, p. 123. BOCAGE, 1895, Herpétol. Angola, p. 13. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 70; 1902, Zool. Jahrb. (Syst.), XV, p. 666, Pl. xxxv, fig. 1. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 554.
Hemidactylus intestinalis WERNER, 1897, Zool. Anz., XX, p. 263.

Two specimens are referable to this species, which has been redescribed and figured by Tornier (1902, p. 666, Pl. xxxv): A. M. N. H. No. 10178 (September 1913) is from Avakubi; 10179 (June 1914), Medje.

Further records of this rare species will be of exceptional interest. The distribution, as at present known, is anomalous in including the open country north of the forest (Togo), the Rain Forest (Kamerun, Ituri) and the open country south of the forest (Kwango). The logical inference would be that it is a forest species spreading beyond the limits of the Rain Forest on either side, probably in the isolated patches of forest along the streams (there are no recorded notes on the habitat of the species), but its apparent absence from the relatively well known Gaboon country is unexplained.

The strikingly slender body and elongate legs appear to be characteristic, as are the small but long and pointed tubercles. The colors in life are rather dark brown above; the venter yellowish brown, dotted with dark spots. The coloration in alcohol of one specimen is best described as grayish brown, washed with darker, while the second has a nuchal and seven indistinct dorsal cross-bands, of which the two posterior are distinct and the two anterior are visible only as pairs of black marks, one on each side.

Measurements and Scale Characters

	No. 10178, ♂	No. 10179, ♂
Preanal Pores	10	8
Length	[84] [1]	112 mm.
Body	51	54 mm.
Tail	[33] [1]	58 mm.
Tail/Length		.51
Axilla to Groin	29	31 mm.
Snout to Arm	22	21 mm.
Arm	20	18.5 mm.
Leg	24	25 mm.
Head Length	14.3	15 mm.
Head Breadth	9.7	11 mm.
Snout	7	7 mm.
Ventrals, Transversely	35	38
Rows of Tubercles	10–12	12
Labials	$\frac{10\text{–}10}{9\text{–}9}$	$\frac{9\text{–}10}{8\text{–}8}$
Digital Lamellæ	$\frac{6\text{–}8}{6\text{–}9}$	$\frac{7\text{–}9}{7\text{–}9}$

[1] In this and similar tables, the measurements of length and tail are put in square brackets if the tail has been reproduced.

Hemidactylus longicephalus Bocage[1]

Map 6

Hemidactylus longicephalus BOCAGE, 1873, Jorn. Sci. Lisboa, IV, p. 210.
Hemidactylus longicephalus (longiceps) O'SHAUGHNESSY, 1875, Zool. Rec., X, p. 89.
Hemidactylus bocagii BOULENGER, 1885, Cat. Lizards, I, p. 125. STRAUCH, 1887, Mém. Acad. Sci. St. Pétersbourg, (7) XXXV, p. 31. BOCAGE, 1895, Herpétol. Angola, p. 11. BOULENGER, 1900, Proc. Zool. Soc. London, p. 448. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exped., IV, p. 203.
Hemidactylus hecqui BOULENGER, 1901, Ann. Mus. Congo, (2) II, fasc. 1, p. 7, Pl. III, fig. 1.

Five specimens from the Lower Congo region have been referred, with some doubt, to this species. In the absence of material for comparison, the writer has been guided by geographical probability in identifying the specimens as *longicephalus* rather than *hecqui,* as will be discussed below. A. M. N. H. No. 10180 (June 1909) is from Thysville; 10181–83 (June 1915), 10184 (July 1915), Zambi.

The geographic improbability of the occurrence of forms as closely related as *longicephalus* and *hecqui* in the same region, together with the fact that the present specimens are in some characters intermediate between the two, seems to make the reference of the single specimen of *hecqui* from Lake Tanganyika to *longicephalus* plausible at least, for the present specimens could certainly be identified from the figure of *hecqui* with that species. The majority of the records for *longicephalus* being from Angola, the fact that it was not taken in the Ituri region, together with the analogous distribution of some Sudanese species, lead the writer to the hypothesis that it is an open country species, reaching Lake Tanganyika via the forest border, and possibly invading the forest region along the sea coast, where the clearings for the plantations have modified the habitat.

These five specimens agree in a similar habitus and general appearance, in having small subcaudal scales, in the number of subdigital lamellæ, and in the possession of small, more or less keeled, tubercles in 14–16 rows. Two specimens have the first labials broadly entering the nostrils; one has them narrowly entering; and in the two juvenile specimens the first labial enters the nostril on one side, but is excluded on the other. The relations with *hecqui* are made still closer by the fact that one specimen has rather large ventral scales, 29 in a transverse series; a second has 31; the other three, 35–45. The male presents a very strong tubercle on each side of the base of the tail, as described for *longicephalus,* but not evident in the figure of *hecqui.* Finally, the dorsal coloration in one specimen is almost exactly

[1] O'Shaughnessy's emendation to *longiceps*, synonym *longiceps* Cope, cannot be accepted.

that of the figure of *hecqui*, with a fairly distinct dorsolateral light line on each side. The remaining four specimens are more obscurely colored, the venter in each case a dirty gray. The specimen from Thysville was found hiding beneath some old banana leaves lying upon a mushroom-shaped termite nest.

Measurements and Scale Characters

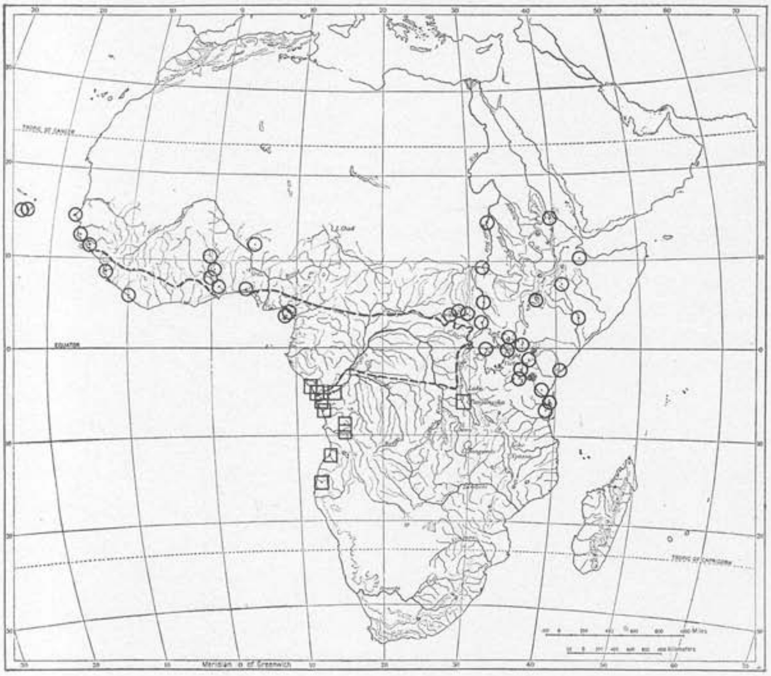
	No. 10181, ♂	No. 10180, ♀	No. 10184, ♀	No. 10182, Juv.	No. 10183, Juv.
Preanal Pores	8				
Length	[68]		90	40	46 mm.
Body	41	43	47	20	23 mm.
Tail	[27]		43	20	23 mm.
Tail/Length			.47	.50	.50
Axilla to Groin	22	23	27 mm.		
Snout to Arm	16.5	17	17 mm.		
Arm	14.5	15	15 mm.		
Leg	17	20	19 mm.		
Head Length	11.7	12	13 mm.		
Head Breadth	8	8.7	9 mm.		
Snout	5.5	5.5	6.5 mm.		
Ventrals, Transversely	41	27	35	31	36
Labials	$\frac{9-9}{9-9}$	$\frac{11-9}{9-7}$	$\frac{11-11}{9-9}$		
Subdigital Lamellæ	$\frac{6-7}{5-8}$	$\frac{6-7}{6-8}$	$\frac{6-7}{5-8}$		

Hemidactylus brookii Gray

Plate XIV, Figure 1; Map 6

Hemidactylus brookii Gray, 1844, Zool. Erebus and Terror, Pl. xv, fig. 2; 1845, Cat. Lizards, p. 153. Boulenger, 1885, Cat. Lizards, I, p. 128. Strauch, 1887, Mém. Acad. Sci. St. Pétersbourg, XXXV, p. 32. Günther, 1888, Proc. Zool. Soc. London, p. 50; 1894, p. 85. Boulenger, 1895, Proc. Zool. Soc. London, p. 532; 1896, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 6. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 12. Boulenger, 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 716. Flower, 1900, Proc. Zool. Soc. London, p. 967. Tornier, 1900, Zool. Jahrb. (Syst.), XIII, p. 586; 1901, Beiheft, Arch. Naturg., LXVII, p. 70; 1902, Zool. Jahrb. (Syst.), XV, p. 669. Peracca, 1904, Boll. Mus. Torino, XIX, No. 467, p. 2. Tornier, 1905, Zool. Jahrb. (Syst.), XXII, p. 368. Boulenger, 1906, Ann. Mus. Stor. Nat. Genova, (3) II, p. 199. Werner, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1831. Boulenger, 1908, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 5. Pellegrin, 1909, Bull. Mus. Hist. Nat. Paris, XV, p. 413. Meek, 1910, Publ. Field Mus. Zool., VII, p. 406. Lönnberg, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 10. Boulenger, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162. Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 204. Nieden, 1913, Mitt. Zool. Mus. Berlin, VII, p. 66. Klaptocz, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 280.

Hemidactylus brookii togoensis Werner, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 396; 1902, LII, p. 336.
Hemidactylus verruculatus (part) Gray, 1845, Cat. Lizards, p. 154.
Hemidactylus angulatus [1] Hallowell, 1852, Proc. Acad. Nat. Sci. Philadelphia, p. 63, fig.
Hemidactylus cyanodactylus (*non* Rafinesque) Girard, 1858, U. S. Explor. Exp., p. 254, Pl. xxv, figs. 17–24.
Hemidactylus guineensis Peters, 1866, Monatsber. Akad. Wiss. Berlin, p. 640. Bocage, 1873, Jorn. Sci. Lisboa, IV, p. 209.
Hemidactylus affinis Steindachner, 1870, Sitzber. Akad. Wiss. Wien (math.-natur.), LXII, part 1, p. 328. Boettger, 1881, Abh. Senck. Ges., XII, p. 406.



Map 6. Distribution of *Hemidactylus*.

□ *Hemidactylus longicephalus*. An Angolan species ranging to Lake Tanganyika, south of the forest.
○ *Hemidactylus brookii*. A Sudanese species extending into Northeast and East Africa and, as a house gecko, invading the forest.

Hemidactylus gleadowii Murray, with its synonymy, has been referred to *Hemidactylus brookii* by Werner (1907, p. 1831).

Seventy-nine specimens of this species were collected as follows: A. M. N. H. Nos. 10245–48 (February 1911), 10249–57 (September 1912), 10258–

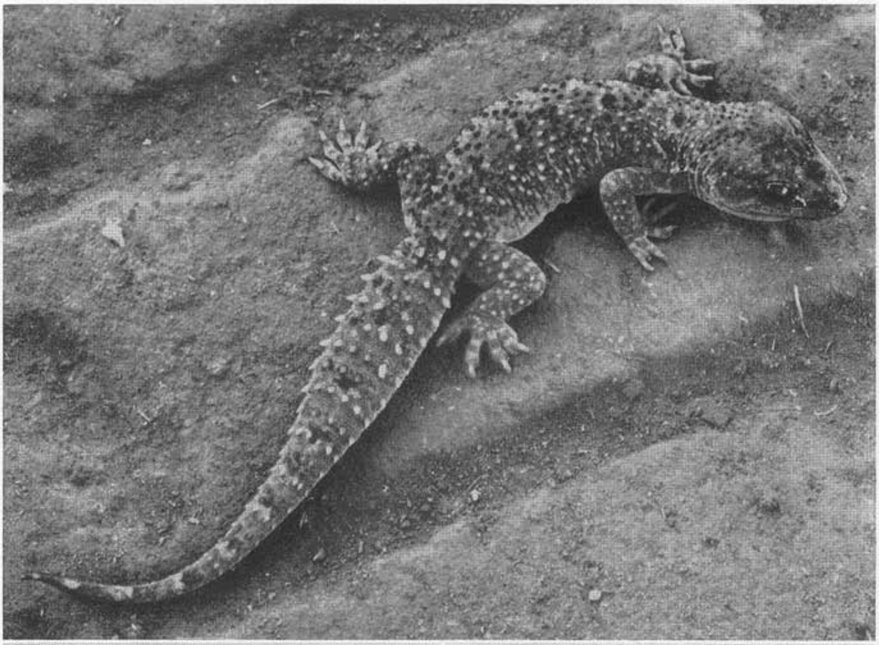
[1] Type examined.

PLATE XIV

Figure 1. *Hemidactylus brookii* Gray. A. M. N. H. No. 10254; ♀; length 122 mm.

Figure 2. *Lygodactylus picturatus gutturalis* Bocage. Dorsal view. A. M. N. H. No. 10325; ♂; length 78 mm.

Figure 3. *Lygodactylus picturatus gutturalis* Bocage. A. M. N. H. No. 10325. Ventral view with characteristic throat marking.



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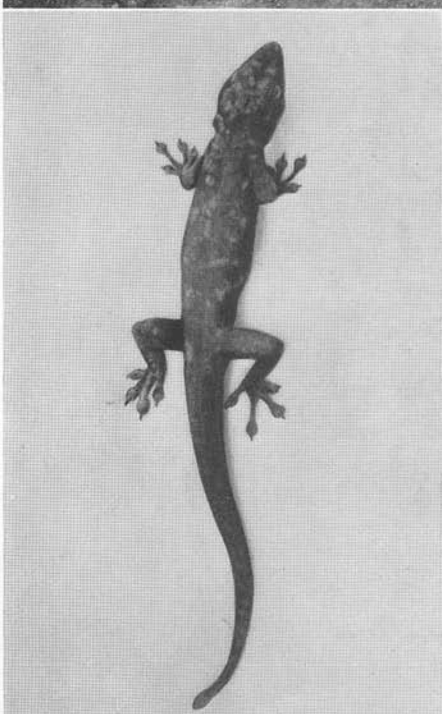
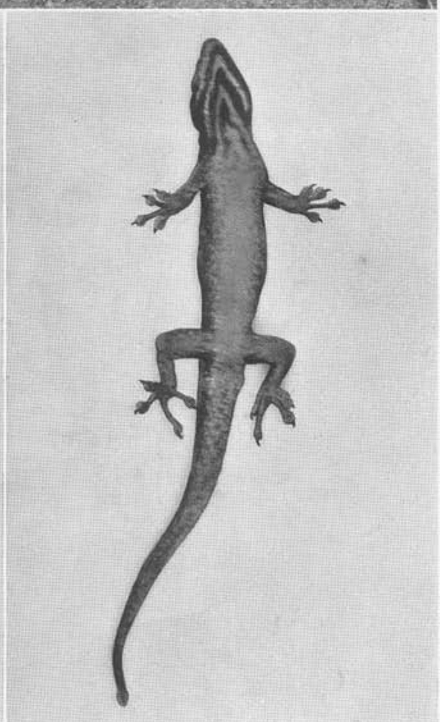




3

60 (October 1912), 10261 (November 1912), 10262–63 (January 1913) are from Faradje; 10234–43 (May 1912), 10244 (June 1912), Garamba; 10185–10229 (November 1910), Niangara; 10230–33 (November 1911), Yakuluku.

Hemidactylus brookii is a virile Sudanese species which has spread from Cape Verde, and the Cape Verde Islands, to Somaliland, invading the forest area in Sierra Leone and Liberia, and again in Kamerun, and extending well south through Uganda into the open country of German East Africa (see Map 6). If the identification of the East Indian *H. gleadowii* Murray with this species (Werner, 1907, p. 1831) is justified, its range is comparable in extent with that of *Hemidactylus mabouia.*

The measurements in the series are fairly constant. The tail length varies from .49 to .55 of the total. The maximum length, 138 mm., considerably exceeds the measurements of Boulenger (1885, I, p. 128) and Werner (1907, p. 1834), 118 and 117 mm. respectively. The head is very slightly more than a fourth of the body length. There is no appearance of incipient imbrication of the dorsal granules (Tornier, 1897, p. 12) except as the strongly imbricate ventrals are approached. The granular body scales are close-set and often keeled. The tubercles are large, larger than the interspaces, which consist usually of two, sometimes three, rows of granular scales. The mid-dorsal line is free from tubercles, with four to six rows of granular scales between the first rows of tubercles on each side. The imbricate ventrals vary from 36 to 48 in a transverse series. The subdigital lamellæ are 4–6 on the first digits, 6–9 (9 rare) on the median, a slightly wider range than given by Boulenger (1885, I, p. 128).

Werner, (1907, p. 1833), in his last mention of this species, has not referred to his subspecies *togoensis* (Werner, 1897, p. 397) characterized by large tubercles, exceeding the interspaces, and by tails *broader in the females than in the males.* This relation is the inverse of that in the eastern Sudan specimens. Tornier (1901, p. 70) has not strengthened the position of *togoensis* and it appears that the individuals from Lagos are aberrant for the species.

The first pair of postmentals are narrowly separated in twelve of the seventy-nine specimens.

The coloration has been described by Werner (1907, p. 1834) and little is to be added. The juvenile pattern may persist in the adult, and the longitudinal rows of spots appear to be derivable from the breaking up of the cross-bands.

Hallowell's *Hemidactylus angulatus* (1852, p. 63), based on a single specimen originally said to be from Liberia but in 1857 (p. 48) included with five additional specimens stated to be from Gaboon, is without doubt referable to this species. The type (Phila. Acad., No. 7431) is a shrunken and worn specimen, the shrinking having produced the apparently diagonal rows of tubercles described by Hallowell. The number and relative size of the tubercles, the disposition of the femoral pores, and the digital lamellæ, $\frac{6\text{–}8}{6\text{–}8}$, are exactly as in *brookii*, but the fact that the tubercles are worn almost flat makes identification, at first glance, difficult. The five specimens added in 1857 are obviously *brookii*, much better preserved.

The six specimens agree in having the first postmentals well separated by the mental, with one to three small scales between, and in having somewhat longer limbs in proportion to body length than the *H. brookii* of the eastern Sudan. There is a possibility, therefore, that in Liberia there may exist a race of *brookii* for which the subspecific designation *angulatus* Hallowell will have to be retained. *H. brookii* has not been recorded in more recent collections from Gaboon, and Hallowell's specimens are almost certainly from Liberia.

Each of the four specimens taken at Niangara, November 1910, contained two eggs ranging from 5 × 4 mm. to 7.6 × 6.2 mm.

Of eight stomachs examined, seven contained parasitic worms; one, a large lycosid spider; five, cockroaches; and two, termites.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	17	102–138	117.7 mm.
	♀	14	87–124	108.6 mm.
Body	♂	40	42–67	57.3 mm.
	♀	30	41–61	53.8 mm.
Tail	♂	17	54–76	62.4 mm.
	♀	18	46–67	57.0 mm.
Tail/Length	♂	17	.49–.55	.521
	♀	18	.50–.55	.525
Axilla to Groin	♂	40	27–39	31.9 mm.
	♀	30	12–35	30.7 mm.
Arm	♂	40	14–21	17.9 mm.
	♀	30	13–19	17.1 mm.
Leg	♂	40	19–27	23.2 mm.
	♀	30	18–27	22.3 mm.
Head	♂	40	12–18	15.2 mm.
	♀	30	11–16	14.1 mm.

		Sex	No. of Specimens	Extremes	Average
Ventrals, Transversely		♂	41	36–48	39.6
		♀	35	34–46	40.4
Subdigital Lamellæ	1st Finger	♂	39	4–6	4.6
		♀	37	4–5	4.3
	3rd Finger	♂	39	6–7	6.2
		♀	37	5–7	6.3
	1st Toe	♂	39	4–6	4.9
		♀	37	4–6	4.8
	3rd Toe	♂	39	6–9	7.0
		♀	37	6–8	7.0
Femoral Pores		♂	41	9–16	12.2

"The commonest geckos in the northeastern Uele belong to a widely distributed species, *H. brookii*, greatly attracted by human settlements and seldom attaining more than five and a half inches (134 mm.) in length. From other forms in the same region they are easily distinguished by the three-cornered, horny, ridged scutes dotting back and hindlimbs, and the cross-rows of pointed tubercles on the anteriorly thickened tail (Plate XIV, Fig. 1), the tip of which is covered with fine scales similar to those on regenerated tails. Their dull waxy appearance and the dusky brown, light reddish brown, or even pale gray upper side with more or less conspicuous crossbars and mottlings in the various color phases match the environment fairly well and help conceal them. Most of their life is spent hiding in darkness, sometimes as many as half a dozen together. They are generally considered nocturnal, although in the dim light of the Mangbetu huts they were active during the day. In the field they are found beneath heaps of dead and dry vegetation, pieces of wood, stones and clods, and in native huts or houses the cracks in walls or the thatch are the favorite retreats, although any dark place, an empty pot, an overturned wooden dish or a rolled up mat, is satisfactory. Perhaps their wide distribution has been helped by incidental voyages in bundles and porters' loads, into which they often creep during the night.

"In our house at Faradje we saw a few running along the ridge pole. From faint noises made, falling dust, and the frequency with which some gecko lost its foothold we concluded that these sluggards often engaged in civil strife. Many tumbled thirty feet to the brick floor, landed on their feet every time, and, after looking around for a second or two, ran off unhurt; even the fragile tail had not suffered. One still had a small white moth in its mouth, evidently the cause of the downfall (and in the cyanide jar disgorged a pellet, 15 mm. by 4 mm., of moth wings and legs). Roaches, crickets, spiders, and termites have been found in the stomach contents; with the latter, granules of quartz from the soil had apparently been swallowed. When climbing walls and walking on the ceiling, or when close to insects, they move with unexpected rapidity. They have no means of defense, and when held, they squirm, attempt to bite, faintly squeak, and often escape by leaving either tail or part of the easily torn skin in the captor's hand" [H. L.].

Hemidactylus fasciatus Gray

Plate XV, Figure 1; Map 7

Hemidactylus fasciatus GRAY, 1831, Zool. Misc., p. 58; 1845, Cat. Lizards, p. 154. PETERS, 1875, Monatsber. Akad. Wiss. Berlin, p. 197. BOULENGER, 1885, Cat. Lizards, I, p. 124, Pl. XI, fig. 4. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 13. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 6. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 133. BOULENGER, 1900, Proc. Zool. Soc. London, p. 448. TORNIER, 1901, Zool. Anz., XXIV, p. 61; 1901, Beiheft, Arch. Naturg., LXVII, p. 69. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 661. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 342. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 198. JOHNSTON, 1906, Liberia, II, p. 833. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 555; 1913, Zool. Anz., XLI, p. 234.

Leiurus ornatus GRAY, 1845, Cat. Lizards, p. 157.

Hemidactylus formosus HALLOWELL, 1856, Proc. Acad. Nat. Sci. Philadelphia, XXIV, p. 148.

There are six specimens in the present collection: A. M. N. H. Nos. 10265–69 (May–June 1914) are from Medje; 10264 (June 1913), Niangara.

H. fasciatus has been recorded chiefly from the West African region, from Liberia to the Congo. Müller (1913, p. 234) has extended its range to the eastern portion of the Rain Forest. The known distribution is shown in Map 7. While probably essentially a forest form, the Togo and Kamerun "Hinterland" records show that, like *muriceus*, it is by no means confined to the Rain Forest proper.

The only differences to be noted between the Ituri series and Boulenger's excellent description (1885, I, p. 124, Pl. XI, fig. 4) are smaller size, slightly fewer digital lamellæ, and a difference in color pattern. The average body length in the six specimens is 71 mm., as compared with 80 mm. given by Boulenger (*loc. cit.*) and 95 mm. in a specimen from Liberia (type of *H.*

formosus Hallowell). The maximum count of lamellæ is $\frac{7-8}{8-9}$; Boulenger's maximum is $\frac{8-10}{8-10}$; Hallowell's specimen has $\frac{6-10}{8-11}$.

General color light gray; tubercles lighter. There is a dead black band on the nape, anteriorly prolonged to the eyes, posteriorly notched. Three black bands on the back followed by six or seven on the tail, those behind the first two forming rings about the tail; the last ring of black may have a white spot beneath. The bands on both body and tail are outlined with white. These bands are distinctly bilobate, especially the first behind the nape, which is only one-third to one-half as wide on the mid-dorsal line as laterally. At their widest point the bands are slightly or considerably narrower than the interspace. The tail bands are subequal to the interspaces anteriorly, much longer behind; the tip either light or dark.

Map 7. Distribution of *Hemidactylus fasciatus*. Characteristic of the entire Western Forest Province; occurring outside the Rain Forest in forest "islands" along streams.

The bands of the specimen figured by Boulenger (*loc. cit.*) are subequal to the interspaces and only very slightly emarginate, in which respects Hallowell's two Liberian specimens agree exactly. More or less variation in these details is observed in specimens from Kamerun in the Museum of Zoology, University of Michigan.

PLATE XV

Figure 1. *Hemidactylus fasciatus* Gray. A. M. N. H. No. 10265; ♀; length 168 mm.

Figure 2. *Hemidactylus ituriensis*, new species. A. M. N. H. No. 10270; ♀; length 162 mm.

In the absence of field notes on the color, Tornier (1901, p. 70) may be quoted (translation) as follows: The animal is a beautiful purplish brown in the dark; the bands brownish black, the borders of these bands and interspersed smaller scales are bright golden yellow. On being brought into the light the animal soon takes on the coloration of alcoholic specimens.

Measurements and Scale Characters

	A. M. N. H.						A. N. S. P.	
	No. 10264	10265	10266	10267	10268	10269	7451[1]	7[illegible]2[1]
Sex	♀	♀	♂	♀	♀	♂	♂	♀
Femoral Pores			16–16			17–17	17–19	
Length	[138]	168	147	[112]	126	[133]		148 mm.
Body	77	77	66	74	57	76	95	70 mm.
Tail	[61]	91	81	[38]	69	[57]		78 mm.
Tail / Length		.54	.55		.55			.53
Axilla to Groin	44	47	36	43	32	44		
Snout to Arm	31	28	25	28	23	29		
Arm	26	23	22	26	19	26	32	24 mm.
Leg	32	32	29	33	24	33	37	31 mm.
Head Length	20	19	17.5	18	15	19.5	24.2	19 mm.
Head Breadth	14	14	12	14	11	14	18	14.2 mm.
Snout	8.5	8.	7.5	8.	6.8	8.	10	8 mm.
Ventrals, Transversely	42	42	38	42	42	38	38	38
Labials	10–10 / 9–10	11–11 / 10–9	10–12 / 10–10	10–9 / 9–9	9–9 / 10–9	10–10 / 9–9		
Subdigital Lamellæ	7–7 / 8–9	7–8 / 7–9	6–8 / 7–8	7–8 / 6–8	6–8 / 6–9	7–8 / 7–9	7–8 / 7–10	6–10 / 8–11

Hemidactylus ituriensis, new species

Plate XV, Figure 2; Plate XVI; Text Figure 7

Six specimens, from the forests of the northeastern affluents of the Congo (Ituri-Aruwimi, Poko-Uele, and Tshopo), have been separated from the preceding species as representing an undescribed, though closely related, form. A. M. N. H. No. 10273 (September 1913) is from Akenge; 10271 (October 1909) and 10272 (August 1914) from Avakubi; 10270 (September 1909), Batama; 10274 (July 1914), Medje; 10275 (September 1914), Panga.

Apparently this species is indigenous to the eastern part of the Rain Forest.

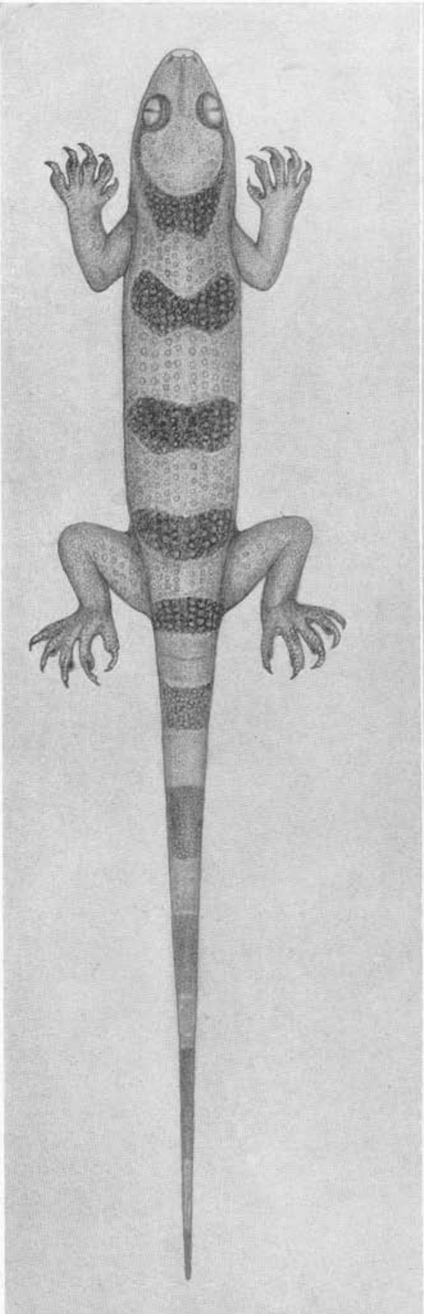
Diagnostic characters

Closely related to *H. fasciatus* Gray, somewhat stouter, with a wider and larger head, and a shorter tail. The following characters may be enumerated: (1) higher

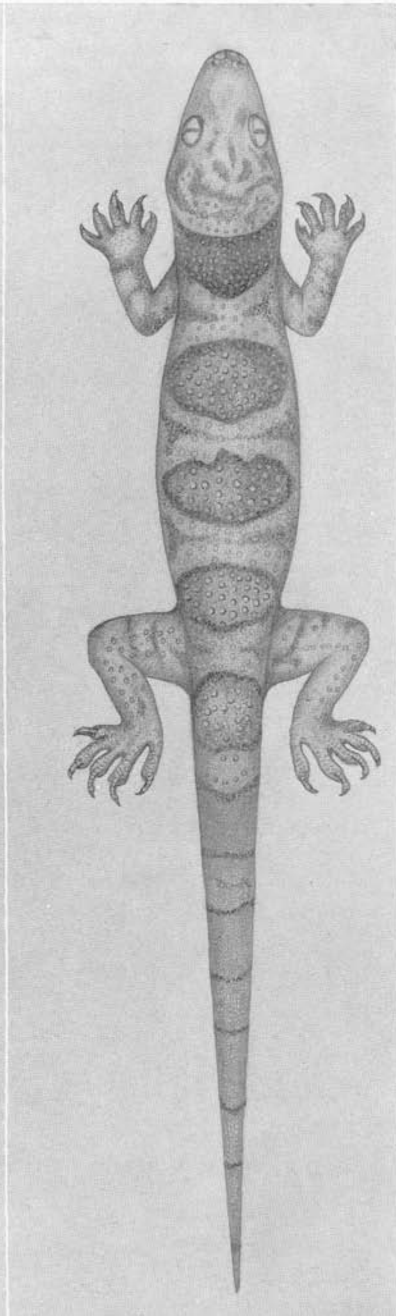
[1] Types of *H. formosus* Hallowell.

PLATE XVI

Hemidactylus ituriensis, new species, showing a variant coloration. A. M. N. H. No. 10273; ♀; length 137 mm.



1



2

number of subdigital lamellæ, from $\frac{10\text{–}10}{9\text{–}11}$ to $\frac{12\text{–}12}{11\text{–}13}$; (2) enlarged subcaudals about one-third the width of the tail, more than half the width in *fasciatus;* (3) femoral pores in the male 8–8, compared with 16–20 on each side in *fasciatus;* the very distinct coloration and head form described below may be subject to more or less variation.

Detailed Description

Type: A. M. N. H., No. 10272.

Rather stout, with strong legs, the tail shorter than the body (.48 of the length in the two specimens with entire tail). The head large, broad, and angular in outline, the breadth averaging .78 of the length. Snout longer than the distance between the eye and ear opening, twice or nearly twice the diameter of the eye, medianly grooved above, with a rounded canthus. Eye large, with vertical pupil; ear opening small, narrow, nearly horizontal in type, round or horizontally oval in the paratypes. The digits distinctly webbed at their base. A faint or fairly well developed lateral fold, without tubercles.

Snout covered with small convex granules, subequal anterior to the orbits, much smaller on the back of the head, with a few small tubercles intermixed just in front of the black band of the nape. Rostral four-sided, three-fourths as high as wide, with median cleft above. Nostril between rostral, first labial, and four or five small nasals. Labials 10–11 above, 8–9 below in the type; the extremes of the series, $\frac{9\text{–}12}{8\text{–}10}$. Mental large triangular, broader in proportion to its length than in *fasciatus;* a pair of postmentals meeting behind its point, and a series of small sublabials below the anterior lower labials.

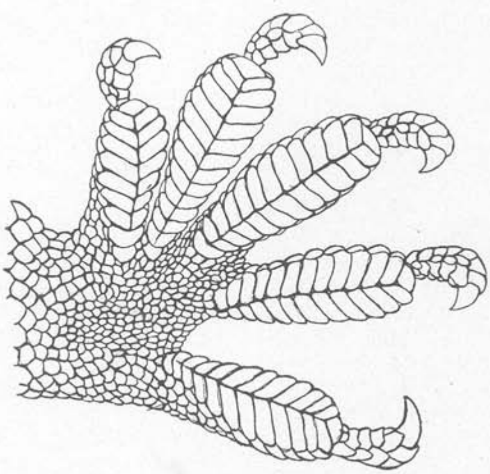


Fig. 7. Plantar view of the foot of *Hemidactylus ituriensis* (type, 10272, × 4).

Dorsal scales granular with rounded tubercles in sixteen to eighteen more or less regular rows. Ventral scales imbricate, in forty-two to forty-eight transverse series. The tail without tubercles, covered above with small imbricate scales; a series of transversely enlarged scales covering the middle third below. The subdigital lamellæ, $\frac{11\text{-}11}{10\text{-}13}$ in the type, varying in the series from $\frac{10\text{-}12}{9\text{-}11}$ to $\frac{12\text{-}12}{11\text{-}13}$. There are eight femoral pores on each side in the single male specimen.

The color pattern in general is closely similar to that of *fasciatus*, while the differences in detail are considerable. The head and light interspaces instead of being uniform are strongly mottled with dark color. The sharply defined band from eye to nape-mark in *fasciatus* is very faint or absent. The bands show no median notching (as frequent in *fasciatus*) and are wider than the interspaces, usually twice as wide. The dark bands instead of being uniform black are brownish, much lighter at the center, dark only on the border; most of the tubercles light. The legs are of the ground color of the body, similarly mottled. Venter immaculate, gray. A single specimen, No. 10273, presents the dead black bands and immaculate interspaces of *fasciatus*, but agrees in all scale characters and in the absence of the ocular band with the other five of the series (Pl. XVI).

The coloration in life, from the field notes, is

yellowish white above (tinged with greenish in one specimen) with faint dark irregular markings. Large dark brown velvety cross-bars, darker on their edges, dark brown rings over tail, lighter beneath. Venter whitish yellow, or greenish, with yellowish throat.

Measurements and Scale Characters

A. M. N. H. No.	10272	10274	10271	10273	10275	10270
Sex	♂	♀	♀	♀	♀	♀
Femoral Pores	8–8					
Length	[134]	[154]	[133]	137	[152]	162 mm.
Body	79	88	83	71	86	89 mm.
Tail	[55]	[66]	[50]	66	[66]	78 mm.
Tail /Length				.48		.48
Axilla to Groin	42	47	46	41	50	47 mm.
Snout to Arm	33	34	32	28	35	35 mm.
Arm	27	27	30	26	27	28 mm.
Leg	36	35	35	30	35	35 mm.
Head Length	20.5	23	22	18	22	22 mm.
Head Breadth	11.5	18	16.5	14	18	16.5 mm.
Snout	9	10	9	8	9.2	9.5 mm.
Ventrals, Transversely	44	42	48	42	44	42
Labials	$\frac{10\text{-}11}{8\text{-}9}$	$\frac{11\text{-}11}{9\text{-}9}$	$\frac{10\text{-}10}{9\text{-}10}$	$\frac{11\text{-}9}{9\text{-}9}$	$\frac{11\text{-}11}{9\text{-}9}$	$\frac{11\text{-}11}{9\text{-}9}$
Subdigital Lamellæ	$\frac{11\text{-}11}{10\text{-}13}$	$\frac{11\text{-}10}{11\text{-}12}$	$\frac{12\text{-}12}{11\text{-}13}$	$\frac{10\text{-}11}{10\text{-}11}$	$\frac{11\text{-}11}{9\text{-}11}$	$\frac{11\text{-}12}{10\text{-}13}$

"The specimen from Panga was taken in a hollow tree, associated with bats and flying squirrels (Bull. A. M. N. H., XXXVII, p. 545)" [H. L.].

Hemidactylus richardsoni (Gray)

Plate XVII, Figure 1; Map 8

Velernesia richardsoni Gray, 1845, Cat. Lizards, p. 156.

Hemidactylus richardsoni Boulenger, 1885, Cat. Lizards, I, p. 143. Fischer, 1888, Jahrb. Hamburg. Wiss. Anst., V, p. 49, Pl. IV. Boulenger, 1900, Proc. Zool. Soc. London, p. 448. Mocquard, 1902, Bull. Mus. Hist. Nat. Paris, VIII, p. 410. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 670. Müller, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 556.

There are ten specimens of this beautiful *Hemidactylus* from the Ituri Forest: A. M. N. H. Nos. 10281 (May 1914), 10282 (December 1913), and 10283–85 (September 1913) are from Avakubi; 10276–78 (September 1909), Bafwaboli; 10279 (May 1914) and 10280 (May–June 1914), Medje.

Map 8. Distribution of *Hemidactylus richardsoni*. A forest species, less abundant and more closely restricted to the continuous forest than *Hemidactylus fasciatus* (Map 7).

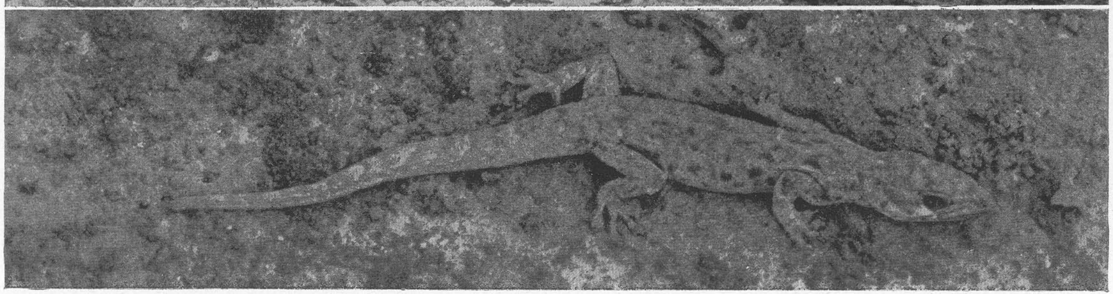
These specimens extend the range of this relatively rare species well through the Congo forest. It had been collected before only from various places in Kamerun and from Gaboon.

PLATE XVII

Figure 1. *Hemidactylus richardsoni* Gray. A rare forest gecko, protectively colored. A. M. N. H. No. 10279; ♀; length 130 mm.

Figure 2. *Lygodactylus depressus*, new species. A. M. N. H. No. 10342; ♀; length 72 mm.

1



2

Hemidactylus richardsoni has been described by Boulenger (1885, p. 143, Pl. XII, fig. 3) from the type; by Fischer (1888, p. 49, Pl. IV, fig. 10) from the next two specimens known (presenting some variations); and very well by Müller (1910, p. 556), who had ten specimens before him. Tornier (1902, p. 670) draws the correct conclusion that the dorsal marking is more vivid in the young. Little need be added to the discussion from the present series. The tubercles are uniformly present on the tail, and all the specimens have the dorsolateral rows of tubercles well developed, with two or more indistinct rows between. The enlarged sublabials (Fischer, *loc. cit.*) are rather well developed in all. The normal tail measures from .47 to .51 of the total length.

None show any trace of the three dorsal longitudinal lines described by Müller, nor have they the brown marking so vividly developed as is described for young specimens. The head pattern and dorsal cross-bands can be distinguished in the smaller specimens, the latter, as brown-dotted areas, in all of them. The postocular band is continued from the arm to the hind leg along the sides as a similar brown-dotted band, occupying the space between the dorsolateral tubercles and the lateral fold. Five or six cross-bands are more distinct on the tail. The limbs are brown-dotted above, the arms appearing to be barred. From the field notes, the colors in life are silvery gray above, with light and dark brown dorsal marks, postocular stripe, and cross-bands on the tail. The labials creamy white, the ventral surface gray with a yellow tinge; tubercles white. The statement that the living specimens change color explains the "obsolete" appearance of the markings in alcohol, though there can be little doubt that there is also a variation from juvenile to adult coloration.

Three specimens were taken from a brick wall, on which they ran with perfect ease, in the evening. One specimen fell from a tree. [L. and C.]

Measurements and Scale Characters

A. M. N. H. No.	10280	10276	10277	10278	10282	10279	10283	10281	10284	10285
Sex	♀	♀	♂	♀	♀	♂	♀	♂	♂	♂
Femoral Pores			22–24			23–23		22–21	22–22	21–22
Length	133	128	[145]		[125]	[130]	[113]	150	122	134
Body	70	64	68.5	50	76	69	69	73	64	66
Tail	63	64	[76.5]		[49]	[61]	[44]	77	58	68
Tail /Length	.47	.50						.51	.48	.51
Axilla to Groin	42	37	39	28	45	38	40	44	39	39
Snout to Arm	26	24	25	18	25	26	25	27	23	25
Arm	22	22	22	15	24	22	20	23	21	22
Leg	32	28	28	20	32	29	28	29	28	28

A. M. N. H. No.	10280	10276	10277	10278	10282	10279	10283	10281	10284	10285
Head Length	19	16	18	14	20	18	18.5	20	16.5	18
Head Breadth	15	14	15	12	16	14	14.7	15.5	13	13.5
Snout	8.	7.5	8.	6.	8.5	8	8	9	7.5	8
Ventrals, Transversely	60	72	70	68	70	66	62	64	62	64
Labials	13–14 / 10–10	13–13 / 10–10	13–12 / 8–10	12–12 / 9–10	11–12 / 9–10	11–11 / 9–9	10–11 / 9–10	12–12 / 9–9	14–12 / 9–10	12–13 / 9–10
Subdigital Lamellæ	7–8 / 7–9	7–8 / 6–9	7–9 / 6–9	5–8 / 6–8	6–9 / 6–9	6–9 / 6–9	6–8 / 6–9	7–9 / 6–9	6–8 / 6–9	6–8 / 6–10

Lygodactylus Gray

Key to the Species of *Lygodactylus* Occurring in the Rain Forest

A. Subcaudal scales small. Three species, South African, *ocellatus* Roux, *angolensis* Bocage, *capensis* Smith.

B. Mental cleft behind, three-lobed; preanal pores 4–6. Gaboon. *capensis*.

AA. Subcaudals enlarged, in two longitudinal rows. *fischeri*.

AAA. Subcaudals transversely enlarged, a single median row.

B. Habit slender; preanal pores 4; 2 lateral rows of ocelli. *conraui*.

BB. Habit stout; no ocelli; 3–4 scales between the enlarged nasals; throat with black chevrons........................*depressus*.

The species *picturatus, thomensis,* and *depressus* require comparative description. It is impossible to distinguish them by "key characters" from the existing literature; while the distinct ranges and habitats are partial evidence, at least, of their specific validity.

Lygodactylus picturatus gutturalis (Bocage)

Plate XIV, Figures 2 and 3; Map 9

Hemidactylus gutturalis Bocage, 1873, Jorn. Sci. Lisboa, IV, p. 211.

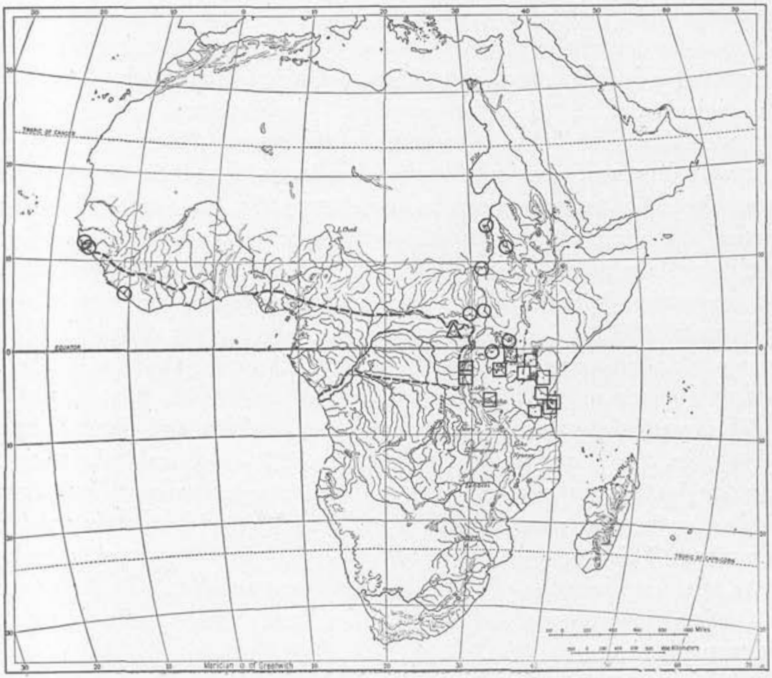
Lygodactylus gutturalis Boulenger, 1885, Cat. Lizards, I, p. 161. Günther, 1888, Proc. Zool. Soc. London, p. 50. Boulenger, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 199; 1908, (3) IV, p. 5; 1911, (3) V, p. 162.

Lygodactylus picturatus (part) Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, III, p. 15.

Lygodactylus picturatus gutturalis Werner, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1833. Barbour, 1913, Proc. Biol. Soc. Washington, XXVI, p. 145.

Fifty-five specimens of this very distinct subspecies come from Garamba, on the watershed between the Uele and the Nile: A. M. N. H. Nos. 10286–10338 (May 1912) and 10339–41 (June 1912).

Günther (1888, p. 50) has recorded this form from "Monbuttu" (Mangbetu) Upper Congo, probably not far to the west of the present locality and doubtless to the north of the Rain Forest. Werner's records (1907, p. 1833) come from less than 150 miles to the northeast. From the records of recent years, *gutturalis* appears to be much more abundant in the eastern



Map 9. Distribution of *Lygodactylus picturatus* and *Lygodactylus depressus*.

□ *Lygodactylus picturatus picturatus*. East African.

○ *Lygodactylus picturatus gutturalis*. Sudanese.

△ *Lygodactylus depressus*.

The ranges of the two subspecies of *picturatus* meet but do not overlap.

Sudan than in the type locality and it is probably a form of the eastern Sudan which has spread westward to the coast, following the more or less uniform habitat afforded by the open country north of the forest. Intermediate records, however, are lacking. The species should appear in Togo or the Kamerun "Hinterland." The distributional relationship with *L. picturatus picturatus* is close, as the latter is recorded from the lake region

(Lake Kivu: Sternfeld, 1912, p. 205) and from the northeast and southeast corners of Victoria Nyanza, while Boulenger (1908, p. 5; 1911, p. 162) records *gutturalis* from Mbale, Uganda, and from the Sesse Islands in the northwest corner of Lake Victoria.

The tail length is rather variable, .47 to .62 of the total length, and, contrary to Werner's report (1907, p. 1834) on his series from the Sudan in which there were no broken tails, twenty-nine of the fifty-four here studied have broken or renewed tails. Perhaps the most remarkable feature of the tail renewal in this species is the attempt to renew the adhesive apparatus at the tip, which is flattened and slightly widened in well-renewed tails. The regular lamellæ of the tail are not reproduced, but irregular scales beneath the tip bear the minute "hairs,"[1] which characterize both caudal and digital lamellæ. This fact appears to indicate that the tail-disc is a phylogenetically well fixed character in the genus. There are two postmentals immediately behind the mental in forty-four of the fifty-four specimens, the other ten specimens having three. The lamellæ of the widened portion of the toes are very constantly four or five in number. Two female specimens have preanal pores (seven in one, eight in the other), or at least the appearance in that the enlarged preanal scales are perforate.

Werner (1907, p. 1834) has given a very satisfactory description of the color of this subspecies, and, with all its variation in shade and tint, the pattern appears to be fairly constant.

The ovaries of three specimens collected in May and June contained 1 + 1 eggs, 5 to 6 mm. long. An egg (No. 10340), probably belonging to *Lygodactylus gutturalis*, was found May 1912 on the ground in company with an embryo or newly hatched young and an adult of this species at Garamba. This egg was 8 × 6 mm. and its shell was hard, discolored white, with circular mass of extra shell matter at one end.

Of six stomachs examined, five contained membracids and a sixth an ant and a small spider.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	18	54–78	67.6 mm.
	♀	8	60–73	66.9 mm.
Body	♂	34	26–36	33.1 mm.
	♀	20	27–38	34.1 mm.
Tail	♂	18	28–41	36.5 mm.
	♀	8	31–35	33.1 mm.

[1] These are not visible until the scales in question are partly dry, when they are very distinct under the microscope.

	Sex	No. of Specimens	Extremes	Average
Tail/Length	♂	18	.50–.54	.52
	♀	8	.47–.53	.50
Axilla to Groin	♂	34	13–22	18.3 mm.
	♀	20	14–23	19.2 mm.
Arm	♂	34	9–14	12.4 mm.
	♀	20	10–13	11.6 mm.
Leg	♂	34	11–19	15.9 mm.
	♀	20	13–17	14.8 mm.
Head Length	♂	34	7–10	8.4 mm.
	♀	20	7.7–9.5	8.7 mm.
Ventrals, Transversely	♂	34	20–28	21.0
	♀	20	22–28	25.0
Preanal Pores	♂	34	6–9	7.1
Subcaudal Lamellæ	♂, ♀	26	5–7	6.0

"A remarkable little arboreal gecko seldom more than three inches (76 mm.) long, with two color phases, dark and light, both broken up by irregular, dusky mottlings resembling the general appearance of the bark of trees in its habitat. Three arrow-shaped black lines on the throat and the yellowish venter (Plate XIV, Figs. 2 and 3) are typical of this species, but the really unique feature distinguishing it from all other geckos is the adhesive pad on the tip of the tail, formed again, as Mr. Schmidt points out, in regenerated tails. In the savannah the great thickness of the rough bark of many trees protects them from destruction by annual grass fires, and for a time the charred condition makes climbing difficult for so small a species, for even the widened lamellar pads near the claws often cannot adhere to such ash-covered or dusty surfaces. An adhesive apparatus at the end of the strong, muscular, flexible tail, capable of supporting the whole weight of the body in any position, is of course of extraordinary advantage. It was no small surprise to see so typical an arboreal form living on the ground; nearly all of the fifty-five specimens were found hiding near the earth, sometimes clinging upside down to pieces of wood; but the reason for this change in habitat is easily explained. In May and June, the beginning of the rainy season, the Mondo and Baka plant their fields. Some time before, they clear large patches of brush and former plantations, piling heaps of the cumbersome rubbish, which is burned when dry. The many tiny creatures living in this scrub are thus thrown together and others are attracted by such accumulations, true also of the few reptiles which prey upon them. In these regions dead vegetable matter is otherwise scarce and it seems natural that so alert and agile a gecko, accustomed to daylight, should come in numbers to profit by an increase in food, which is more varied than that of any of its relatives and includes several diurnal forms of great activity. Spiders, termites, ants, tiny wasps, flies, various beetles, bugs, and the larvæ of some of the last three mentioned were taken" [H. L.].

Lygodactylus depressus, new species

Plate XVII, Figure 2; Map 9

Five specimens of *Lygodactylus* from the Ituri Forest, though differentiated with some difficulty, require special description: A. M. N. H. Nos. 10342 (April 1914), 10343 (May 1914), and 10344–46 (May–June 1914) are from Medje.

The distribution of several species of this genus, with the type locality of the present form, which is the only one so far recorded from the eastern part of the Rain Forest, is shown on Map 9.

Diagnostic Characters

Subcaudals transversely enlarged; habitus stout, depressed; head flat; orbits little raised. Venter immaculate, throat with V-shaped black markings. Dorsum mottled bluish gray and black. Three to four scales between the enlarged nasals. Seven preanal pores.

Detailed Description

Type: A. M. N. H., No. 10345, ♂.

Strikingly different in habitus from the preceding species; body more flattened, head more depressed, and legs shorter. Snout without distinct *canthus rostralis*. Diameter of eye contained in length of snout twice. Orbits scarcely raised above the general contour of the head. Tail .51 of the total length.

Dorsal granular scales somewhat smaller than in *Lygodactylus picturatus gutturalis*. Scales on upper side of tail flat, imbricate. Ventrals imbricate, twenty-six in a transverse row. Subcaudals transversely widened. Nostril bounded by the first labial and three nasals, a large anterior and two very small posterior. Four small scales between the anterior nasals. Postmentals, three. Labials, seven above and below. The lamellæ of the digital expansions of the fingers and toes, five. Subcaudal lamellæ, eight.

Coloration dark bluish gray, irregularly mottled with black, more heavily anteriorly. A dark mark from eye to eye, and a second across the snout. Tip of snout, black. An indistinct line through the eye to the shoulder. Venter and enlarged subcaudals immaculate yellow in life — an apparently constant distinction from *Lygodactylus picturatus gutturalis*. Throat with two V-shaped, narrow, black marks, enclosing a third median spot.

Chevrons of the throat equally distinct in the female (only two V's in three of the paratypes) narrower than in *gutturalis*. Postmentals three in three of the specimens, two in the two remaining. Series otherwise relatively uniform.

The relation of this species with *L. picturatus picturatus* (Peters) appears to be close; its coloration is in some respects similar but does not seem to fall within the wide variation described by Tornier (1897, pp. 15–24). The peculiar, flattened body, with its shorter hind legs, seems to be the most distinctive character.

Measurements and Scale Characters

A. M. N. H. No.	10343	10342	10344	10346	10345
Sex	♂	♀	♂	♂	♂
Preanal Pores	7		8	7	7
Length		72	74	[78]	78 mm.
Body	36	35	36	38	38 mm.
Tail		37	38	[39]	40 mm.
Tail/Length		.51	.51		.51
Axilla to Groin	20	20	20	20	22 mm.
Snout to Arm	14	13.5	13.5	15	14 mm.
Arm	13	12	13	12	13 mm.
Leg	15	15	14	15	15 mm.
Head Length	9.5	9.6	9.0		10.0 mm.
Head Breadth	7.6	6.5	7.0		7.5 mm.
Snout	4.6	4.5	4.5		5.0 mm.
Postmentals	2–5	3–5	3–5	2–5	3–5
Ventrals, Transversely	26	28	25	26	26
Labials	7–8 / 7–7	7–7 / 7–7	7–7 / 7–7	7–7 / 7–7	7–7 / 7–7
Subcaudal Lamellæ		6	7		8

"The coloration is changeable in life. One specimen was entirely black when caught, turning bluish gray when injected. One specimen was taken under the bark of a fallen tree" [H. L.].

AGAMIDÆ

Agama Daudin

The three species of *Agama* found in the Rain Forest are readily distinguished as follows:

A. Lepidosis homogeneous. . . . . *A. colonorum.*

AA. Lepidosis heterogeneous, large scales intermixed with smaller ones on the dorsum.

B. Snout broad, obtuse; enlarged dorsal scales relatively few, not crowded at the mid-dorsal line. (Kamerun). . . . . . *A. mehelyi.*

BB. Snout pointed; enlarged dorsal scales more numerous, crowded along the vertical line. (Ituri). . . . . *A. atricollis.*

"The dull, usually keeled, or spinous, scales are a noteworthy feature in these common and rather wary lizards, the males of which become 13 inches (330 mm.) in length. Apart from the slight nuchal crest and the small clusters of spikelets around the ear and on the side of the neck, the disposition of nearly all the highly modified scales indicates that they are of some assistance in progress. One readily observes that the great ease and confidence with which they move up or down rocks and tree trunks depend more on the specialized scales on the lower surface of the toes than on the claws; the spinous scales along the sides of the body, the limbs, and especially the tail must be equally helpful at times.

"Two species of *Agama* are represented in the collection: *A. colonorum*, chiefly inhabiting the moist West African forest, and *A. atricollis*, the dry East and South African savannah; both require open, sunny places and in the greater part of their habitat naturally depend on and shift with human settlements. The presence of the East African *A. atricollis* in the Ituri Forest nearly as far north as the Uele watershed is attributable to the caravan traffic of the Arabs in former times. The two species of *Agama* are among these lizards which often creep into porters' loads, which partly accounts for their extended distribution. Their liveliness and intense coloration depend on sunshine, and even a slight rain sends them to their hiding places; in fact, the genus *Agama*, common in Africa and Asia, is absent from all the cooler parts of the Palearctic Region and, curiously, also from Madagascar. Refuge is sought in any suitable spot provided by nature and in or near human settlements, not for the sake of darkness but for protection from moisture, especially the heavy dewfall that in those regions often exceeds the frequent showers of rain. Then the males lose their quarrelsome spirit, the gregarious instinct gains the upper hand, and all sizes huddle together; when picked up, stiff and inert, they show no readiness to bite.

"The two species present no particular dissimilarity in habits and both are extremely wary and quick to evade capture. Like some squirrels they always dodge from view and, especially when perched in a tree, escape on the side turned away from the observer. During the greatest heat of the day, the more active, brighter colored adult males love to exhibit themselves in solitary splendor, always in places flooded with sunshine, and their colors appear so much more gorgeous under the direct influence of the sun; fences, stone piles, tree trunks, and the perpendicular stems of palms are equally attractive. They may remain motionless, but often perform the well-known, peculiar nodding motion.

"Color differences in adult males of *A. colonorum* deserve more careful study. In the Lower Congo we found the head bright reddish brown, in the Ituri yellowish, and from the Gold Coast come records of flamescarlet. The males of *A. atricollis* have bright blue on body, head, and part of the tail (Pl. XVIII).

"The tables (pp. 476, 479) compiled by Mr. Schmidt clearly show that in the two species recorded the males are somewhat larger than the females, a fact even more noticeable in the field. The relative slenderness, dull coloration, and less bold movements of the latter distinguish them from even young males, which, like many of the females, bear a dark irregular pattern on the back, limbs, and part of the tail. *A. colonorum* attains its greatest length, 13.08 inches (332 mm.), in the Rain Forest, is smaller in the Lower Congo, 12.32 inches (313 mm.), and still smaller in the Sudan, 11.25 inches (286 mm.). The regular and abundant food supply in the Rain Forest, where there is practically no dry season, offers more ideal conditions than in the arid Sudan, and may account for the chief differences in size. The agility and powerful dentition enables them to feed on all sorts of insects; beetles, bugs, roaches, grasshoppers, ants, and even bees are quickly dispatched, and caterpillars, snails, and pillbugs are occasionally taken. I saw a male *A. colonorum* kill a huge grasshopper nearly four inches long with two bites and frighten off a chicken ready to dispute the prey by showing its readiness to attack.

"Men and children of the Mangbetu and other tribes of the Ituri and Uele districts do not refrain from eating this lizard. The head of a male, considered a powerful aphrodisiac by some, is always removed, and when dried is worn as an amulet; if immediate effects are desired the head is charred and powdered, and taken with plenty of banana wine" [H. L.].

Agama colonorum Daudin

Plate XVIII, Figure 2; Map 10

Agama colonorum Daudin, 1830, Hist. Nat. Rept., III, p. 356. Griffith, 1831, Cuvier's Animal Kingdom, IX, p. 123. Duméril and Bibron, 1837, Erpétol. Gén., IV, p. 489. Duméril, 1861, Arch. Mus. Hist. Nat. Paris, X, p. 176. Steindachner, 1870, Sitzber. Akad. Wiss. Wien (math.-natur.), LXII, part 1, p. 330. Reichenow, 1874, Arch. Naturg., XL, part 1, p. 295. Boettger, 1881, Abh. Senck. Ges., XII, p. 407. Boulenger, 1885, Cat. Lizards, I, p. 356. Boettger, 1887–1888, Ber. Senck. Ges., p. 22. Stejneger, 1893, Proc. U. S. Nat. Mus., XVI, p. 717. Bocage, 1895, Herpétol. Angola, p. 17. Boulenger, 1895, Ann. Mag. Nat. Hist., (6) XVI, p. 167. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 29. Sjöstedt, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 13. Werner, 1897, Verh. Zool. Bot. Ges. Wien, XLVII, p. 397. Boulenger, 1898, Ann. Mus. Stor. Nat. Genova, (2) XVIII, p. 717. Werner, 1899, Verh. Zool. Bot.

Ges. Wien., XLIX, p. 133. BOULENGER, 1900, Proc. Zool. Soc. London, p. 448. TORNIER, 1900, Zool. Jahrb. (Syst.), XII, p. 589. LAMPE, 1901, Jahrb. Nassau. Ver. Naturk., LIV, p. 205. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 72; 1901, Zool. Anz., XXIV, p. 61, JOHNSTON, 1902, Uganda Protectorate, I, p. 445. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 672. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 333, 336, 342. PERACCA, 1904, Boll. Mus. Torino, XIX, No. 467. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 200. TORNIER, 1905, Zool. Jahrb. (Syst.), XXII, p. 371. NEUMANN, 1905, Zool. Jahrb. (Syst.), XXII, p. 392. JOHNSTON, 1906, Liberia, II, pp. 814, 833, Pl. WERNER, 1907, Sitzber. Akad. Wiss. Wien, (math.-natur.), CXVI, part 1, p. 1889. PELLEGRIN, 1909, Bull. Mus. Hist. Nat. Paris, XV, p. 413. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 95. MEEK, 1910, Publ. Field Mus. Zool., VII, p. 407. NIEDEN, Fauna Deutschen Kolonien, Reihe I, Kamerun, Heft 2, p. 16. PERACCA, 1910, in Il Ruwenzori, p. 2. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, pp. 199, 207. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 69. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 281. LAMBORN, 1913, Proc. Zool. Soc. London, p. 218. WERNER, 1913, in Brehm's Tierleben, 4th Ed., V, p. 43. BOULENGER, 1914, Rept. and Batr., p. 60.

Agama colonorum congica PETERS, 1877, Monatsber. Akad. Wiss. Berlin, p. 612.

Agama occipitalis GRAY, 1831, Synopsis, p. 56, in Griffith, Cuvier's Animal Kingdom, IX. GRAY, 1845, Cat. Lizards, p. 256.

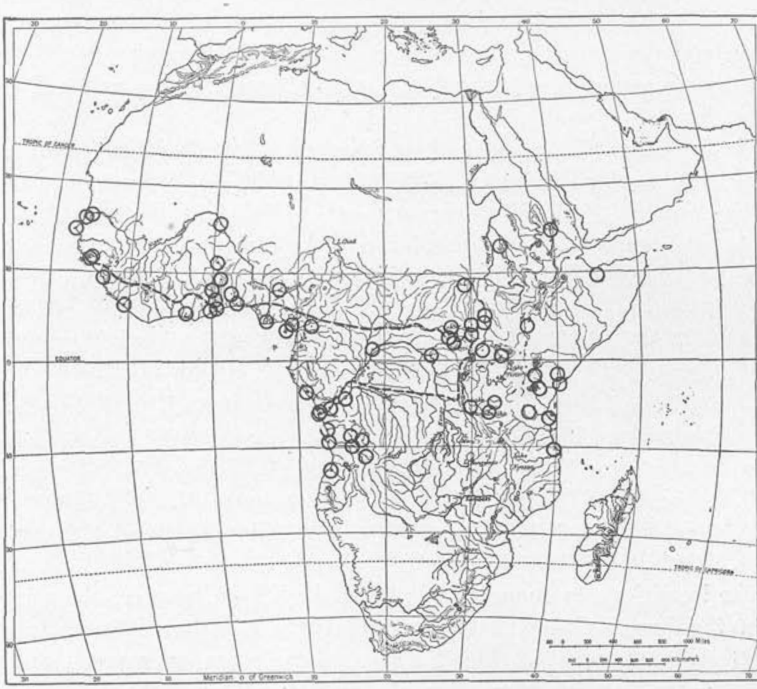
Agama picticauda PETERS, 1877, Monatsber. Akad. Wiss. Berlin, pp. 612, 620.

The involved early synonymy of this species has been dealt with by Duméril and Bibron (1837, p. 489). In recent years the status of *Agama hartmanni* Peters (1869, Monatsber. Akad. Wiss. Berlin, p. 65) and of *Agama doriæ* Boulenger (1885, Ann. Mus. Stor. Nat. Genova, (2) II, p. 13) with relation to *colonorum* has been questioned. A summary of the somewhat voluminous discussion is offered herewith. Anderson (1898, Zool. Egypt, I, p. 119), after examination of the type of *doriæ* and of photographs and descriptions of the unique type of *hartmanni*, very convincingly argues that the species are identical. Tornier (1905, p. 37) however, dealing with specimens from northeastern Africa, reaffirms the distinctness of *doriæ*, evidently after comparison with the type of *hartmanni*, and Neumann (1905, p. 391) points out the distinctness of the habitat of *doriæ* and *colonorum* in the same region. Werner (1907, p. 1836) adopts a provisional standpoint but argues that, if *doriæ* were identical with *hartmanni*, both must belong to *colonorum*, from consideration of the geographical relationships and the fact that *doriæ* is in any case very closely related to *colonorum*. Barbour, (1913, Proc. Biol. Soc. Wash., XXVI, p. 146) has overlooked the subjunctive in Werner's paper, and is puzzled as to his meaning; and, although Werner's position seems clear enough to the writer, Nieden (1913, p. 69) also misunderstands his provisional standpoint, for he quotes him as uniting *doriæ* and *colonorum* outright. Nieden adds clarity to the discussion by referring all of the so-called *doriæ* from German East Africa to *colonorum*, restricting *doriæ* to the Abyssinian highlands. The problem is thus freed, in part, from the geographical considerations of Werner and, although the difference on which *doriæ* is based is still slight, there seems no reason for doubting its validity. There remains only the fact that the reestablishment of *doriæ* has proceeded without examination of the type and, until the identification of the *doriæ* of the German herpetologists with that of Boulenger is made certain and the status of *hartmanni* is settled by an examination of both types by the same herpetologist, the question cannot be considered definitely closed.

Of this species 134 specimens were collected: A. M. N. H. Nos. 10465–66 (April 1913) are from Bafuka; 10379–80 (August 1915), Banana; 10467–80, Belgian Congo; 10451–52 (February 1911), 10453–54 (February 1912), 10454*a* (September 1912), Faradje; 10386 (January 1910), Gamangui; 10455–60 (March 1910), Garamba; 10348–51, 10382 (July 1909), Leopoldville; 10358–78 (July 1915), Malela; 10357 (June 1915), Matadi; 10387–92 (January 1910), 10393–95 (March 1910), 10396–403 (April–May 1910), 10404 (June 1910), 10405–7 (September 1910), 10408–11 (April 1914), 10412–23 (June 1914), Medje; 10428–49 (November 1910), 10450 (April 1913), Niangara; 10425 (November 1913), Niapu; 10381 (July 1909), Nouvelle Anvers; 10426–27 (September 1914), Panga; 10424 (August 1913), Poko; 10383 (August 1909), 10384 (October 1914), 10385 (December 1914), Stanleyville; 10347 (July 1909), Thysville; 10461–64 (November 1911), Yakuluku; 10352–56 (June 1915), Zambi.

The localities add connecting links in the known range of the species. From the Lower Congo it had previously been reported from Banana (Boettger, 1888, p. 22). The Sudanese records are approached on the northeast by Werner's from Mongalla and Gondokoro. The species had not previously been recorded from the Ituri Forest and it appears to be absent from the eastern portion, being replaced at Avakubi by the following species (*Agama atricollis*). Abundant in Uganda, it was not taken in the region to the south by the Deutsch. Zentral Afrika Expedition (Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV). From the general distribution and the preference of the species for clearings, this appears to be a Sudanese form which has invaded the forest and spread far south of it on the West Coast. The range overlaps that of *Agama atricollis* in German East Africa.

The variations observable in the series are moderate. A constant difference in the coloration of the adult males from the Lower Congo and the Ituri and Uele regions is reported by Messrs. Lang and Chapin, in that the rusty red head of Lower Congo specimens is yellowish green in the eastern representatives. The well known color change in this species does not account for the difference, as that was also observed. (One specimen from the forest is recorded as having a brown head.) Werner (1907, p. 1840), giving a very clear account of coloration in this species, records the head coloration of the adult males as bright lemon-yellow; and Steindachner



Map 10. Distribution of *Agama colonorum*. Probably a Sudanese species, everywhere invading the forest clearings and plantations.

(1870, p. 330) describes the same coloration in Senegambian specimens. Sternfeld (1912, p. 207) describes specimens from Kibwezi, British East Africa, as having a yellow head. The red head-color of West African specimens, south of Senegambia, is reported by Johnston (1906, p. 814) from Liberia; from the Gold Coast by Reichenow (in Werner, 1913, p. 43); from Kamerun by Sjöstedt (1897, p. 13), and Nieden (1910, p. 16); and from the Lower Congo by the present expedition. Records of a yellowish head in breeding males from the latter region (as Boettger, 1888, p. 22) may usually be explainable as taken from alcoholic specimens, but such a coloration in life is mentioned as rare by Pechuel-Lösche (in Werner, 1913, p. 43) from localities on the Loango Coast.

The difference suggested by Stejneger (1893, p. 717) of fewer spines in the nuchal crest in eastern specimens does not appear in the present series. The only scale character which appears to be in any way definite and related to locality is the higher number of canthal and supraciliary scales ("canthals") in the Lower Congo specimens, 7–9 in place of 6–8. The average number of scale rows about the body seems also somewhat higher in these, 70, as compared with 64 (forest specimens) and 68 (Sudanese specimens).

The coloration of males from Leopoldville, according to the field notes, is dorsally dark gray to bright blue; head and a posteriorly directed median V-shaped mark on the shoulder-region, bright rusty red; tail grayish at base followed by light rusty red (tip dark); venter yellowish; throat yellowish with dusky network. The females in the Upper Congo region show a very variable brownish red pattern on the gray dorsal ground color. The old males are dark gray above, tinged with blue; head, lips, and nuchal V-shaped mark grayish or yellowish green; shoulders and fore limbs dark gray-blue; throat and venter greenish gray, throat often with dark reticulation. The more brightly colored males exhibit an orange-red throat, mottled with dark, and have the posterior half of the tail also orange-red. It may be added that the ventral coloration in alcohol of both sexes is variable, but often entirely dark (blue in life?) in the males.

A single specimen (No. 10404) has the lower labials anterior to the eye fused.

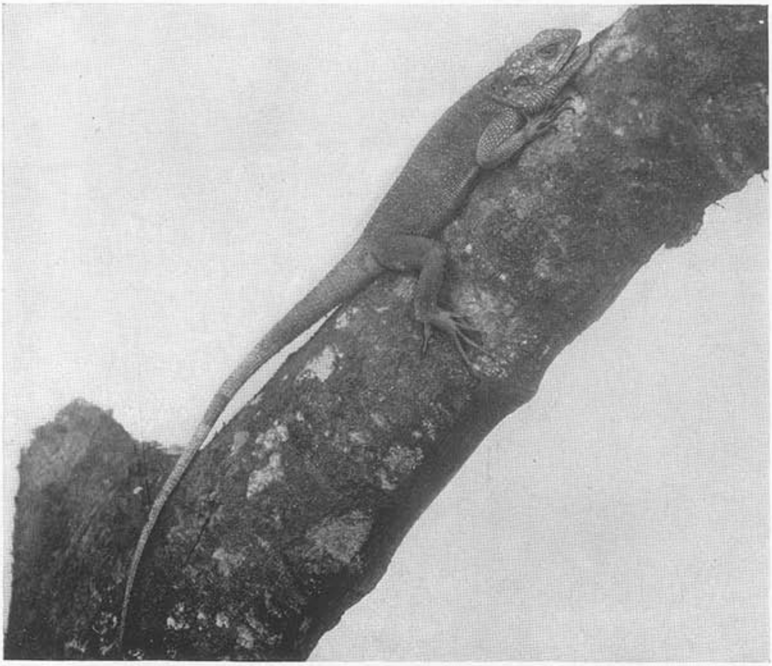
The ovaries of four specimens from the Lower Congo (July and August 1915; Nos. 10369, 10372, 10378 and 10379) contained many small eggs, maximum about 1 mm. One specimen from the Sudan (September; No. 10454*a*) contained many undeveloped eggs, maximum 1 mm.; and two others (November 1910; Nos. 10438 and 10461), numerous eggs, maximum 5 mm. Specimens from the Forest were as follows: No. 10406 (September 1909), numerous eggs, maximum 5 mm.; No. 10393 (March 1909), 8 eggs, (3×5), about 19×11 mm., with numerous undeveloped ones, four reaching 4–5 mm. in diameter, others 1–2 mm.; No. 10399 (May 1909), 8 eggs, (4×4) nearly round, about 9 mm. in diameter, with many small undeveloped ones; No. 10421 (June 1914), 8 eggs, (4×4) 19×10 mm., extending far forward in the body cavity; No. 10422, 7 eggs (4×3) about 16×8 mm. If the breeding season is the same in the Ituri region as at the coast, the eggs must be laid from April to June.

Parasitic worms are very frequent. Besides those noted in the stomach contents, specimens were observed in which these worms were apparently

PLATE XVIII

Figure 1. *Agama atricollis* Smith. A. M. N. H. No. 10489; ♂; length 330 mm.

Figure 2. *Agama colonorum* Daudin. A. M. N. H. No. 10408; ♂; length 303 mm.



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boring their way through the stomach wall, and several had masses of them in the mesentery outside the stomach.

A female from Banana, No. 10379, with undeveloped eggs has the internal organs entirely enclosed by a layer of fat, greatly distending the body, much as if gravid.

The stomachs from the Lower Congo contained parasitic worms (Nos. 10361, 10364, 10369, 10377, 10378), remains of a cockroach (No. 10368), grasshoppers (Nos. 10377, 10378), neuropteron wings (No. 10378), trichopteron wing (No. 10370), homopteron fragments (No. 10379), heteropteron remains (No. 10362), a caterpillar (No. 10362), beetles (Nos. 10362, 10364, 10368, 10377, 10378), ichneumonid wing (No. 10379), chalcid wing (No. 10378), ants (Nos. 10361, 10362, 10364, 10368, 10369, 10370, 10372, 10377, 10378, 10379), bees (Nos. 10372, 10369 wings and legs of a small *Ceratina*, 10378 head of a *Trigona*).

The stomachs from the Sudan contained parasitic worms (Nos. 10432, 10438), beetles (No. 10471), ants (Nos. 10432, 10434 remains of several species of workers), bees (No. 10438 remains of the honey bee *Apis mellifica*, a wing certainly of that species).

The stomachs from the Forest specimens contained pieces of land snails (Nos. 10419 *Subulina*, and 10422 old pieces which were certainly dead when the lizard swallowed them), isopods (No. 10419), insect larvæ (No. 10399), cockroach (No. 10414), Heteroptera (Nos. 10393, 10401 a large green one, 10415), a caterpillar (No. 10422), beetles (Nos. 10399, 10419), ants (Nos. 10393, 10399, 10408 a black-winged and two heads of a smaller red ant, 10415, 10419, 10422), bees (Nos. 10399 the hind leg and wing of a *Nomia* and 10422 a large *Megachile*).

Summary of Measurements and Scale Characters of Agama colonorum *Daudin*

		SUDAN			FOREST			LOWER CONGO		
	Sex	No. of Specimens	Extremes	Average	No. of Specimens	Extremes	Average	No. of Specimens	Extremes	Average
Length	♂	24	197–286	239.6	26	188–332	270.1	19	176–313	267.8 mm.
	♀	10	129–218	186.6	16	150–258	220.5	10	190–254	221.7 mm.
Body	♂	27	75–115	94.9	26	70–122	103.0	20	66–117	99.1 mm.
	♀	12	48–93	71.5	17	53–101	86.9	12	70–93	81.7 mm.
Tail	♂	24	122–171	144.4	26	118–210	166.9	19	110–200	174.7 mm.
	♀	10	81–126	111.8	16	97–157	133.7	10	110–155	141.1 mm.
Tail/Length	♂	24	.58–.62	.602	26	.60–.63	.616	19	.58–.65	.63
	♀	10	.56–.63	.602	16	.56–.65	.607	10	.57–.66	.63
Axilla to Groin	♂	27	43–67	54.8	26	41–75	60.7	20	32–70	56.6 mm.
	♀	12	29–58	42.7	17	29–62	52.8	12	42–58	47.5 mm.
Arm	♂	26	37–52	46.0	26	37–59	50.7	20	37–58	49.3 mm.
	♀	12	29–58	42.7	17	30–50	44.0	12	38–47	43.6 mm.
Leg	♂	26	54–73	65.0	26	50–85	72.8	20	50–81	71.2 mm.
	♀	12	36–62	50.5	17	43–72	62.4	12	58–69	61.8 mm.
Head Length	♂	27	19.0–27.5	23.8	26	17–30	24.5	20	18–30	25.1 mm.
	♀	12	13.0–24.0	18.8	17	14.6–25.0	21.5	12	19–24	21.5 mm.
Head Breadth	♂	27	15.0–21.0	18.1	26	13–22	18.6	20	13–23	18.6 mm.
	♀	12	10.5–17.0	14.3	17	12–19.5	16.5	12	14–19	16.2 mm.
Scales about Body	♂	27	60–74	67.9	26	58–70	63.1	20	62–78	69.8
	♀	12	55–80	67.1	20	58–78	65.1	14	62–90	70.5
Canthals	♂	27	6–8	7.0	26	6–8	7.1	20	7–9	7.8
	♀	12	6–8	6.9	20	6–8	7.0	14	7–9	8.0

Agama atricollis Smith

Plate XVIII, Figure 1; Map 11

Agama atricollis SMITH, 1849, Ill. Zool. S. Africa, III, Appendix, p. 14. BOULENGER, 1885, Cat. Lizards, I, p. 358. DOLLO, 1886, Bull. Mus. Roy. Hist. Nat. Belgique, IV, p. 153. BOULENGER, 1892, in Distant, Naturalist in the Transvaal, p. 174. GÜNTHER, 1892, Proc. Zool. Soc. London, p. 555. JEUDE, 1895, Notes Leyden Mus., XVI, p. 228. JOHNSTON, 1897, British Central Africa, p. 361. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 29; 1900, Zool. Jahrb. (Syst.), XIII, p. 589. BOULENGER, 1902, Proc. Zool. Soc. London, II, p. 16; 1902, in Johnston, Uganda Protectorate, I, p. 445. MOCQUARD, 1902, Bull. Mus. Hist. Nat. Paris, VIII, p. 405. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 582. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 110; 1904, Mem. Proc. Manchester Lit. Philos. Soc., LIII, part 3, No. 12, p. 7. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 416; 1907, Rev. Suisse Zool., XV, p. 82. BOULENGER, 1908, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 5. CHUBB, 1908, Ann. Mag. Nat. Hist., (8) II, p. 221. ODHNER, 1908, Ark. Zool. Stockholm, IV, No. 18, p. 3. BOULENGER, 1909, Trans. Zool. Soc. London, XIX, p. 242. CHUBB, 1909, Proc. Zool. Soc. London, p. 593. BOULENGER, 1910, Ann. S. African Mus., V, p. 466. LÖNNBERG, 1910, in Sjöstedt, Kilimandjaro-Meru Exp., I, part 4, p. 5. MEEK, 1910, Publ. Field Mus. Zool., VII, p. 408. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 96. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 162. STERNFELD, 1911, Mitt. Zool. Mus. Berlin, V, pp. 416, 419; 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 385; 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 208.

Agama atricollis NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 70.

Stellio capensis DUMÉRIL, 1851, Cat. Méth. Rept., p. 106; 1856, Arch. Mus. Hist. Nat., Paris, VIII, p. 579.

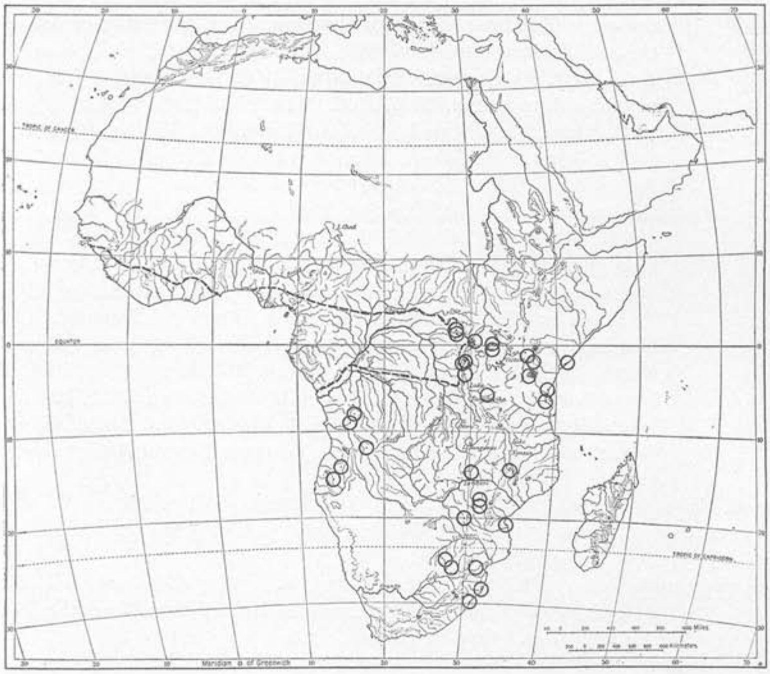
Stellio nigricollis BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 43; 1879, Jorn. Sci. Lisboa, VII, p. 95. PETERS, 1881, Sitzber. Ges. Naturf. Freunde Berlin, p. 147. BOCAGE, 1895, Herpétol. Angola, p. 22.

Agama gregorii GÜNTHER, 1894, Proc. Zool. Soc. London, p. 86. BOULENGER, 1894, Proc. Zool. Soc. London, p. 723. GÜNTHER, 1895, Ann. Mag. Nat. Hist., (6) XV, p. 523.

There are thirteen specimens: A. M. N. H. Nos. 10281–86 (October 1909), 10487 (November 1909), 10488 (December 1909), 10489 (September 1913), 10490–92 (August 1914) are from Avakubi; 10493 (January 1910), Bafwabaka.

The distribution of *A. atricollis* closely parallels that of many species in other groups and accords almost exactly with the botanical subdivision of South and East Africa. The extension of its range into the eastern Ituri Forest may be analogous to the spread of *A. colonorum* into the forest from the north. The species has been recorded as abundant in the lake region immediately to the east of Avakubi (Sternfeld, 1912, p. 208). The absence of *A. colonorum* in this region has been noted above.

There have been available for comparison with the present series two specimens of *A. atricollis* from the Durban Museum, Natal; and, through the kindness of Dr. L. Stejneger, the writer has been enabled to examine a series of specimens of this species from British East Africa, collected by the Roosevelt Expedition.



Map 11. Distribution of *Agama atricollis*. A species of the Eastern and Southern Subprovince invading only the eastern Ituri Forest.

The nostril is laterally directed, not or very slightly tubular, and just below the canthus. The only notable structural difference between the Ituri specimens and those from South Africa is the homogeneous squamation of the anterior sides of the limbs in the former, strongly heterogeneous in the latter. The East African specimens appear to be intermediate in this respect. The ventral scales are keeled to a variable degree (Tornier, 1897, p. 29). Keels appear most frequently anterolaterally, developed to a diminishing extent toward the median line and posteriorly.

The black shoulder mark of the South African specimens is indistinct in the males of the present series, and a comparison of the colors in life should be of interest.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	6	314–337	330.0 mm.
	♀	6	255–298	280.1 mm.
	Juv.	1		97.0 mm.
Body	♂	6	110–124	116.5 mm.
	♀	6	90–105	98.6 mm.
	Juv.	1		34.0 mm.
Tail	♂	6	204–219	213.5 mm.
	♀	6	165–196	181.5 mm.
	Juv.	1		63.0 mm.
Tail/Length	♂	6	.63–.65	.647
	♀	6	.63–.65	.643
	Juv.	1		.65
Axilla to Groin	♂	6	62–72	67.8 mm.
	♀	6	53–65	60.3 mm.
	Juv.	1		18.0 mm.
Arm	♂	6	57–61	58.8 mm.
	♀	6	50–54	51.8 mm.
	Juv.	1		20.0 mm.
Leg	♂	6	78–88	82.0 mm.
	♀	6	68–75	70.8 mm.
	Juv.	1		27.0 mm.
Head Length	♂	6	30–34	32.0 mm.
	♀	6	25.5–28	26.3 mm.
	Juv.	1		11.0 mm.
Head Breadth	♂	6	21–25	22.5 mm.
	♀	6	18–20	19.0 mm.
	Juv.	1		8.5 mm.
Scales from Anus to Chin	♂	6	70–78	73.1
	♀	6	69–75	71.5
Canthals	♂	6	9–12	10.5
	♀	6	10–12	10.7

"The coloration is dorsally bluish black, the enlarged scales ultramarine blue, the head is blue or emerald green, and the green may extend on the mid-dorsal line to the pelvic region. The enlarged scales may be lighter behind, or even yellow, like the base of the tail; under parts blue anteriorly, greenish posteriorly; the posterior two-thirds of the tail are blue like the back, the tip gray. Toes, and often elbows and knees, yellowish gray. The female differs from the above in having the top of the head dark gray, green between the eyes, and blue in front of the tympanum; back dark brown, nearly black, with some yellow markings on shoulders and along back to base of hind limbs. Abdomen and under side of tail yellowish. On dull rainy days and at night these colors are less conspicuous, being nearly uniformly dark.

"The species was abundant at Avakubi, where specimens were seen basking on logs and tree stumps, while another comes from a maize-field. It is also found under the thatch in the native huts and in the houses at the station" [H. L.].

VARANIDÆ

Varanus Merrem

Varanus exanthematicus exanthematicus (Bosc)

Plate XIX; Plate XX, Figure 1; Text Figure 8; Map 12

Lacerta exanthematica Bosc, 1792, Actes Soc. Hist. Nat. Paris, p. 25, Pl. v, fig. 3 (not seen). LATREILLE, 1800, Hist. Nat. Rept., I, p. 251.
Tupinambis exanthematicus DAUDIN, 1803, Hist. Nat. Rept., III, p. 80.
Varanus exanthematicus MERREM, 1820, Tent. Syst. Amphib., p. 60. BOULENGER, 1885, Cat. Lizards, II, p. 308. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 72. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 200. MÜLLER, 1910, Abh. Bayer. Akad. Wiss., 2 Kl., XXIV, p. 559. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 281.
Varanus ocellatus (*non* Rüppell) DUMÉRIL AND BIBRON, 1836, Erpétol. Gén., III, p. 496.
Monitor exanthematicus Var. *A*. SCHLEGEL, 1844, Abbild. Amph., p. 70 (not seen). PETERS, 1870, Monatsber. Akad. Wiss. Berlin, p. 109.
Regenia ocellatus GRAY, 1845, Cat. Lizards, p. 9.

A skin and skeleton (A. M. N. H. No. 10494, May 1912) from Garamba are referable to this species.

The occurrence of this species at Garamba is not surprising in view of the analogous distribution of many Sudanese species (cf. especially *Lygodactylus picturatus gutturalis*); and the record from Lake Chad serves to link it with the West African and Togo records.

The distribution of *Varanus* in Africa exhibits many of the characteristic features of the zoogeography of the Ethiopian Region, and the accompanying map has therefore been made to include the ranges of *V. ocellatus*

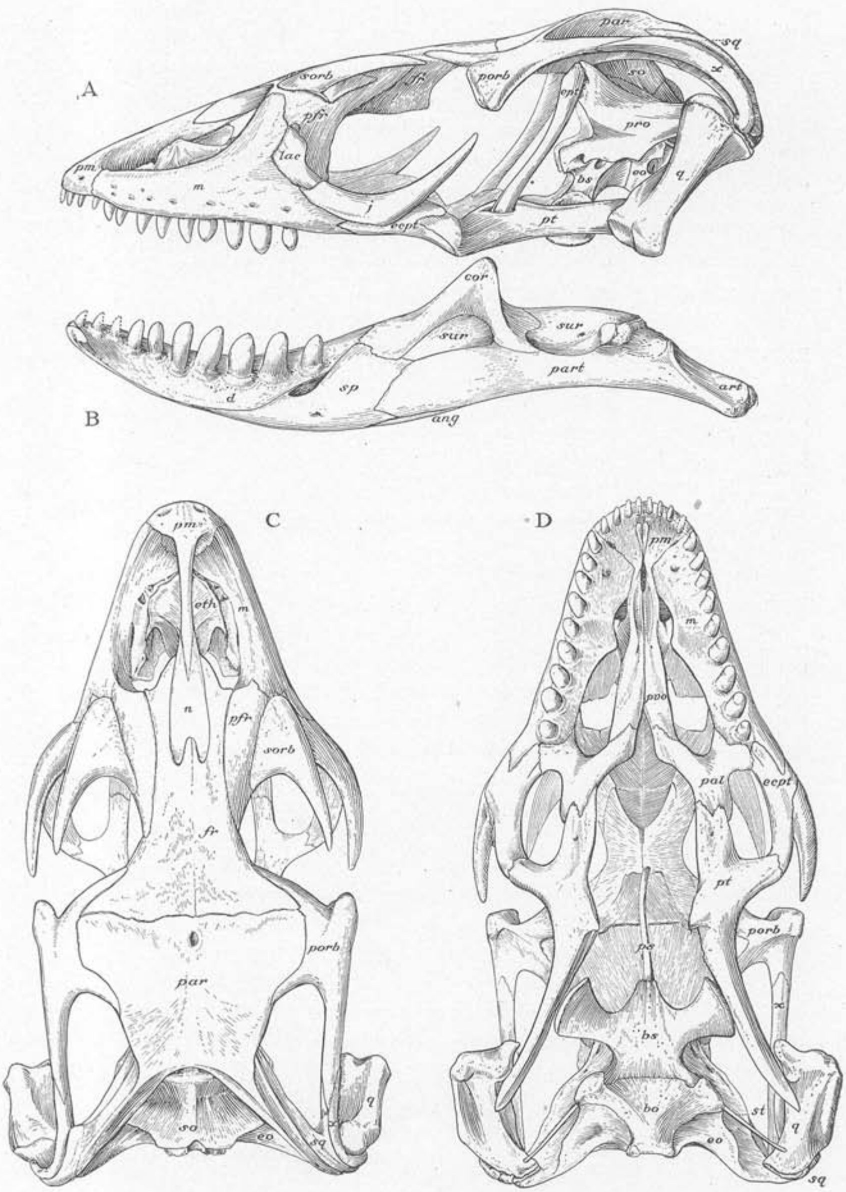
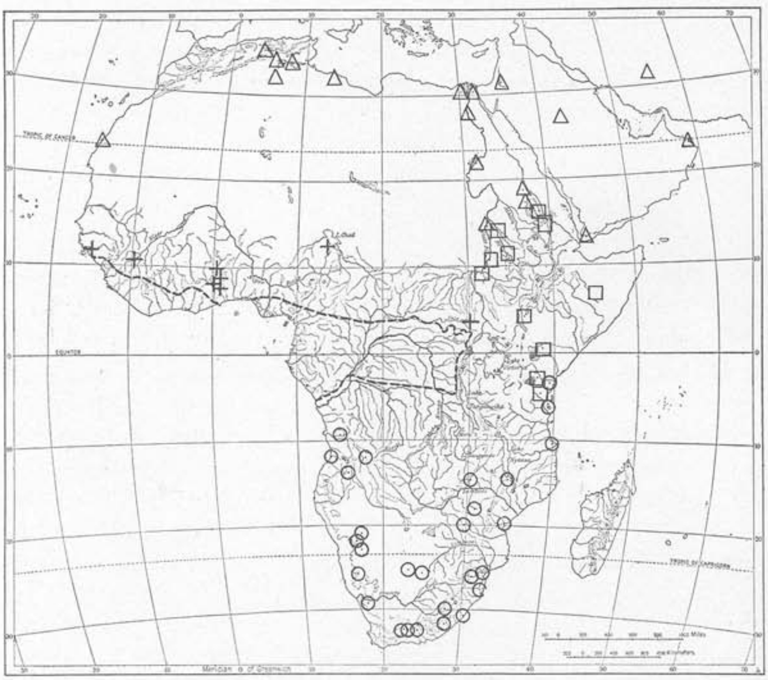


Fig. 8. Skull of *Varanus exanthematicus exanthematicus* (10494, × 1.46) A, lateral view; B, mandible from inside; C, dorsal view; D, palatal view. Ang, angular; Art, articular; Bo, basioccipital; Bs, basisphenoid; Cor, coronoid; D, dentary; Ecpt, ectopterygoid; Eo, exoccipital; Ept, epipterygoid; Eth, ethmoid; Fr, frontal; J, jugal; Lac, lacrimal; M, maxillary; N, nasal; Pal, palatine; Par, parietal; Part, prearticular; Pfr, prefrontal; Pm, premaxillary; Pro, prootic; Ps, parasphenoid; Pt, pterygoid; Pt fr, postfrontal; Porb, postorbital; Pvo, prevomer; Q, quadrate; Sur, surangular; So, supraoccipital; Sorb, supraorbital; Sp, splenial; Sq, squamosal; St, stapes; X, homology disputed.

and *V. albigularis,* as well as *V. griseus,* with that of the present species. *V. niloticus* has been omitted, as its distribution may be simply enough defined as "Africa except Barbary," occurring throughout the ranges of the other species, excepting *griseus* (see below).

The distribution center of *Varanus griseus* is Mesopotamia, from which region it reaches the deserts of northwest India eastward, Central Asia to the northeast, Arabia to the south, and Barbary to the west. In Lower Egypt its distribution is overlapped by that of *niloticus,* and to the south it reaches the northern border of the range of *V. ocellatus.*



Map 12. Distribution of *Varanus* in Africa.

△ *Varanus griseus.* A Mesopotamian species invading Africa north of the Sahara and ranging south along the Nile.

+ *Varanus exanthematicus exanthematicus.* Characteristic of the Sudanese Subprovince.

□ *Varanus exanthematicus ocellatus.* Characteristic of the Abyssinian Subprovince.

○ *Varanus exanthematicus albigularis.* Characteristic of the Eastern and Southern Subprovince.

The remaining three species inhabit the open country of Africa south of the Sahara, surrounding the Rain Forest. *V. exanthematicus* is Sudanese, extending from the headwaters of the Uele to Senegal. *V. ocellatus* is essentially Abyssinian, reaching the White Nile to the west and intergrading with *V. albigularis* to the south in British East Africa and German East Africa. *V. albigularis* inhabits the Eastern and Southern Subprovince (cf. botanical map, p. 399). Boettger's record of *albigularis* from Ogaden (1893, p. 115) has been referred to *ocellatus* by Anderson (1898, p. 1380.) The record of *albigularis* from Somaliland by Meek (1903, Publ. Field Mus. Zool., I, p. 181) should doubtless be transferred to *ocellatus* and, similarly, Sternfeld's record of *ocellatus* from Mozambique (1911, Mitt. Zool. Mus. Berlin, V, p. 416) should logically belong to *albigularis*, the specimen recorded being, in fact, intermediate between the two forms.

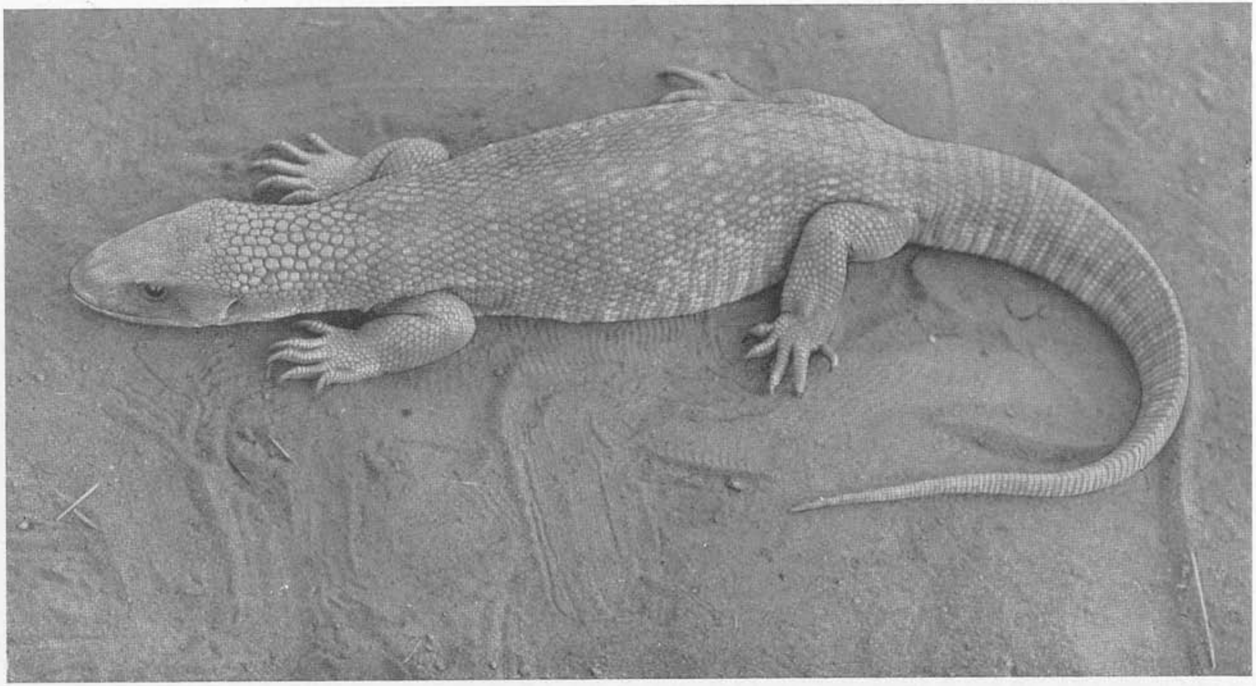
The intergradation of *albigularis* and *ocellatus* has been discussed by Tornier (1897, p. 38), and Werner (1907, p. 1843) suggests the probability of similar intergradation between *ocellatus* and *exanthematicus*. These geographical and morphological relationships seem to the writer to be logically and usefully expressed by classification of the three forms as subspecies, *Varanus exanthematicus exanthematicus* (Bosc), *V. exanthematicus albigularis* (Daudin), and *V. exanthematicus ocellatus* Rüppell.

The specimen was a male about 650 mm. in length. The position of the nostrils and the large nuchal scales readily place it as *exanthematicus exanthematicus*.

"Forty miles north of Garamba, in the midst of grass-covered plains, the barren space of a leveled termite hill with a smooth, glossy opening attracted my attention. The natives who accompanied me were sure it was the home of a python, especially as the entrance looked like one of the numerous holes this snake chooses as a retreat. Only one man was willing to brave the danger of breaking the edge of the cavity and ramming the shaft of his lance into the hole. When it had penetrated nearly two feet, the wooden end was grasped and to our surprise this monitor, after great resistance, was hoisted to the daylight. Far from loosing the hold with its teeth, it held on for several minutes, lashing its tail against the ground. Suddenly, however, it let itself drop, landing in a squatting position, and to our amazement raised its body high from the ground and made a rush for safety. This manner of running, in which elbows and knee-joints of the straightened fore and hind limbs were drawn beneath the body, appeared unusual, for when slowly progressing the limbs are extended laterally; the tail was carried in a graceful downward curve. No hiding place was in sight, however, and when overtaken it turned and fearlessly attacked, but, far from trying to bite and snap, as the Nile monitor does when cornered, its defense for a time consisted of fairly rapid and well-directed blows with the tail. It soon settled down in its habitual pose (Pl. XIX) and was content to hiss, a noise caused chiefly by the outrushing air with which it swelled the body more than one-third of the ordinary size. When held by

PLATE XIX

Varanus exanthematicus exanthematicus (Bosc). A. M. N. H. No. 10494; length 650 mm.



the nape of the neck it tried to break free by wrenching body and tail; the forelimbs, however, were firmly pressed against its breast. I was not surprised at the fear of the natives, some of whom considered its bite poisonous, for, although it often allowed itself to be handled, it might snap at anything, not sparing its own limbs and tail when they were held before its mouth. Once the jaws were locked they might not be opened again for half an hour, and from the way the creature held on it seemed clear that only by breaking its jaws would the victim be released. Our captive feigned death in many positions (Pl. XX, Figure 1), sometimes at slight provocation, with eyes wide open, giving no sign of life even when turned on belly or back.

"Some natives who knew the Nile monitor and *Gerrhosaurus zechi* Tornier came from villages nearby to see our rare animal, and although I offered a high reward for other specimens none was reported to us. In captivity all food was refused. The stomach was empty and no excrement giving indication of the habitual food was found in its shelter, which, however, clearly had been occupied for several months, and it may be possible that during the dry season this species estivates.

"Judging from our only specimen, an adult male measuring barely two feet two inches in length, the Sudan monitor (*V. e. exanthematicus*) is considerably smaller than the Nile monitor (*V. niloticus*) with its record of about five feet eight inches. The ventral surface is comparatively light in color and the scales somewhat glossy; the dusty gray of the upper side matches the color of the burrow and is in striking contrast with the conspicuous shiny black and yellow pattern of the Nile monitor. Light dots, arranged in transverse rows, were visible after the skin had been washed, a pattern probably more distinct in younger specimens" [H. L.].

The sluggishness and fearlessness of this species in contrast with the agility and wariness of *niloticus* have been noted by Klaptocz (1913, p. 281); and *ocellatus* from Khor Attar is similarly characterized by Werner in this regard.

Varanus niloticus (Linnæus)

Text Figures 9 and 10

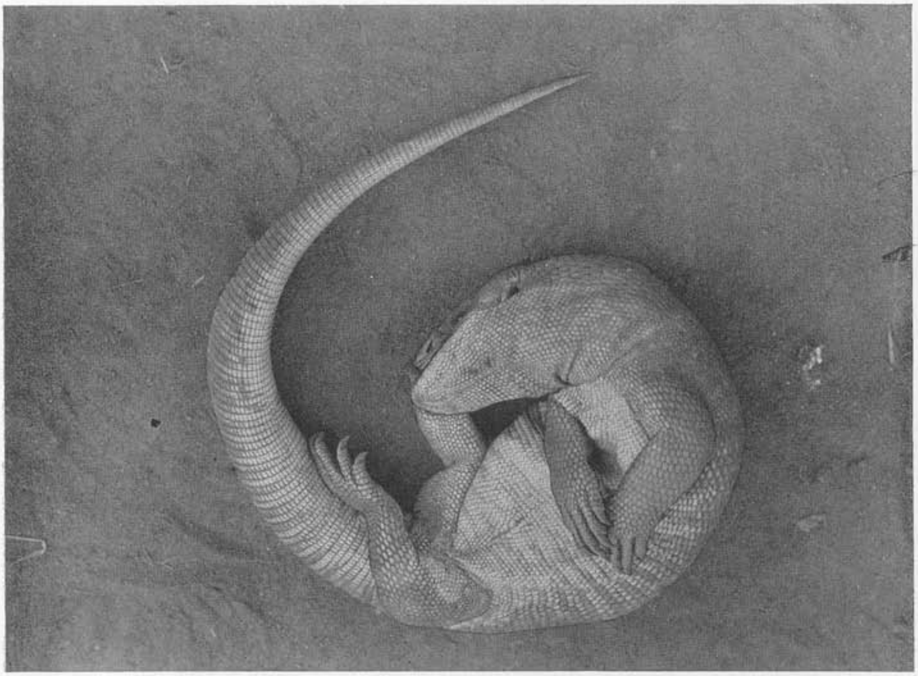
Lacerta nilotica Linnæus, 1766, Syst. Nat., Ed. 12, p. 369.

Varanus niloticus Boulenger, 1885, Cat. Lizards, II, p. 318. Dollo, 1886, Bull. Mus. Roy. Hist. Nat. Belgique, IV, p. 153. Boettger, 1886–1887, Ber. Senck. Ges., p. 55; 1887–1888, p. 23. Günther, 1888, Proc. Zool. Soc. London, p. 50. Mocquard, 1888, Mém. Cent. Soc. Philom. Paris, p. 115. Boulenger, 1892, in Distant, Naturalist in the Transvaal, p. 174. Matschie, 1892, Zool. Jahrb. (Syst.), V, p. 612. Pfef-

PLATE XX

Figure 1. *Varanus exanthematicus exanthematicus* (Bosc). A. M. N. H. No. 10494. Characteristic attitude when annoyed.

Figure 2. *Gerrhosaurus zechi* Tornier. A. M. N. H. No. 10722; ♀; length 302 mm.



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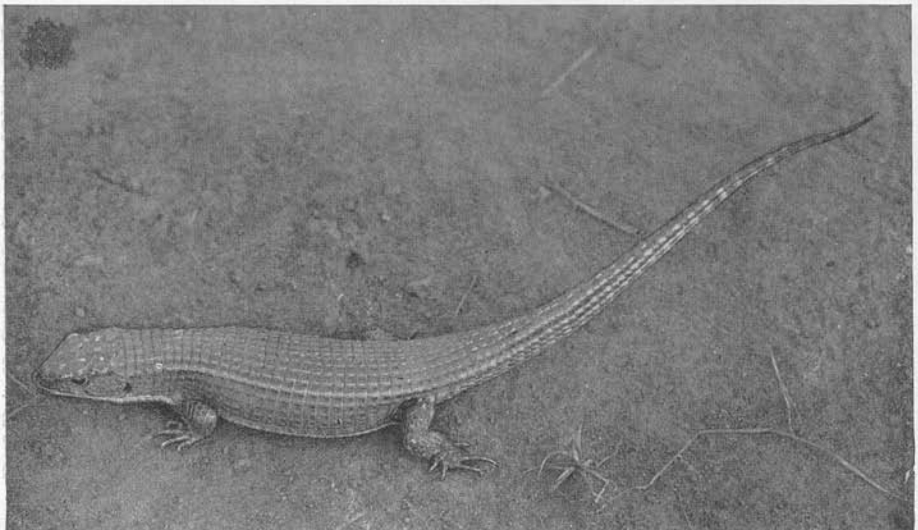


2

FER, 1892, Jahrb. Hamburg. Wiss. Anst., X, p. 72. GÜNTHER, 1894, Proc. Zool. Soc. London, p. 87. BOCAGE, 1895, Herpétol. Angola, p. 26. BOULENGER, 1896, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 17. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 264. WERNER, 1896, Jahrb. Ver. Magdeburg, p. 141. BOULENGER, 1897, Proc. Zool. Soc. London, p. 800; 1897, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 278; 1897, (6) XIX, p. 277. JOHNSTON, 1897, British Central Africa, p. 361. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 6. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 12. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 38. ANDERSON, 1898, Zool. Egypt, I, p. 140, Pl. XVIII. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien., XLIX, p. 133. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451. FLOWER, 1900, Proc. Zool. Soc. London, p. 967. TORNIER, 1900, Zool. Jahrb. (Syst.), XIII, p. 590. LAMPE, 1901, Jahrb. Nassau. Ver. Naturk., LIV, p. 210. TORNIER, 1901, Zool. Anz., XXIV, p. 61; 1901, Beiheft, Arch. Naturg., LXVII, p. 73. BOULENGER, 1902, in Johnston, Uganda Protectorate, p. 445. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, pp. 582, 674. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 342. LÖNNBERG, 1903, Ark. Zool., Stockholm, I, p. 65. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 200. TORNIER, 1905, Zool. Jahrb. (Syst.), XXII, p. 375. JOHNSTON, 1906, Liberia, II, p. 833. BOULENGER, 1907, Ann. Mag. Nat. Hist., (7) XVI, p. 111; 1907, Proc. Zool. Soc. London, p. 485. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 424. WERNER, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1843. CHUBB, 1908, Ann. Mag. Nat. Hist., (8) II, p. 221. ODHNER, 1908, Ark. Zool., Stockholm, IV, No. 18, p. 3. CHUBB, 1909, Proc. Zool. Soc. London, p. 593. BOULENGER, 1910, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 310; 1910, Ann. S. African Mus., V, p. 471. LÖNNBERG, 1910, in Sjöstedt, Kilimandjaro-Meru Expedition, I, part 4, p. 5. MEEK, 1910, Field Mus. Publ. Zool., VII, p. 409. ROOSEVELT, 1910, African Game Trails, p. 432, figs. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 327. LÖNNBERG, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 13. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 209. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 74. WERNER, 1913, in Brehm's Tierleben, Ed. 4, II, pp. 125, 129.

(For bibliography of this species *ante* Boulenger, 1885, refer to Anderson, 1898, p. 140.)

There are thirty-one specimens of *Varanus niloticus*, 9 young alcoholic, the remainder represented by dried skins and skeletal material: A. M. N. H. Nos. 10521–22 (September–October 1913) are from Akenge; 10497 (October 1909), 10498 (December 1913), Avakubi; 10086, Belgian Congo; 10512–17 (February–March 1911), 10518–19 (January 1913), Faradje; 10500 (February 1910), Gamangui; 10501 (March 1910), 10502–09 (April–May 1910), 10510 (June 1914), Medje; 10511 (December 1910), Niangara; 10523–24 (November–December 1913), Niapu; 10499 (December 1909), Ngayu; 10520 (August 1913), Poko; 10495–96 (August 1909), Stanleyville.

This species is distributed over almost the whole of Africa, inhabiting the forest and open country alike. The riparian habitat doubtless contributes to this wide distribution, and the Nile has evidently served as the highway for the northern extension of its range to Lower Egypt.

Several young alcoholic specimens have a pair of apparently perforated preanal scales, more or less distinct, as observed by Anderson (1898, p. 140). The coloration in this species has been well described and figured by the same author (*loc. cit.*, Pl. XVIII). From the field notes of the expedition the following observations may be summarized.

The hyoid apparatus in a large specimen from Medje (Field No. 479) extends backward on the side of the neck, with two lateral external folds which posteriorly form tapering protuberances, 26 mm. in length, in front of the fore limbs, containing the ends of the hyoids.

The species is fairly common in and about the swampy and reedy portions of the rivers and brooks. They often bask in cleared places in the afternoon, but keep near sheltering bushes or reeds. A specimen was taken from an island in the Ituri opposite Avakubi. The natives have the same fear of the *Varanus* as of a crocodile. The Mangbetu eat the flesh, which is said to taste like chicken (cf. Steindachner, 1870, Sitzber. Akad. Wiss. Wien, math.-natur., LXII, Abt., p. 330). When pursued, the animal runs a distance, pauses, and then runs again. When cornered it attacks fiercely, biting, and slashing with its tail, with which it deals powerful and well directed blows. The tails of the larger specimens are often mutilated in consequence.

The correlation of the very curious dentition in this species, in which the posterior teeth are developed into broad round crushers, with molluscivorous diet is confirmed and extended to include crustaceans, for which the crushing dentition is equally adapted, by the observations of Messrs. Lang and Chapin, who record stomach contents of adult specimens as follows:

No. 10499.— Small land snails in gullet.
No. 10502.— Four large land snails (*Achatina*) partly crushed.
No. 10506.— Three crabs (of two species), and one large land snail, the carapaces and shell crushed.
No. 10507.— One small crab and the remains of a small fish.
No. 10524.— Two large snails, without the shells; remains of several crabs, without carapaces, though the feet are present; a small water-snake.

Werner (1907, p. 1843) records stomach contents of fresh-water crabs and small mussels. Rats and mice are readily taken in captivity according to Anderson (1898, p. 142). The accounts of the robbing of crocodile nests by this species by Roosevelt (1910, p. 432, figs.) are of especial interest in view of its reputation as an enemy of that species (see Werner, 1913, V, pp. 125 and 128). There are frequent accounts of the voracity and destructiveness of the species and Johnston (1906, p. 816) speaks of the depredations on poultry. In spite of the great range of diet, there can be little doubt that the strongly modified dentition of the *niloticus* of the Congo Forest is correlated with the diet of crabs and molluscs.

The contents of three stomachs of the juvenile specimens (other stomachs were empty) were: No. 10509, remains of a large mantid, remains of a grasshopper, a mass of leaves, four large slugs, and a small frog; No. 10520, remains of a cricket; No. 10523, miscellaneous insect remains.

The changes in the dentition of *V. niloticus* with age are well shown in the extensive series of skulls collected by the present expedition. (Refer to Boulenger, 1885, II, p. 318, and Lönnberg, 1903, p. 65.) The extremes in form of teeth are figured herewith (Figs. 9 and 10). Figures (Fig. 8) of the skull of *V. exanthematicus* are presented for comparison with the radically

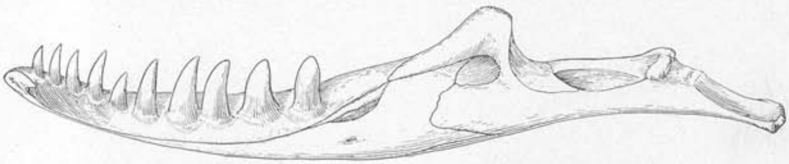


Fig. 9. Mandible of *Varanus niloticus*, juvenile (10086, × 3). Internal view. Compare the form of the teeth with that of an adult (Fig. 10, B).

different *niloticus*, though it is beyond the scope of the present paper to enter upon a discussion of the distinctions. It may be mentioned that in the most striking of these, the narrowness of the parietal in *niloticus*, skulls of juvenile specimens in the same species exhibit a condition almost exactly intermediate between that in the two skulls figured.

The powerful ridges of the parietal in *niloticus* may serve to increase the strength of the attachments of the muscles operating the lower jaw, in secondary correlation with the development of the crushing dentition.

Summary of Measurements and Scale Characters

	Age	No. of Specimens	Extremes	Average
Length	Adult	18	810–1718	1337.7 mm.
	Juv.	9	300–625	387.4 mm.
Body	Adult	18	320–640	510.7 mm.
	Juv.	9	110–240	145.4 mm.

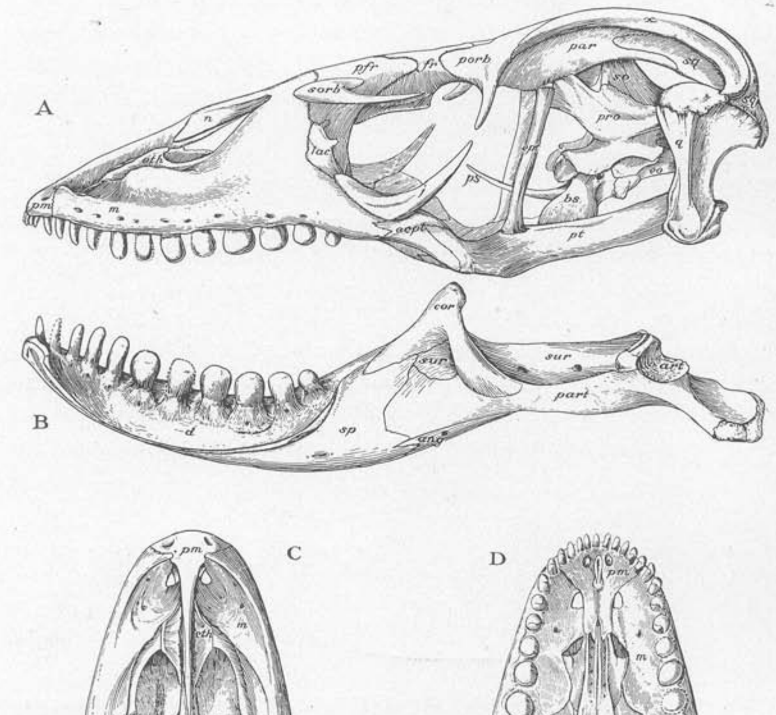


Fig. 10. Skull of *Varanus niloticus* (10500, × .72), lettering as in Fig. 8.

	Age	No. of Specimens	Extremes	Average
Tail	Adult	18	490–1100	827.0 mm.
	Juv.	9	190–385	244.2 mm.
Tail/Length	Adult	18	.58–.65	.62
	Juv.	9	.61–.63	.62
Axilla to Groin	Juv.	9	54–130	75.7 mm.
Arm	Juv.	9	36–77	47.5 mm.
Leg	Juv.	9	48–100	61.9 mm.
Ventrals, Transversely	Juv.	9	80–90	83.5

Lacertidæ

Artificial Key to the Genera of Lacertidæ Known to Inhabit the Congo Rain Forest

A. Interparietals and frontoparietal fused; two central rows of dorsal scales large, smooth, laterals small; tail laterally denticulate.. *Holaspis.*

AA. Head shields normal. Dorsal scales not as above, tail not laterally denticulate.

B. Dorsal scales juxtaposed, small.

C. Nostril separated from 1st labial by lower nasal; digits keeled inferiorly. (Occurrence doubtful in forest). *Eremias.*

CC. Nostril bordered by 1st labial, digits not keeled. . . . *Lacerta.*

BB. Dorsal scales large, imbricate, keeled.

C. Ventrals not keeled (Nostril distinctly separated from 1st labial in the Ituri species). . . . . *Algiroides.*

CC. Ventrals keeled.

D. Dorsal scales large, keeled, in longitudinal rows, laterals small. . . . . *Poromera.*

DD. Dorsals and laterals similar. . . . . *Bedriagaia.*

Lacerta Linnæus

Key to the African Species of *Lacerta*

A. Tail near base strongly spinose (Section *Centromastix* Boulenger).

B. Head shields normal, dorsal scales 33–36. . . . . *echinata.*

BB. No interparietal, dorsal scales 43–46. . . . . *langi.*

AA. No spinose scales on tail (Section *Zootoca* Wagler).

B. Occipital short, femoral pores 9–10. . . . . *vaueresellí.*

BB. Occipital longer than broad, fem. pores 16–18. . . . . *jacksoni.*

Section *Centromastix* Boulenger

Lacerta langi, new species[1]

Plate XXI; Text Figure 11

Two specimens (A. M. N. H. Nos. 10525–26, April 1914) from Medje belong to an undescribed lacertid species.

In distribution, the new form is widely separated from its West African ally, *L. echinata* Cope, but, with the uniform habitat of the Rain Forest, exploration of the intervening area may discover an overlapping of the ranges or even an intergradation between the two forms.

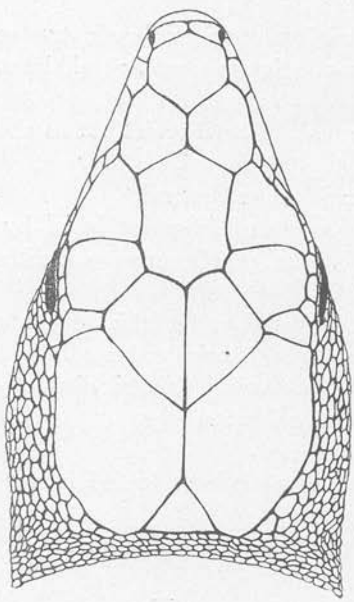


Fig. 11. Head of *Lacerta langi*, (type, 10525, × 4).

Diagnostic Characters

Allied in habitus and in the spinous base of the tail to *L. echinata* Cope (Section *Centromastix* Boulenger), from which it is readily distinguished by (1) the absence

[1] *Lacerta langi.* Named in honor of Mr. Herbert Lang, leader of The American Museum of Natural History Congo Expedition.

of an interparietal; (2) higher number of dorsal scales, 43–46 instead of 33–36; (3) fewer scales between collar and gulars, 27–28 instead of 35–43; (4) femoral pores, 9 or 10 instead of 12–13.

Detailed description

Type: A. M. N. H., No. 10525.

Slender; head moderate; tail more than twice the length of the body; limbs moderately developed, adpressed hind limb not reaching elbow; toes long.

Scutellation of the head normal lacertoid except for the entire absence of an interparietal. Rostral moderate, supranasals meeting behind it; frontonasal six-sided, as long as or slightly longer than broad; prefrontals forming a median suture; supraoculars four, the anterior very small, with three small elongate granules between them and the eight supraciliaries (six supraciliaries in the paratype); frontal as long as its distance from the rostral, equalling or exceeding the length of the interparietals; these large, four-sided, the posterior side slightly convex; parietals large, outer edge rounded, forming a median suture between the interparietals and the occipital; occipital as broad as long, subtriangular; temporals small, faintly keeled. Nostril narrowly entered by rostral, broadly by the first labial, bounded above and behind by a supra- and postnasal. Labials 8–9 above, 7–7 below; five pairs of chin shields, the first three in contact, two loreals. Lower eyelid scaly.

The dorsal scales small, juxtaposed, slightly keeled, in forty-six longitudinal series in the type, forty-three in the paratype, in 118 and 115 transverse rows from occiput to anus. Ventrals six in a cross row, median pair narrowest, thirty-two from anals to collar. Eight scales in the collar, which is serrate (nine in the paratype). A large anal plate bordered by six smaller ones. The caudals in distinct verticils, all strongly keeled, those above and on the sides produced into long spines from the tenth to twenty-fifth verticil. Perforate femoral scales 9–9 in the type, 9–10 in the paratype. Without further material it seems best to disregard the very slight development of femoral pores, which may be explainable as an individual character, possibly juvenile, possibly modified by the sex, both specimens being females.

The coloration in alcohol (from formalin) is a uniform greenish gray. In life, the field notes describe it as bright green above, lighter beneath and darker on the crown, the large gulars grayish green. A few of the outer throat scales are orange, as well as the outer row of ventral plates, the interior rows being only slightly tinged with orange. In the paratype, mutilated by an arrow-shot, the orange color is visible on the last pair of chin shields, on the outer collar scales, and on the large scales between the arms, not on the outer row of ventrals as in the type.

Measurements

A. M. N. H. No.	10525 (type)	10526
Length	275	272 mm.
Body	90	84 mm.
Tail	185 (regenerated?)	188 mm.
Tail/Length	.67	.69
Axilla to Groin	54	50 mm.
Snout to Arm	31	30 mm.
Arm	27	26 mm.
Leg	35	35 mm.
Head Length	20	18.2 mm.
Head Breadth	12	11 mm.

PLATE XXI

Lacerta langi, new species. A. M. N. H. No. 10525, type; ♀; length 275 mm.

The species has the same habitat as *Bedriagaia*, specimens of which were taken "on a tree trunk near the water."

"When felling trees to bridge a forest brook, in 1910, the Medje caught two rare forms of large green lizards, *Lacerta langi* and *Bedriagaia tropidopholis*. The specimens were later spoiled, however, through the breaking of the jar, and though, on my return in 1914, I offered a high reward for the capture of others to replace them, it was not until several months had passed that any were secured. Of the two species, *Lacerta langi* is smaller, more lively, and of a brighter green. A large male measured more than a foot in length, and the peculiar spines on the basal portion of its tail were more pronounced and characteristic than those on the females collected. The presence of these typically arboreal lizards in a rather moist, swampy portion of the forest, where the trees are covered with long green moss, is noteworthy. They retreat into hollow trees, from which they emerge only late in the afternoon, and, due to the ease with which they can conceal themselves and their swiftness, are difficult to capture. Various hardshelled beetles found on tree trunks are eaten, and bugs, caterpillars, and termites complete the diet" [H. L.].

Section *Zootoca* Wagler

Lacerta vauereselli Tornier

Text Figure 12

Lacerta vauereselli TORNIER, 1902, Zool. Anz., XXIV, p. 701. BOULENGER, 1909, Trans. Zool. Soc. London, XIX, p. 242. DEGEN, 1911, Proc. Zool. Soc. London, p. 35. STERNFELD, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 386; 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exped., IV. p. 317, Pl. VI, fig. 2. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 75 BOULENGER, 1916, Trans. Zool. Soc. London, XXI, p. 3.

A juvenile specimen (A. M. N. H. No. 10527) from Walikale, January 1915, presented to the collection by Dr. J. Bequaert, has been identified with this species.

The known range of this species is restricted to the eastern part of the Congo Forest and the outlying forest areas of the Lake Kivu region, where the more widely distributed *L. jacksoni* occurs with it.

Boulenger (1909, p. 242) and Degen (1911, p. 35) have expressed doubts as to the status of *vauereselli*, whose validity has, however, been sufficiently established by Sternfeld (1912, p. 317 *et seq.*). The unfortunate contradiction as to the femoral pores in the original description, as well as the erroneous tail-length, have been cleared up by Sternfeld, and the present specimen agrees in most respects with his redescriptions. The shortness of the parietal region, emphasized by Tornier, is striking, and the writer ventures to supplement Sternfeld's figure (*loc. cit.*, Pl. VI, fig. 2) by a more detailed representation of the head of the present specimen (Fig. 12).

The extreme shortness of the occipital and the presence of two anterior

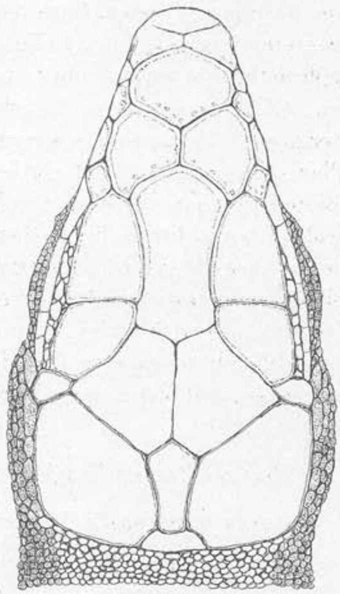


Fig. 12. Head of *Lacerta vauereselli* (10527, × 8).

loreals do not appear to be described by Tornier and Sternfeld, and may be individual characters but, if at all constant, would add materially to the distinction from *L. jacksoni*.

Rostral not entering nostril, which is bordered by the first labial below. An anterior supraloreal. Occipital, wider than the interparietal, short. Head plates otherwise normal, the parietals slightly shorter than the frontal, frontal slightly longer than the distance between it and tip of snout.

Coloration as described by Sternfeld, very vivid in the present specimen. No mid-dorsal series of spots. The lateral black band beginning at the nostril is sharply defined above on the canthus and does not include the upper anterior loreal. The top of the head is copper color, the dorsal band (ten scales wide on the mid-body) is bronze-green, becoming brown at the base of the tail. The lateral white line, beginning on the shoulder, passes *through* the ear and outlines its lower border. Sternfeld's statement that it passes "over" the ear may possibly be taken in the same sense; the position of such a band would scarcely be expected to vary. It is continued from the axilla nearly to the groin as a double row of rather irregular white spots. Ventrals green, each shield with more or less black at its anterior edge. Labials, gulars, and throat white, spotted with black.

Measurements and scale characters of A. M. N. H. No. 10527 (♀): Length, 107 mm.; body, 34 mm.; tail, 73 mm.; tail/length, .68; axilla to groin, 17 mm.; arm to snout, 14 mm.; arm, 14 mm.; leg, 21 mm.; head length, 9 mm.; head breadth, 6.2 mm.; ventrals, transverse rows, 20; ventrals, longitudinal rows, 6; dorsals, transverse (occiput to anus), 86; dorsals, longitudinal rows, 46; collar scutes, 10; collar to chin shields, 27; labials anterior to subocular, 4–4; femoral pores, 9–10.

Bedriagaia Boulenger

Bedriagaia tropidopholis Boulenger

Plate XXII; Text Figures 13 and 14

Bedriagaia tropidopholis BOULENGER, 1916, Ann. Mag. Nat. Hist., (8) XVIII, p. 112.

Three specimens (A. M. N. H. Nos. 10528–29, April 1914, and 10530, July 1914) of this recently described genus were obtained at the type locality, Medje.

This form is known only from the Ituri region.

The specimens agree closely with Boulenger's detailed description, and show only minor variations among themselves. The rostral and frontonasal form a suture in two of the three. The supraciliaries are 7–7 in two, and 6–7 in the third, with or without a granular scale between them and the oculars. The preanal scales in two rows in one specimen, medianly enlarged in the others, (Fig. 14) but both of the adults are males, and this character is not distinctive of the sex in this species (as in *Poromera*). The collar contains eight scales, with twenty-four to twenty-nine from the gular symphysis to the collar. Upper labials eight, lower seven or six. The number of ventrals in a longitudinal series varies from thirty-one to thirty-four; the dorsals in a transverse row twenty-three to twenty-six, in a longitudinal (to a point above the anus) seventy to seventy-nine. Femoral pores 13–13 in two males; the pore-bearing scales in the juvenile female 12–12, not all perforate.

The coloration in alcohol as described by Boulenger. In one of the present male specimens the back is spotted with bluish green spots covering two or three scales, on a black ground color; sides greenish, slightly marked with black (on single scales); tail and venter bluish green. First five cross-rows of the ventrals, and the collar, pinkish gray; throat gray, chin shields

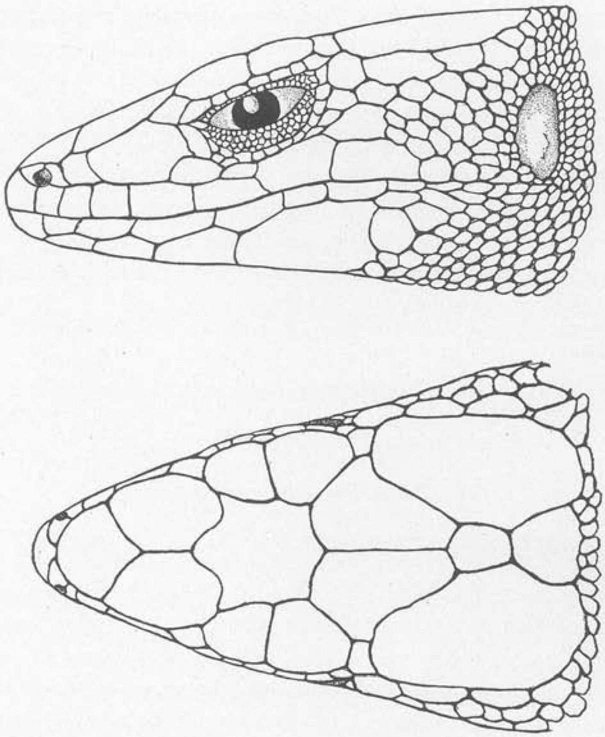


Fig. 13. Head of *Bedriagaia tropidopholis* (10530, × 3).

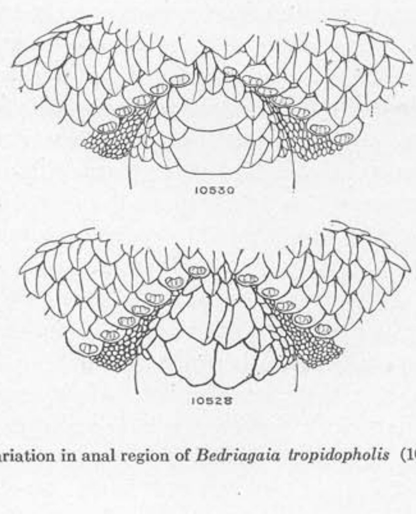


Fig. 14. Variation in anal region of *Bedriagaia tropidopholis* (10528, 10530).

marked centrally with pink. The second male displays the same coloration much less distinctly, while the single female is uniform green beneath, except for the chin shields which have an obscure light median line and are nearly uniform above. In all three the head plates are strongly mottled with black.

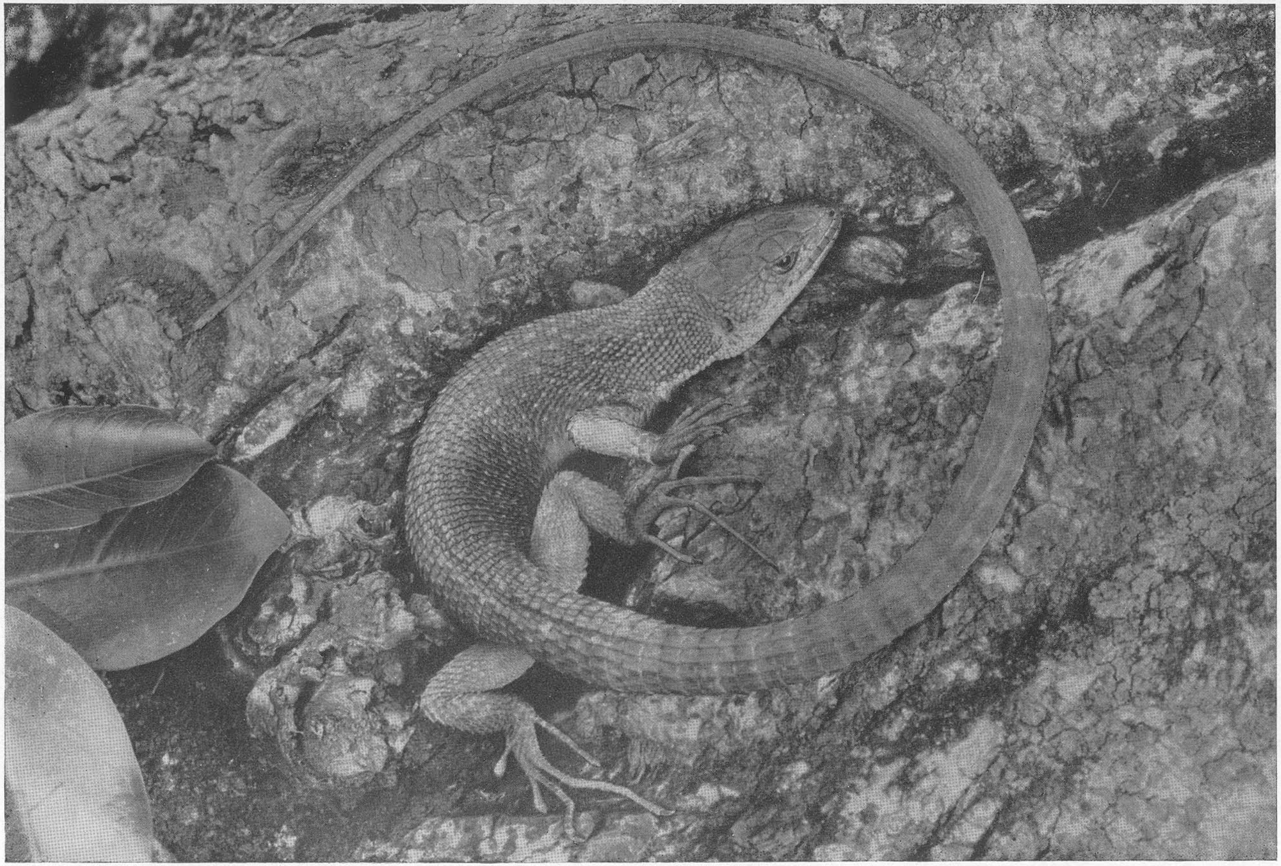
Measurements

A. M. N. H. No.	10529	10528	10530
Sex	♀ (Juv.)	♂	♂
Total Length	219	389	389 mm.
Body	83	116	115 mm.
Tail		273	274 mm.
Tail/Length		.70	.70
Axilla to Groin	49	66	65 mm.
Snout to Arm	29	41	41 mm.
Arm	30	39	37 mm.
Leg	38	57	52 mm.
Head Length	18.5	26.5	25.5 mm.
Head Breadth	11.2	16.1	16 mm.

"While the photograph (Plate XXII) hardly indicates the great length (15.75 inches) of an adult male, the characteristic attempt to find concealment, even in a slight unevenness of a tree trunk, is well shown. The scales of the upper side are rough, heavily ridged, and not glossy, thus enhancing the inconspicuousness of the green color pattern. Some specimens are marked by a series of blue-green spots, while the smooth scales on the upper part of the head are mottled with black. *Bedriagaia tropidopholis* inhabits the swampy portion of the forest, together with *Lacerta langi*, and, though clearly arboreal, frequently comes to the ground and basks upon boulders in the brooks. This species is more sluggish than the equally shy *L. langi* and when in danger has the peculiar habit of jumping from any height, and, instead of running up a tree, makes a dash for the shelter of leaves or logs. On the level it ran swiftly for a distance of ten to twenty yards, with tail in the air, but on finding no suitable retreat curled up flat on the ground. Held in the hand it bit and lashed the tail much like the Nile monitor; it apparently was not inconvenienced when thrown into the water, where it swam with ease. The food had consisted of small weevils and other beetles, although large ants and several caterpillars had also been taken" [H. L.].

PLATE XXII

Bedriagaia tropidopholis Boulenger. A. M. N. H. No. 10528; ♂; length 398 mm.



Algiroides Fitzinger

Algiroides africanus Boulenger

Plate XXIII, Figure 1; Text Figures 15 and 16; Map 13

Algiroides africanus Boulenger, 1906, Proc. Zool. Soc. London, p. 570, fig. 96. Peracca, 1909, in Il Ruwenzori, I, p. 167.
Adolfus fridericianus Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 220, fig.

This species is represented in the collection by 143 specimens: A. M. N. H. Nos. 10531 (January 1910), 10534 (April 1914), 10535–633 (June 1914), 10634–49, 10652–73 (July 1914) are from Medje; 10532–33 (November 1910), Niangara; 10650–51 (April 1914), Penge.

Peracca's specimen from Fort Portal is the second record of *A. africanus* in Uganda. The type locality, Entebbe, on the northwest corner of Victoria Nyanza is in an "island" of Rain Forest (see Engler, Vegetation der Erde, IX, I, part 1, Pl. ii). From the abundance of the species at Medje and its comparative rarity outside the forest, it may be considered as essentially a forest species and characteristic of the Ituri region, though the westward extension of its range is unknown. Local occurrence outside the Rain Forest proper is exemplified in the present collection by the two specimens from Niangara, where typical forest conditions reappear bordering the Uele River.

The writer adopts a conservative attitude toward the generic distinction of the present form from the Mediterranean *Algiroides*. In the large series now available, the nostril is widely separated from the first labial in every

Fig. 15. The nasal region in *Algiroides*. *Algiroides moreoticus* (A, after Bedriaga); *Algiroides alleni* (9528); *Algiroides africanus* (10672).

case and is enclosed between two instead of three nasals. It is true that this is one of the characters used in the definition of genera in the Lacertidæ (cf. Boulenger, 1887, Cat. Lizards, III, pp. 2 and 44). No natural classification can, however, apply a rigid system with definite category of "generic characters" — witness the keeling of the subdigital lamellæ in the present family (especially in *Philochortus*, recently revised by Boulenger, 1917,

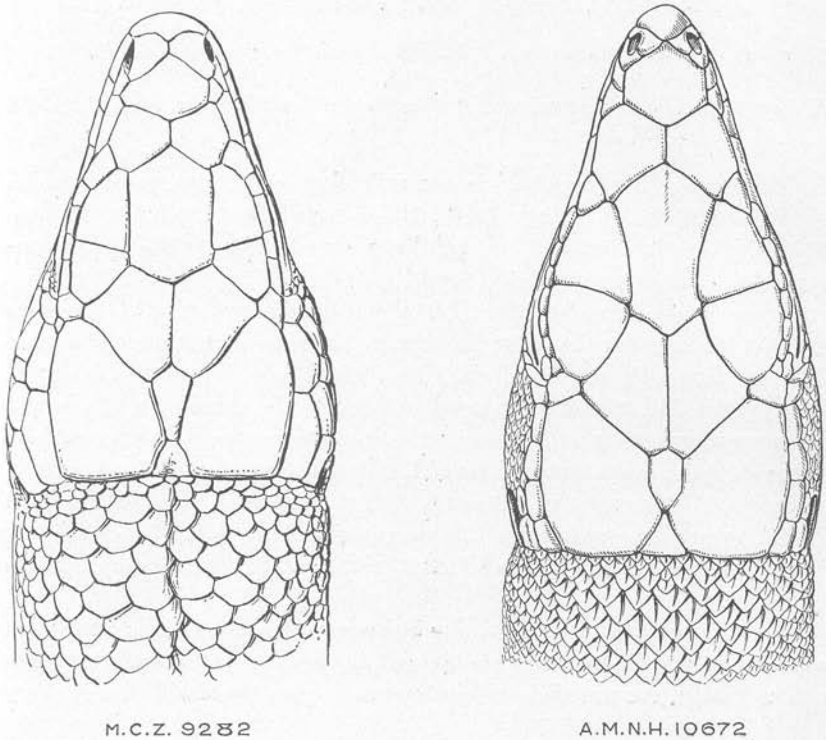


Fig. 16. Dorsal views of head of *Algiroides alleni* (type, M. C. Z. 9282, × 4.75; courtesy of Dr. Barbour), and *Algiroides africanus* (A. M. N. H. 10672 × 5).

Proc. Zool. Soc. London, p. 145). In *Algiroides alleni* Barbour, from Mt. Kenia, also with only two nasals, the nostril borders the first labial or is separated from it by a very narrow rim, as in the Mediterranean species; and with this geographical link, there seems no necessity for the retention of the name *Adolfus*. The only alternative is the admission of both *Adolfus* and *Algiroides* in East Africa, unless, indeed, a third genus be created for *A. alleni*.

Adolfus fridericianus Sternfeld was founded on a specimen from Avakubi, and there can be no question that the present series belongs to the same species. *A. fridericianus* is distinguished from *A. africanus* by the fewer

Map 13. Distribution of *Algiroides* in Africa.

△ *Algiroides alleni.*

○ *Algiroides africanus.*

Algiroides may be considered an eastern element in the Ituri fauna.

dorsal scales, the presence of a gular fold, and the higher number of scales between the collar and chin shields. These characters are compared with the range in the present series below:

	Dorsals	Collar to Gulars	Collar	Ventrals	Fem. Pores
A. africanus	24	19	6	18	13–15
A. fridericianus	19	25	9	20	15–15
Present series	18–24	18–30	6–9	18–23	12–17
A. africanus (*non* Blgr.) Peracca	?33	25	6	22	9–9

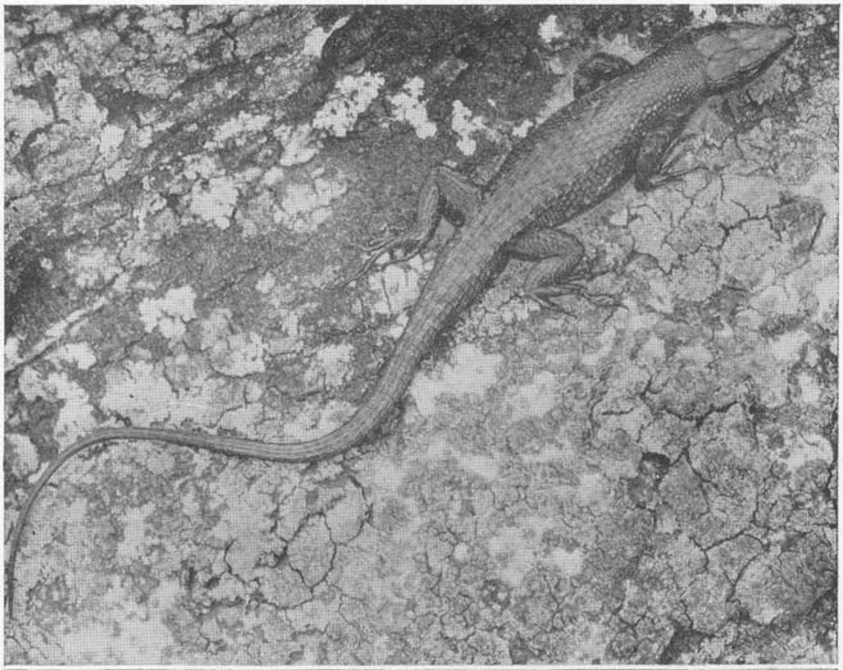
Since the gular fold is present in some and absent in other specimens and the coloration is variable, there can be little question of the identity of *africanus* and *fridericianus*.

The specimen from Fort Portal, Uganda, recorded by Peracca, falls so far outside the limits of variation here established that it may require dis-

Plate XXIII

Figure 1. *Algiroides africanus* Boulenger. A. M. N. H. No. 10534; ♂; length 163 mm.

Figure 2. *Holaspis guentheri* Gray. A. M. N. H. No. 10709; ♂; length 118 mm.



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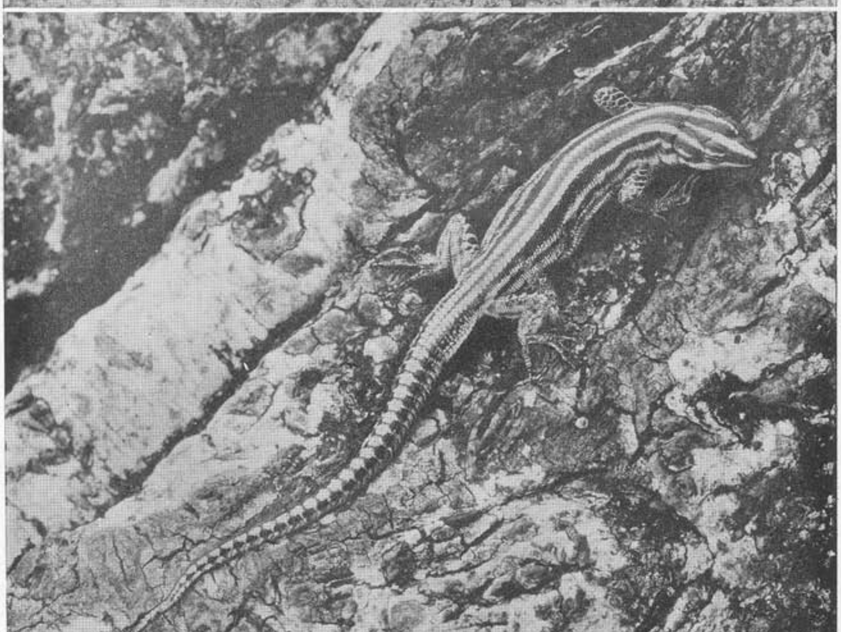

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tinction as a third African species of *Algiroides*. The scale count of thirty-three, however, may include the ventrals, in which case the difference is greatly reduced; and it is impossible to judge the importance of the difference in number of femoral pores from a single specimen.

Algiroides alleni Barbour (1914, Proc. New England Zool. Club, IV, p. 97), described from a series of specimens collected by Dr. Glover M. Allen on Mt. Kenia, is of exceptional interest in its closer relations with the Mediterranean species of the genus (at least in the character of the nostril above discussed). Through the kindness of Dr. Thomas Barbour, the writer had the privilege of examining the type and paratypes of this species at the Harvard Museum of Comparative Zoology and Dr. Barbour has supplied the accompanying drawing (Fig. 16).

Direct comparison with *africanus* considerably increases the distinctness of *alleni*. It has a more slender body, a shorter head, and a much stouter tail. The outline of the head from the side is convex, straight or even concave before the eyes in adult *africanus*.

The more weakly keeled scales (cf. the original description) are very distinctive. The laterals and anterior dorsals are entirely smooth and none of the keels approach those of *africanus* in distinctness.

The prefrontal is wider than long in *alleni*, as long as wide in *africanus*. The frontal is short with parallel sides, elongate and wider anteriorly in *africanus*. The granules between supraoculars and supraciliaries, entirely absent in *alleni*, are well developed in *africanus*, hiding the supraciliaries if the head is viewed from above. Finally, the nostril, as above reported, is bordered by the first labial and two nasals.

In the present series the ventrals are uniformly in six longitudinal rows posteriorly, four anteriorly; the scales of the median rows are as long as wide, the second row the widest; the scales of the outer row are more or less keeled; the transverse rows vary from eighteen to twenty-three. The strongly keeled imbricate or subimbricate dorsals vary in number from eighteen to twenty-four across the body and from thirty-eight to forty-eight from anus to occiput. The keels converge more or less toward the median line. One specimen has the keels of the seven enlarged dorsal rows continuous and nearly parallel to the median axis, while those of the lateral rows are alternate. The dorsal rows are considerably larger than the lateral, the gradation sometimes uniform, more usually the seven or eight mid-dorsal rows rather sharply defined. The number of scales in the collar varies from six to nine, including the small keeled scales at the sides. The scales between collar and gular symphysis vary from eighteen to thirty. A gular fold (as described by Sternfeld) often faint, usually absent, sometimes well marked. A lateral horizontal fold from the lower side of the ear toward the collar usually more distinct. The femoral pores vary from 12–12 to 17–17, the higher numbers more frequent in the males.

The scutellation of the head is interesting in the number of its variations. In seventy-five specimens the parietals are separated by the interparietal and the occipital; in seventeen they meet in a point; and the parietals form a more or less extensive suture in the remaining fifty-one. The interparietal is transversely divided in two specimens; it is absent in six specimens; and it may be cut off from the frontoparietals by an anterior parietal suture. The nasals usually meet behind the rostral, separated by a suture between rostral and frontonasal in three cases. The prefrontals are narrowly separated by the frontal and frontonasal in one specimen. Five specimens have a small azygous plate between the prefrontals. The upper labials anterior to the subocular are normally five, varying from four to six. The nostril is in every case separated from the first labial, pierced between two nasals, above or just behind the rostral first labial suture.

The coloration in life, according to the field notes, is as follows: head reddish brown above; a brownish green dorsal band, more brownish anteriorly, continuing on the tail. This band extends on the seven or eight enlarged dorsal scale rows, is outlined with a row of yellow spots on each side, and bears one or two rows of widely separate dark spots centrally. The sides are dark brown, with a row of yellow spots at the edge of the ventrals, which are a vivid green. A more or less noticeable light line below the ear, on the longitudinal fold.

The stomachs contained a spider (No. 10591), cockroaches (Nos. 10559, 10569, 10595, and 10661), a cricket (No. 10568), grasshoppers and caterpillars (Nos. 10610 and 10630), and a species of Reduviidæ (No. 10595).

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	59	109–181	155.3 mm.
	♀	33	111–177	153.7 mm.
	Juv.	7	65–104	86.4 mm.
Body	♂	86	40–60	53.6 mm.
	♀	47	40–63	56.4 mm.
	Juv.	10	26–38	32.9 mm.
Tail	♂	59	69–125	102.7 mm.
	♀	33	70–113	97.1 mm.
	Juv.	7	39–69	54.3 mm.
Tail/Length	♂	59	.61–.69	.654
	♀	33	.60–.67	.628
	Juv.	7	.59–.65	.623

	Sex	No. of Specimens	Extremes	Average
Axilla to Groin	♂	86	21–32	27.5 mm.
	♀	47	22–36	30.5 mm.
	Juv.	10	14–21	17.2 mm.
Arm	♂	86	15–25	21.8 mm.
	♀	47	15–25	21.9 mm.
	Juv.	10	11–16	13.2 mm.
Leg	♂	86	21–38	32.5 mm.
	♀	47	22–36	32.0 mm.
	Juv.	10	15–22	19.1 mm.
Head Length	♂	86	11.0–16.5	14.4 mm.
	♀	47	11.0–16.0	14.2 mm.
	Juv.	10	7.5–11.0	9.2 mm.
Head Breadth	♂	85	7.0–10.8	9.2 mm.
	♀	47	7.0–10.5	9.1 mm.
	Juv.	10	5.0–7.0	6.0 mm.
Transverse Ventral Scale Rows	♂	86	17–23	19.7
	♀	47	18–23	21.1
Longitudinal Dorsal Scale Rows	♂	86	18–23	20.3
	♀	47	18–24	20.2
Scales from Collar to Gulars	♂	86	18–27	22.7
	♀	47	19–26	23.5
Femoral Pores (total/2)	♂	86	13–17	14.7
	♀	47	12–16.5	14.0

"*Algiroides africanus* shows considerable variation in color phases, and while the one described above is typical, some specimens are more uniform, with the greenish brown dorsal band less conspicuous or absent, whereas in others the brown and green shades may be even more intense. The rough, peculiarly shaped body scales are well shown on Plate XXXIII, Fig. 1. The females are slightly smaller than the males, which seldom exceed seven inches in length.

"These lizards were never seen in villages but sometimes on the road, where, however, they ran along wooden beams of bridges or among heaps of stones. The higher lying rocky portions of the forest are their real haunts and most of the specimens in the collection were caught under fallen timber in the extensive clearings made by the Medje in 1914. They usually basked on trees and stones, but hunted for food among the dry leaves and other rubbish of the ground. They were especially fond of spiders, roaches, grasshoppers, and crickets, and a few had also fed on caterpillars, beetles, ants and their larvæ" [H. L.].

Ichnotropis Peters

Synopsis of the Species of *Ichnotropis*

A. Frontonasal divided longitudinally, subocular cut off from lip, no distinct occipital.......................................*squamulosa.*

AA. Frontonasal single, subocular bordering lip, a distinct occipital.

B. Frontal square anteriorly, a pair of small anterior supraloreals. *chapini.*

BB. Frontal more or less pointed anteriorly, no small anterior supraloreals.

C. Hind limb not reaching ear....................*capensis.*

CC. Hind limb reaching ear or beyond..........*macrolepidota.*

Ichnotropis chapini, new species[1]

Text Figure 17; Map 14

A single specimen (A. M. N. H. No. 10674) from Aba, July 1911, requires distinction as a new species.

The distribution of the species of this genus is of considerable interest. *Ichnotropis capensis* (Smith) is southern, extending farthest north in Angola, where it is the sole species, but, curiously enough, unrecorded from German Southwest Africa. *Ichnotropis macrolepidota* Peters appears to be derived directly from *capensis,* probably replacing it in Matabeleland and northern Rhodesia. *Ichnotropis squamulosa,* a very distinct form, overlaps much of the range of *capensis* and probably all of that of *macrolepidota* and extends much farther north than these, into German East Africa, reaching also Angola to the west. The present form, known only from the Sudan, is closely allied to *capensis,* consequently there is a very wide gap in the distribution of the *capensis* group.

Diagnostic characters

Habitus as in *Ichnotropis capensis,* to which it is closely allied. Hind leg not reaching axilla; head shields very rugose; frontonasal undivided; an occipital; a supraloreal between the frontonasal and the anterior loreal; an auricular shield. Anterior border of frontal square.

Detailed description

Type: A. M. N H., No. 10674.

Habitus lacertiform; body slender; legs short; tail .56 of the total length (.57 in *capensis*). Head shields very rugose, except nasals and anterior loreals,

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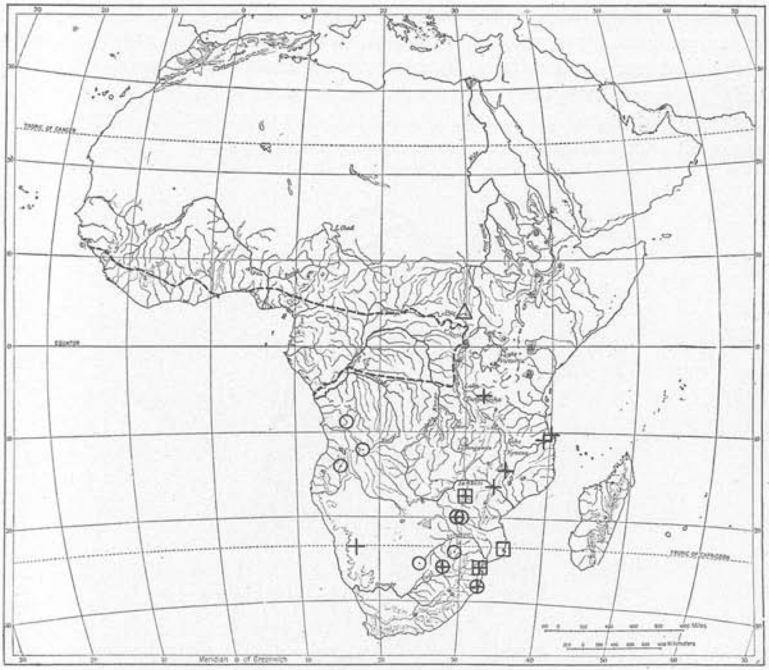
[1] *Ichnotropis chapini.* Named in honor of Mr. James P. Chapin, who accompanied Mr. Lang on the American Museum's Congo Expedition, and prepared in the field a valuable series of color sketches from life of many of the species included in this paper.



Map 14. Distribution of *Ichnotropis* in Africa.

○ *Ichnotropis capensis.*
□ *Ichnotropis macrolepidota*, probably a northeastern subspecies of *capensis.*
△ *Ichnotropis chapini.* Closely related to *capensis* but widely separated in range.
+ *Ichnotropis squamulosa.* Represents a distinct section of the genus.

about as in *squamulosa*, more so than in *macrolepidota.* Rostral nearly as high as wide, five-sided, pointed above, narrowly separated from the frontonasal by the superior nasals. Nostril circumscribed by three nasals, an anterosuperior, an inferior, and a very small posterior, the latter much smaller than observed in *macrolepidota* and *squamulosa.* A smooth supraloreal between the two upper nasals, the frontonasal, prefrontal, anterior and posterior loreals. Frontal four-sided, with two longitudinal keels, anteriorly enclosed between the prefrontals. Four supraoculars; four supraciliaries, of which the anterior exceeds the other three, separated from the supraoculars by a series of granular scales. Frontoparietals slightly exceeded by the interparietal, which is bordered behind by an occipital. Parietal shields rounded behind, with three enlarged scales on each side. Temporals small, uniform, keeled. A curved auricular bordering the ear opening anteriorly; auricular larger than in *squamulosa* or *macrolepidota* examined. Labials 8–7, above and below, four anterior to the subocular (which borders the lip) on one side, five on the other.

Dorsal scales strongly keeled and imbricate, in twenty-five longitudinal and fifty-five transverse series. Ventrals smooth, imbricate, in ten fairly regular longitudinal series and thirty cross-rows to the arms. Twenty-three scales from brachial region to the gular symphysis. Scales of the preanal area small. Fold anterior to the shoulder faint.

General color grayish brown above. A lateral white stripe originating on the subocular, outlined above and below with black, passes above the arm, but does not reach the hind leg. A very faint dorsolateral line above this (visible only when in alcohol). Between these lines on the sides is a series of transverse black spots, two or three scales wide and half a scale long, on the tips of scales; two series of similar transverse markings dorsally, one on each side of the median line, extending to the

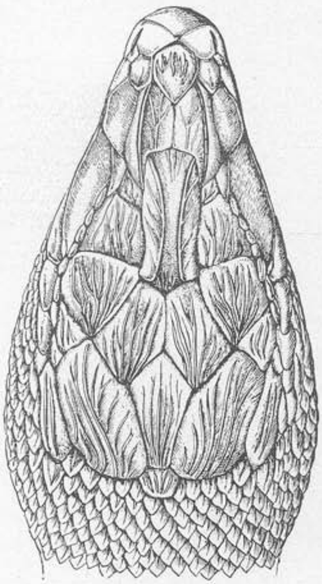


Fig. 17. Head of *Ichnotropis chapini*, (type, 10674, × 5).

longitudinal dorsolateral stripe. Ventral scales and chin shields white, outlined with gray, the two outer rows of ventrals punctate with brown dots. Lower and upper labials mottled with light and dark. Limbs grayish brown above, light beneath.

Measurements of A. M. N. H. No. 10674 (♀): length, 135; body, 58; tail, 77; axilla to groin, 33: snout to arm, 21; arm, 18; leg, 28; head length, 14; head breadth, 8 mm.

Eremias Wiegmann

Key to the Species of *Eremias* Recorded from the Sudan, in the Restricted Sense of the Present Paper

A. Supraoculars entirely surrounded by granules; head shields striate; ventral plates in six longitudinal series; subocular cut off from the lip. *spekii sextæniata.*

AA. Supraoculars in contact with the frontal.
B. Ventrals in ten longitudinal series; femoral pores 21–21. *guineensis*.[1]
BB. Ventrals in six longitudinal series; femoral pores 12–15. *nitida*.
C. Dorsal scales, 42 .... *nitida nitida*.
CC. Dorsal scales, 51 .... *nitida nigerica*.
CCC. Dorsal scales, 59 .... *nitida garambensis*.

Eremias nitida Günther

Eremias nitida Günther, 1872, Ann. Mag. Nat. Hist., (4) IX, p. 387. Boulenger, 1887, Cat. Lizards, III, p. 83. Tornier, 1901, Beiheft, Arch. Naturg., LXVII, p. 73.
Eremias nitida nigerica Klaptocz, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 282.

Eremias nitida garambensis, new subspecies

Text Figures 18 and 19

A distinct new form is represented by thirty-four specimens: A. M. N. H. Nos. 10682–705 (May 1912), 10706–08 (June 1912) are from Garamba; 10678–81 (April 1912), Vankerckhovenville; 10675–77 (November 1911), Yakuluku.

The zoogeographical relations of the part of the Sudan reached by the present expedition with the West African region north of the Forest (Upper Niger to Senegal) have been exemplified in a number of species. The present form exhibits the same relationship, in that it is allied to the West African species of the genus. The above localities probably represent the eastern border of its range, since it was not taken by Werner on the Nile, one hundred miles to the northeast, where a distinctively East African species, *E. spekii sextæniata* Stejneger, was found (Werner, 1907, Sitzber. Akad. Wiss. Wien, math.-natur., CXVI, part 1, p. 1845).

Diagnostic characters

Head shields smooth, no granules on inner sutures of the supraoculars. Lower nasal undivided, resting on the first labial only, in contact with the rostral. Interparietal narrow reaching the occipital or cut off from it. Ventrals in six straight longitudinal series. Dorsal scales keeled, fifty-eight across the body.

Detailed description

Type: A. M. N. H., No. 10686.

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[1] This species is described from Brass, Mouths of the Niger, within the forest area. It has not been rediscovered, and the writer regards its occurrence there as accidental. Probably a Sudanese species.

Habitus typical of the genus; head and limbs moderate, the hind limbs reaching between collar and ear; tail more than two-thirds the total length. Head rather high; snout long, obtusely pointed.

Nostril between three nasals, not at all swollen; the lower above the first labial, narrowly in contact with the rostral; the upper forming a median suture; the small posterior wedged between the anterior loreal and the frontonasal. Frontonasal two-thirds as long as wide. Prefrontals four-sided, with median suture as long as the frontonasal. Frontal as long as its distance from the rostral, shorter than the parietals. Interparietals regular, posterior sides convex. Parietals large with elongate shield on each side for three-fourths of their length. Interparietals small, elongate, separated from the small occipital by a parietal suture. An auricular shield on the superoanterior border of the ear opening. Temporals small, smooth. Oculars four, the second and third large. Supraciliaries six, separated from the oculars by a row of small uniform granules. Five labials anterior to the subocular, which is moderately narrowed beneath. Second loreal in contact with the first ocular.

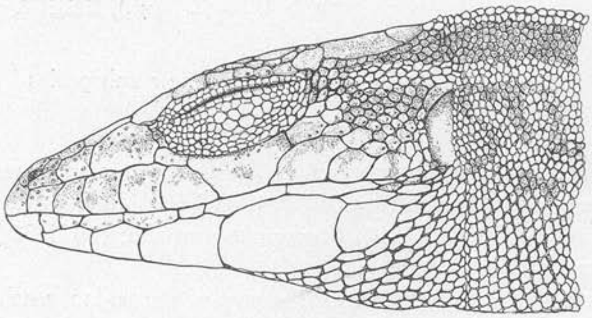


Fig. 18. Head of *Eremias nitida garambensis*, (type, 10686, × 4.3).

The dorsal scales are small, keeled, rhomboidal, juxtaposed, sixty across the body, about one hundred and fifty from the anus to occiput, about three rows corresponding to one of the ventrals. Ventrals in twenty-six transverse series and six longitudinal, of which the middle two are narrowest, the outer two rows on each side equal. Collar serrate, of eight plates, with thirty-one scales between it and the gular symphysis. Five pairs of chin shields, the anterior two in contact. Gular fold well developed.

A very striking and handsome color pattern. In the young and middle-sized specimens the ground color of the back and sides is black, becoming brownish posteriorly, the tail brown. On this ground color are six light lines; the two lateral, about two scales wide, are more or less broken up into spots, especially above the arm, originate on the subocular, and continue to the hind leg. The second line on each side, also two scales wide, begins at the lower posterior corner of the eye and continues on the base of the tail; sometimes slightly zigzag on the sides, rarely slightly broken. The two median lines are more brownish than the lateral and very even edged, two to three scales wide. They merge posteriorly into the brown of the tail. Anteriorly, at some distance from the parietals, they bifurcate, the outer branches going to the outer corners of the parietals, the inner to the inner corners, including the occipital between them; sometimes less widely separated, they do not reach the corners but start from the middle third of the posterior border of the parietals. The black above the first lateral line continues to the end of the tail, which is orange brown in youngest specimens. In the males a row of five to seven large, blue-edged, light ocelli lies between the ventrals and the first lateral line, the first over the arm, the last just behind the hind leg.

Measurements of the type: Length, 225 mm.; body, 60 mm.; tail, 165 mm.; tail/length, .73; axilla to groin, 36 mm.; snout to arm, 21 mm.; arm, 19 mm.; leg, 37 mm.; head length, 15 mm.; head breadth, 9 mm.

This pattern is still visible in the largest specimens, in which it is obscured by the anterior invasion of the brown of the tail and by the breaking up of the black interspaces into light brown and black crossbars, often very irregular, scarcely visible on the back, but often very strong on the sides. Venter yellowish white. Hind limbs brown with round light spots above. Arms irregularly marked with brown and black.

The interparietal is sometimes in contact with the small occipital. The latter may be transversely divided, or absent. The anterior ocular may subdivide into two or three plates. The supraciliaries vary from five to six. The loreal region shows a triangular interloreal in one specimen, a small supraloreal in another. The labials before the subocular are 4–4 in two specimens, 4–5 in three, 5–5 in twenty, 5–6 in four, 6–6 in one. The scales in the collar number from eight to thirteen, the scales between the collar and gulars from twenty-six to thirty. Two or three pairs of gulars in contact. Longitudinal series of ventrals twenty-five to thirty-one. Number of dorsals in a transverse row fifty-two to sixty-four, mean fifty-nine.

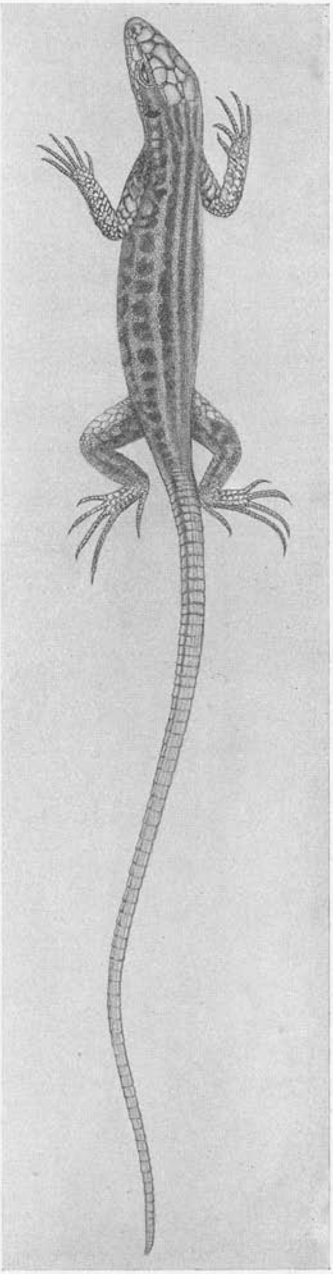


Fig. 19. *Eremias nitida garambensis* (10682, × 1). To show color pattern.

The relationship with *Eremias nitida nitida* Günther appears to be close, the chief distinctions being the much reduced interparietal, the higher number of scale rows across the back, and probably the bifurcation of the dorsal lines. This gap is bridged by *Eremias nitida nigerica* Klaptocz, in which the dorsal scales are fifty-one, (forty-two in *nitida nitida,* fifty-eight in this series), the interparietal narrower, and the coloration very similar, but apparently without the forked dorsal lines which seem a very striking and characteristic feature in the present subspecies. These relations, of course, may be found on the examination of a larger series of the western forms to be either more distant or closer.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	14	104–225	177.9 mm.
	♀	16	95–229	173.9 mm.
Body	♂	14	33–61	51.0 mm.
	♀	16	32–65	52.7 mm.
Tail	♂	14	71–165	126.9 mm.
	♀	16	63–164	122.5 mm.
Tail/Length	♂	14	.62–.74	.71
	♀	16	.64–.73	.69
Axilla to Groin	♂	14	22–36	29.7 mm.
	♀	16	17–40	30.0 mm.
Arm	♂	14	13–19	16.8 mm.
	♀	16	11–18	15.8 mm.
Leg	♂	14	26–37	31.9 mm.
	♀	16	19–34	30.0 mm.
Head Length	♂	14	11–15	13.1 mm.
	♀	16	9–14	13.5 mm.
Head Breadth	♂	14	6.0–9.0	7.7 mm.
	♀	16	5.0–8.2	7.4 mm.
Ventrals, Transversely	♂	14	25–28	26.9
	♀	16	27–31	28.5
Dorsals, Transversely	♂	14	56–62	58.5
	♀	16	52–64	58.7
Femoral Pores (total number)	♂	14	22–28	25.6
	♀	16	23–28	24.8

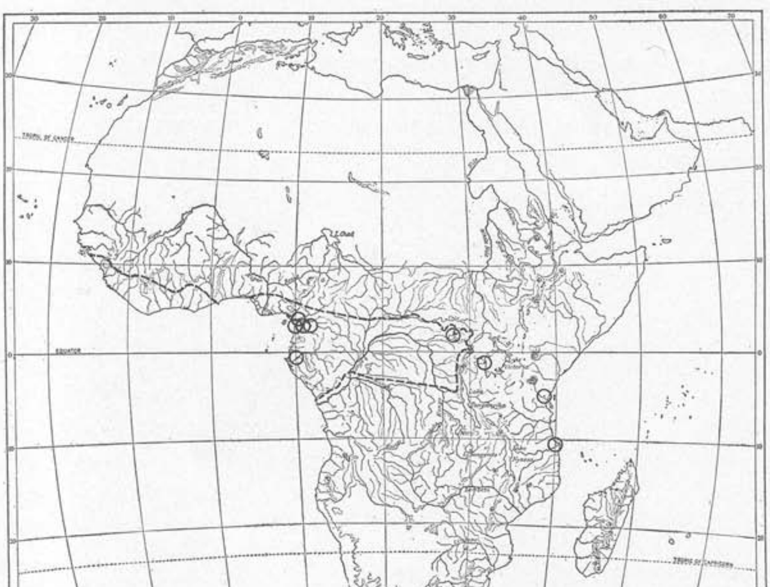
Holaspis Gray

Holaspis guentheri Gray

Plate XXIII, Figure 2; Text Figure 20; Map 15

Holaspis guentheri GRAY, 1863, Proc. Zool. Soc. London, p. 153, Pl. xx, fig. 1; 1864, Ann. Mag. Nat. Hist., (3) XIII, p. 103. MÜLLER, F., 1885, Verh. Naturf. Ges. Basel., VII, p. 702. BOULENGER, 1887, Cat. Lizards, III, p. 118. MATSCHIE, 1892, Sitzber. Ges. Naturf. Freunde Berlin, p. 110. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 40. BOULENGER, 1900, Proc. Zool. Soc. London, p. 449. TORNIER, 1900, Zool. Jahrb. (Syst.), XIII, p. 593; 1902, Zool. Jahrb. (Syst.), XV, pp. 582 and 674. MÜLLER, L., 1910, Abh. Bayerischen Acad. Wiss. 2 Kl., XXIV, p. 560. NIEDEN, 1910, Fauna Deutschen Kolonien, Reihe I, Heft 2, p. 19. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exped., IV, p. 199. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 79. WERNER, 1913, Denkschr. Akad. Wiss. Wien (math.-natur.), LXXXVIII, p. 717.

Holaspis guentheri lævis WERNER, 1895, Verh. Zool.-Bot. Ges. Wien, XLV, p. 191.



Map 15. Distribution of *Holaspis guentheri*. A forest species occurring also in East Africa.

The collection contains eleven specimens of this aberrant lacertid: A. M. N. H. Nos. 10709 (April 1914), 10710–18 (June 1914), and 10719 (July 1914) from Medje.

The species has not hitherto been recorded from the Ituri region, being known from the Kamerun-Gaboon district in West Africa and from German East Africa, where it ranges from Lake Victoria (Bukoba) to the coast. It is the distribution of true forest species like the present which lends support to the theory of a former greater extension of the continuously forested area.

There seems to be no reason for retaining Werner's subspecies *lævis* for the East African members of the species, as Tornier (1897, p. 40) has shown. The original description of Gray and that of Boulenger (1887, p. 118) were founded on a single immature specimen. The present series is in entire agreement with Tornier's remarks, the dorsolateral scales being smooth and the femoral pores nineteen to twenty-four.

The coloration in alcohol is that described by Werner for *lævis* (1895, p. 191), but the field notes indicate that this is radically different in life. The bluish venter is orange, the dorsal blue lines pale yellow, and only the tip of the tail is blue. The lower jaw and throat are pale grayish green, as is the lower side of the fore limbs. The limbs are black above, the large scales edged with yellow. Sides yellowish green. Lower side of tail yellowish, with dark bars, more pronounced toward the tip, which is blue beneath (as above).

The tabulation of measurements and scale characters shows the range of variation in the present series.

The writer is inclined to believe that the lateral denticulation of the

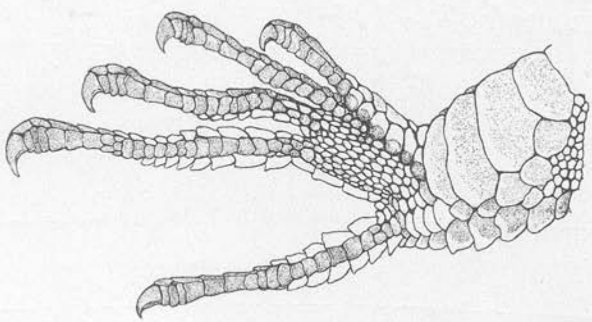


Fig. 20. Plantar view of foot of *Holaspis guentheri* (10718, × 5.2). To show lateral denticulation and modified scales.

tail, which is directed somewhat downwards, as well as the similar expansion on the bases of the toes and on the inner edge of the hind leg (Fig. 20) and the keeling of the lower scales of the tail toward its tip, may best be regarded as a tree-climbing adaptation. A peculiar character in this species consists of the fusion of the third and fourth fingers for nearly their entire first joint.

The anterior row of plantar scales is enlarged and they are remarkable in the possession of soft pads on the downwardly directed (inner) half, while the outer and lateral half is hard, like a normal scale.

Apparently only two eggs reach full development in this species and these eggs become relatively very large. No. 10717 contained two eggs on each side, .5 mm. long; No. 10716 contained 1 + 1 eggs, 12 × 6.3 mm. Both of these specimens were captured in June. No. 5275, from Kamerun, without a date, contained 1 + 1 eggs, 11 × 5 mm.

Measurements and Scale Characters

A. M. N. H. No.	10709	10710	10711	10712	10714	10715	10716	10717	10718	10719
Sex	♂	♂	♂	♀	♂	♀	♀	♀	♀	♂
Femoral Pores	22–22	23–23	22–22	18–19	24–24	19–21	19–19	20–20	21–21	22–23
Length	118	109	[117]	106	109				[85]	[88]
Body	52	52	52	51	48	24	49	38	50	51
Tail	66	57	[65]	55	61				[35]	[37]
Tail/Length	.56	.52		.52	.56					
Axilla to Groin	30	29	29	29	28	12	28	21	28	27
Snout to Arm	19	19	19	18	18	11	18	14	16	19
Arm	17	18	17	15	16	7	15	12	14	17
Leg	24	23	24	22	22	10	22	16	21	23
Head Length	12	12.2	12.2	11	11.5	6.3	10	9	10.5	12
Head Breadth	8	8	7	7	8	4	6.2	6	7	7.6
Ventrals, Transversely	6	6	6	6	6	6	6	6	6	6
Ventrals, Longitudinally	27	27	28	30	28	27	30	30	30	27
Dorsals, Transversely	58	60	62	64	72	56	60	66	62	66
Dorsals, Longitudinally	57	54	53	51	55	55	53	55	52	52
Collar Scales	11	9	10	7	11	11	11	10	10	11
Scales Collar-gulars	29	26	28	28	27	30	25	30	27	31

"Our largest specimen measures three and a quarter inches (118 mm.) in length and represents one of the most conspicuously colored lizards seen in the Rain Forest. The yellow markings of the upper side contrast strongly with the glossy black and merge on the sides into pale green, which extends to the bright orange of the venter. On the tail the series of spines is olive-yellow and the tip blue.

"All of the specimens were collected among the fallen timber in clearings recently made, and were never seen in or near villages. Its remarkable adaptations to arboreal life enable it to glide on trees and even the lower surface of smooth boughs with such ease that at first sight it reminds one of a gecko. Other arboreal lizards run up and down rough tree trunks with perhaps greater facility, but their movements are dependent on the grip taken with the claws, for the ventral surface and tail are generally carried free and contribute nothing to their hold; but *H. guentheri* slips along with body and tail pressed close to the surface. The head, body, and even the thigh are singularly flattened; the smoothness of the large scales of the belly and lower jaw, facilitating unhampered gliding, is in contrast with the roughness of the tail, provided with lateral serrations directed outward, downward, and backward. These and other adaptations cited below assist in climbing, a process greatly aided by the facility with which the tail adjusts itself to the shape of the supporting surface. The flatness of the belly, with the ridges of scales fore and aft, and the slightly overhanging edge of finely scaled skin on the sides have suggested that through some muscular arrangement a temporary suction is produced, completely securing it to the bark, which in these forests is often smooth and devoid of moss and lichens.

"These lizards were seen singly and are extremely shy and difficult to approach. Two were found in the early morning hiding beneath large pieces of bark, and as a result of the dampness had lost their usual agility. The conspicuous yellow markings, well shown in Plate XXIII, Figure 2, are not dependent on the intensity of the sunlight, as is the case with the brilliant blue of a male *Agama*, yet the orange, green, and blue tints are dull when seen in hiding places in the early morning. Their food consists of various ants, earwigs, and small beetles and their larvæ" [H. L.].

GERRHOSAURIDÆ

Gerrhosaurus Wiegmann

Synopsis of the Genus *Gerrhosaurus* (Based on Boulenger, 1910, p. 480)

A. Ventral shields in 14–16 longitudinal series; tympanic shields large, crescentic; 18–20 femoral pores on each side. . . . . *validus*.

AA. Ventrals in less than 14 rows.

B. Ventrals in 10 longitudinal series.

C. Tympanic shield large, crescentic; dorsal scales in about 56 transverse series; 15–18 femoral pores on each side. . *typicus*.

CC. Tympanic shield small; dorsals in 32–37 transverse series; femoral pores 11–14.

D. Dorsal color uniform brown. . . . . *major*.

DD. Dorsum spotted with yellow.

E. Yellow spots on the scales (Zululand). . . . *grandis*.

EE. Yellow spots on the sutures between the scales.

F. (Eritrea). . . . . *bottegoi*.

FF. (Togo-Uele) . . . . *zechi*.

BB. Ventrals in 8 series.

C. Tympanic shield large, crescentic; no strongly marked dorsolateral stripe; dorsals in 50–52 transverse series. (German Southwest Africa; known only from the unique type.) *auritus*.

CC. Tympanic shield narrow; a dorsolateral stripe; dorsals in 54–64 transverse rows. . . . . *flavigularis*.

D. Dorsal scales in a transverse row 20–26, mode 22 (South and East Africa). . . . . subsp. *flavigularis*.

DD. Dorsals 24–28, mode 26 (Angola, Lower Congo). subsp. *nigrolineatus*.

Gerrhosaurus zechi Tornier

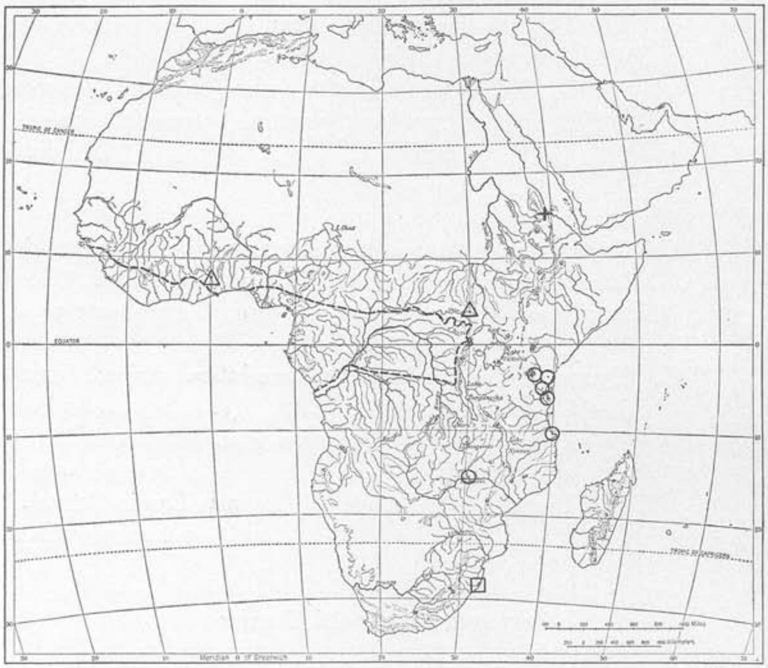
Plate XX, Figure 2; Text Figure 21; Map 16

?*Gerrhosaurus bottegoi* Del Prato, 1892, Atti Soc. Italiana Sci. Nat., XXXV, p. 20, fig. 1.
Gerrhosaurus maior zechi Tornier, 1901, Beiheft, Arch. Naturg., LXVII, p. 74.

Three specimens of this interesting lizard were collected: A. M. N. H. Nos. 10720–21 (May 1912) and 10722 (June 1912) from Garamba.

The writer has been unable to discover any distinction of specific value between *Gerrhosaurus zechi* and *Gerrhosaurus bottegoi;* but Tornier's name is provisionally retained because it seems probable that differences of at least subspecific value could be discovered if a series of the Eritrean form were available. The geographical relations between the Uele region and Togo are much closer, at any rate, than with Eritrea, and the question will be cleared up by future collections.

Gerrhosaurus zechi is the widest ranging species of the genus, which is essentially South African. *Gerrhosaurus zechi*, *Gerrhosaurus bottegoi*, *Gerrhosaurus major*, and *Gerrhosaurus grandis* seem to be a group of closely related forms, some of which may be found to intergrade. Their distribution is indicated on Map 16.



Map 16. Distribution of the species of *Gerrhosaurus* related to *G. major*.
○ *Gerrhosaurus major*. East African.
□ *Gerrhosaurus grandis*. South African.
△ *Gerrhosaurus zechi*. Sudanese.
+ *Gerrhosaurus bottegoi*. Abyssinian (probably identical with *zechi*).

Tornier (1901, p. 77, figs. 2 and 3) has given an excellent account of the variations in the head squamation of *Gerrhosaurus major*. Since an inter-nasorostral shield has been observed in *major*, and as *zechi* varies in an exactly analogous way, this character is of no value for the distinction of *Gerrhosaurus bottegoi*. Tornier's two figures illustrate the general arrangement of the head shields in the largest and smallest of the present specimens. The change in the form of the frontal with age is observable in other lizards, notably in *Bedriagaia tropidopholis*. Further variations are shown in the figure of No. 10722, in which a small shield is cut off from each anterior nasal to form a double inter-nasorostral, while the instability of the head shields extends to the supraoculars (Fig. 21). Far from regarding such variations as pathological, the writer would consider the instability in question one of the characters of the species.

The coloration is relatively much more constant. The outer four dorsolateral scale rows on each side, and the lower edge of the fifth, are chestnut. The dorsal space between these is black in ground color, with a yellow spot

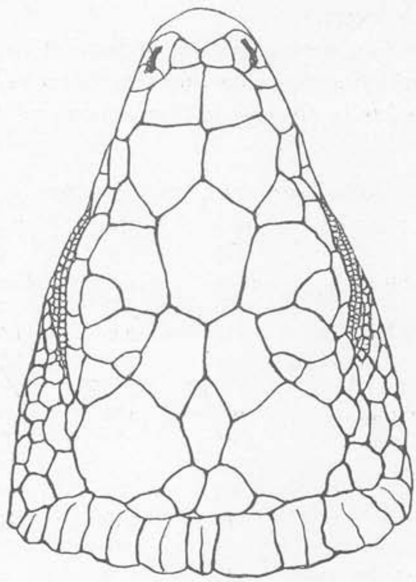


Fig. 21. Head of *Gerrhosaurus zechi* (10722, × 2.3). Showing two internasals and supernumerary oculars.

on the lateral suture between each of the scales. These spots are confluent on the sutures between the fifth and sixth scale rows and continue as a yellow line on the tail. The interrupted lines between these indicate the mode of augmentation of the dorsal scale rows very clearly. With fourteen on the neck, a median row is added at the seventh vertical from the parietals, the middle row of spots being replaced by two; on the eleventh vertical the median scale is replaced by two, and a median row of yellow spots begins; at the twentieth vertical another median scale is added, the row of spots again dividing into two. Reduction takes place in the reverse order, beginning at the thirty-second scale row, above the hind legs. A row of lateral scales is added on each side between the legs, making the total number of longitudinal dorsal scale rows nineteen if counted between the twentieth vertical and the hind legs.

The sides of the tail are more or less distinctly marked with light lines no the sutures of the scales, while the sides of the body are entirely uniform or posteriorly lined with yellow.

The head is black with yellow markings, chiefly on the sutures but somewhat irregularly disposed. The interparietal and each side of the parietals have a yellow spot in the middle. The keeled or rugose scales of the outer and upper sides of the limbs are yellow-spotted on their sutures. The venter is grayish brown.

The coloration of *Gerrhosaurus grandis* in South Africa appears to differ from that of *zechi* in having the yellow spots on the scales instead of between them, as is also stated to be the case in *Gerrhosaurus validus*.

Measurements and Scale Characters

A. M. N. H. No.	10720	10721	10722
Sex	♂	♂	♀
Femoral Pores	12–14	12–14	13–13
Length	375	455	302 mm.
Body	181	203	129 mm.
Tail	194	252	173 mm.
Tail/Length	.52	.53	.54
Axilla to Groin	100	113	70 mm.
Snout to Arm	61	70	47 mm.
Arm	49	52	39 mm.
Leg	63	67	51 mm.
Head Length	40	44	33 mm.
Head Breadth	28	31	24 mm.
Dorsals, Longitudinally	20	19	19
Dorsals, Transversely	37	32	32
Ventrals, Longitudinally	10	10	10
Ventrals, Transversely	49	47	46
Labials	$\frac{6\text{–}7}{5\text{–}5}$	$\frac{7\text{–}6}{7\text{–}5}$	$\frac{7\text{–}7}{5\text{–}5}$

"The habitat of these large, terrestrial lizards is really the Sudan, but we found them also in the Belgian Congo in the savannah adjoining Garamba. The heavily ridged scales on the back, the yellow-streaked, blackish upper side and broad lateral band of vinous red contrasting with the grayish white under side, and the large size, nearly a foot and a half in adult males, make these reptiles one of the striking features in their generally barren haunts. Here their liveliness and boldness of pose as they watch an intruder render them very conspicuous. When pursued they race toward their burrows in the hard ground, which are undoubtedly dug by themselves, probably during the rainy season when the moist soil makes this easy. The entrance to the refuge is so small that one is surprised to see them enter with such speed. They quickly disappear in the narrow galleries, which are several feet in length, and retire to the more spacious chamber about a foot below the surface. It is difficult to remove them from one of the channels for they not only hold on to its sides with their claws but also inflate the body considerably. The heavy tail is very flexible, but at the slightest pull breaks off and the lizard runs away apparently unhurt.

Two specimens in the collection were unearthed in widely distant plantations and one near the edge of a road, and although several others were seen, the species must be considered scarce. They miss no opportunity to bite and scratch, but when roughly handled feign death, like the Sudanese monitor, watching, however, their chance to take refuge in any suitable hollow or crevice. When freed on level ground they have the peculiar habit of running a distance and suddenly halting, sometimes with tail raised, as shown in Plate XX, Figure 2. This trait, of course, practically protects them from further pursuit when cover has been reached, especially as they remain so quiet that one is likely to tread upon them.

"Stomach contents show that the food consists chiefly of various insects commonly found on or below the surface of the ground in the savannah. Of the Orthoptera, crickets are favorites, and among beetles, even the strong protective fluid of carabids does not protect them from being gulped down. Millepeds (Polydesmidæ) are also welcome morsels. The sharp claws and vigorous limbs bring to light this small prey, for these lizards feed only during the day, when most of these creatures are hiding beneath pieces of stones, dead wood, and other objects" [H. L.].

Gerrhosaurus flavigularis nigrolineatus Hallowell

Gerrhosaurus flavigularis DUMÉRIL (*non* Wiegmann) 1856, Rev. Mag. Zool., (2) VIII, p. 418.

Gerrhosaurus nigrolineatus HALLOWELL, 1857, Proc. Acad. Nat. Sci. Phila., p. 49. PETERS, 1876, Monatsber. Akad. Wiss. Berlin, p. 118; 1877, p. 613. BOULENGER, 1887, Cat. Lizards, III, p. 122. BOETTGER, 1887–1888, Ber. Senck. Ges., p. 25. PFEFFER, 1892, Jahrb. Hamburg. Wiss. Anst., X, p. 74. BOCAGE, 1895, Herpétol. Angola, p. 35. WERNER, 1896, Jahrb. Ver. Magdeburg, p. 142. MOCQUARD, 1897, Bull. Soc. Philom. Paris, IX, p. 8. TORNIER, 1897, Kreichtiere Deutsch-Ost-Afrikas, p. 42. BOULENGER, 1900, Proc. Zool. Soc. London, II, p. 448; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 204; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 111; 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 8; 1910, Ann. S. African Mus., V, p. 480.

Gerrhosaurus multilineatus BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 61; 1867, p. 221. PETERS, 1881, Sitzber. Ges. Naturf. Freunde Berlin, p. 147.

Gerrhosaurus flavigularis nigrolineatus STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., V, p. 224.

References dealing with the relationship of this species to *G. flavigularis* Wiegmann.
TORNIER, 1900, Zool. Jahrb. (Syst.), XIII, p. 594; 1902, XV, p. 583. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 429. HEWITT, 1910, Ann. Transvaal Mus., II, p. 103; 1911, III, p. 49. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 80.

There are twenty-six specimens of this subspecies in the collection: A. M. N. H. Nos. 10744–45 (August 1915) are from Banana; 10739 (December 1914), Kinshasa; 10737–38 (July 1909), Leopoldville; 10746–48, Lower Congo; 10740–43 (August 1915), St. Antonio (Angola); 10723–25 (June 1915), 10726–36 (July 1915), Zambi. These localities are all in the Lower Congo, outside the forest proper.

They agree in every respect with the type and with the description of *nigrolineatus*, with the exception noted below. The preponderance of *nigrolineatus* characters in this region (Gaboon-Angola) seems sufficient to warrant the retention of Hallowell's name for a subspecies. The geographic relations with *flavigularis flavigularis*, however, are far from clear. The area in which the two forms intergrade is very large and, in addition, there are probably sporadic specimens of *flavigularis flavigularis* which appear to be *nigrolineatus*. With considerable hesitation, the writer inclines to a geographic definition of *nigrolineatus*, confining it to West Africa, probably north of German Southwest Africa, and with an undefined eastern boundary in Central Africa. All of the East and South African "*nigrolineatus*" are thus referred to *flavigularis flavigularis*. This geographic division emphasizes the number of longitudinal dorsal scale rows as a character for the separation of the subspecies. Only three of the twenty-nine specimens from East Africa examined by Nieden (1913, p. 80) have over twenty-four scale rows, while this figure is reached as a minimum by only three of the present twenty-six specimens from the Lower Congo. The fact that this character is not mentioned by Boulenger (1910, p. 480) in his attempt to distinguish a South African *nigrolineatus* may be a further indication of the value of this character for the restricted *nigrolineatus* in the present sense.

In one specimen of the present series, No. 10745, the frontonasal and the frontal form a short suture, and in a second they are rather narrowly separated by the prefrontals. The suture between the prefrontals varies considerably in length in the remaining specimens. A number of minor variations in head scalation may be noted. One specimen has a median occipital between the parietals. Six have one or more small plates between the frontal and the frontoparietals; in one specimen the frontoparietals and the interparietal are fused into a single plate, with indications of the normal sutures. In this specimen a supraloreal is cut off on each side from the frontonasal.

Stomach contents, examined in four specimens, consisted of parasitic worms, a small spider, and remains of grasshoppers, beetles and ants.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	5	300–339	315.7 mm.
	♀	9	169–429	265.5 mm.
Body	♂	12	85–138	110.8 mm.
	♀	14	59–131	87.8 mm.
Tail	♂	5	212–240	219.2 mm.
	♀	9	118–298	186.7 mm.
Tail/Length	♂	5	.70–.71	.704
	♀	9	.69–.72	.703
Axilla to Groin	♂	12	47–78	62.6 mm.
	♀	14	27–78	49.8 mm.
Arm	♂	12	24–38	29.7 mm.
	♀	14	17–34	24.8 mm.
Leg	♂	12	43–62	52.8 mm.
	♀	14	31–61	44.7 mm.
Head Length	♂	12	20.5–31	25.2 mm.
	♀	14	14.0–28	20.1 mm.
Head Breadth	♂	12	12–20	16.1 mm.
	♀	14	8–17	12.1 mm.
Dorsals, Longitudinally	♂	12	24–28	26.3
	♀	14	24–26	25.7
Ventrals from Anus to Gulars	♂	12	50–54	52.0
	♀	14	49–55	51.6
Femoral pores (total number)	♂	12	32–42	34.6
	♀	14	30–40	35.2

Scincidæ

See page 568 for artificial key to the species occurring in the Rain Forest.

Mabuya Fitzinger

Mabuya maculilabris (Gray)

Map 17

Euprepis maculilabris Gray, 1845, Cat. Lizards, p. 114. Müller, F., 1882, Verh. Nat. Ges. Basel, VII, p. 159.
Mabuia maculilabris Boulenger, 1887, Cat. Lizards, III, p. 164, Pl. ix, fig. 2.

BOETTGER, 1888, Ber. Senck. Ges., p. 26. GÜNTHER, 1894, Proc. Zool. Soc. London, p. 87. BOCAGE, 1895, Herpétol. Angola, p. 40, Pl. IV, fig. 1. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 12. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 42; 1900, Zool. Jahrb. (Syst.), XIII, p. 595; 1901, Beiheft, Arch. Naturg., LXVII, p. 81. BOULENGER, 1902, in Johnston, Uganda Protectorate, p. 446. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, pp. 583, 675. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien., LII, p. 342. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 205. JOHNSTON, 1906, Liberia, II, p. 833. WERNER, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1847, Pl. I, fig. 1. BOULENGER, 1908, Ann. Mus. Stor. Nat. Genova, (3) IV, pp. 5, 302; 1909, Trans. Zool. Soc. London, XIX, p. 342. PERACCA, 1909, in Il Ruwenzori, I, p. 168. MÜLLER, 1910, Abh. Bayerischen. Akad. Wiss., 2 Kl., XXIV, p. 96. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 442; 1910, Arch. Naturg., LXXVI, part 1, p. 237. ROUX, 1910, Rev. Suisse Zool., XVIII, p. 96. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 163. STERNFELD, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 386; 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 225. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 84.

Mabuia maculilabris major STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 232. NIEDEN, 1912, Mitt. Zool. Mus. Berlin, VII, p. 84.

Mabuia maculilabris bergeri STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 235.

Euprepes anchietæ BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 62.

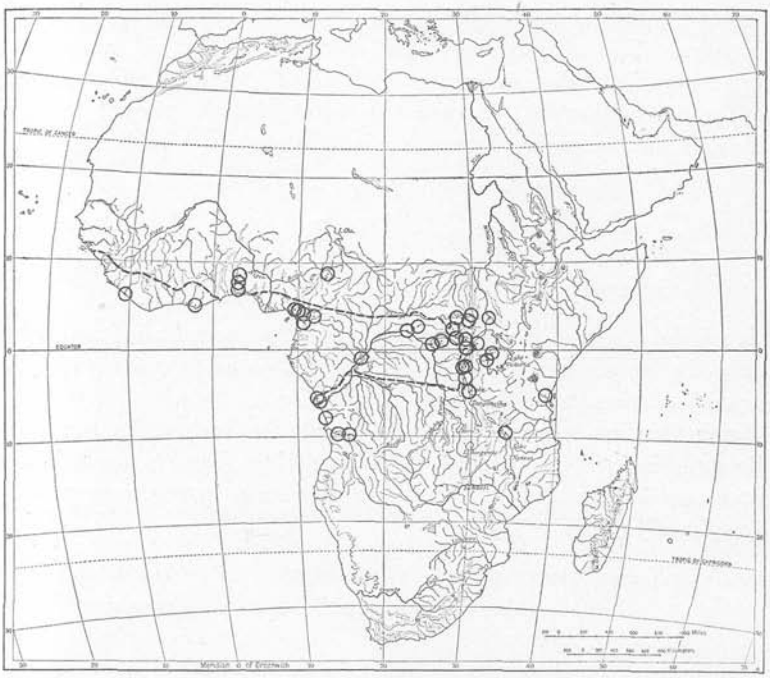
Euprepes notabilis PETERS, 1879, Sitzber. Ges. Naturf. Freunde Berlin, p. 36. BOCAGE, 1886, Jorn. Sci. Lisboa, XI, p. 4.

Sternfeld (1912, p. 232 *et seq.*) has differentiated two supposedly distinct subspecies, *major* and *bergeri*, respectively from the Central African lake region and the Sudan, whose status will be discussed below.

One hundred and forty-three specimens of this species were taken as follows: A. M. N. H. No. 10777 (October 1909) is from Avakubi; 10767–76 (September 1909), Batama; 10890, Belgian Congo; 10750 (July 1909), Bumba; 10816 (February 1911), 10817–18 (April 1911), 10819–20, 10838–39 (September 1912), 10840–46 (October 1912), 10847 (January 1913), Faradje; 10837 (June 1912), Garamba; 10749 (July 1909), 10888 (May 1915), Lukolela; 10778–93 (April–May 1910), 10794–96 (June 1910), 10850 (March 1913), 10851–60 (June 1914), 10861–62 (July 1914), Medje; 10849 (July 1913), Nala; 10797–815 (November 1910), 10848 (April 1913), Niangara; 10751–66 (August 1909), 10863 (December 1914), 10864–71 (January 1915), 10872–87 (April 1915), Stanleyville; 10836 (April 1912), Vankerckhovenville; 10821–35 (November 1911), Yakuluku; 10889 (July 1915), Zambi.

Mabuya maculilabris is one of the species which have been able to meet the conditions of both forest and open country. Its range extends both north and south of the Rain Forest, and it occurs somewhat more rarely eastward to the coast of German East Africa.

By far the most useful systematic discussion of variation in African Scincidæ that has appeared in recent years is that of Lorenz Müller (1910, p. 560 *et seq.*). The theoretical considerations advanced for the delimitation of species are sound and the conclusions reached definitive. The writer here expresses his appreciation of a paper which has in several respects



Map 17. Distribution of *Mabuya maculilabris*. Closely approximating the Western Forest Province of the Botanical map, and probably essentially a forest species.

served as a model in the study of the present material. With minor exceptions, the evidence of the Central African material is in accord with that of Müller, handicapped though he was by relatively small series of specimens.

The maximum length in the present series is reached in a male of 270 mm., body 90 mm.; the maximum body length is 95 mm., also in a male. The largest female measures 233 mm., body 82 mm., with a maximum body length in this sex of 89 mm. The tail length varies from .61 to .69 of the total. These measurements exceed those of Boulenger (1887, p. 165) and

Müller (1910, p. 568) for West African specimens, and even those of Sternfeld (1912, p. 231) for a series from the Central African lake region. Since Sternfeld bases his subspecies *major* chiefly on its larger size, it is interesting to note that the present series does not contain so large a proportion of specimens exceeding the West African specimens in this respect; and it must be noted that no series comparable to the present have been studied from West Africa, and, finally, that Bocage's type of *M. anchietæ* measured 85 mm. in body length.

The prefrontals form a suture in fifty-five specimens, are separated by a suture of the frontal and frontonasal in sixty-three, and meet in a point in twenty-one. This character appeared to Sternfeld (*loc. cit.*) as correlated with geographic variation, especially in his *Mabuya maculilabris bergeri* from the Sudan (Dufile). To test this assumption the present series may be divided into two groups, from the rain forest and bush-veldt respectively:

Prefrontals	*Ituri Forest*	*Sudan*
Forming a suture	40 specimens	15 specimens
Meeting in a point	16	5
Separate	30	33

It will be observed that the separation of the prefrontals does predominate in the Sudan; but the proportions are such as to make a specific or subspecific distinction on this basis inconclusive.

Similarly, since *bergeri* is said to have only five keels on its dorsal scales while *major* is distinguished from the West African *forma typica* in having a greater number, the variation in the present series in this respect may be geographically presented:

Keels of Dorsal Scales	*Ituri Forest*	*Sudan*
3–5	1 specimen	1 specimen
5–6	47	27
7–8	32	22
9	3	1

Since this character supplies even less basis for differentiation, *Mabuya maculilabris* does not seem at present divisible into subspecies. Either it has reached its present range too recently to be influenced by the environmental differences or these differences have recently been superimposed on a long established range.

The supranasals form a suture in forty-nine specimens, are separate in seventy, and meet at a point in nineteen. The supraciliaries are typically 5; 3–4 in one specimen, 4–4 in two, 4–5 in ten, 5–5 in one hundred and one, 5–6 in nineteen, 6–6 in four.

Müller's distinction of this species from *Mabuya raddoni* on the basis of the length of the snout appears somewhat less secure in the present series. Out of sixty specimens the distance from snout to frontal equals or exceeds the length of the frontal in forty-one cases, and is shorter in nineteen.

The scale rows about the body vary from twenty-nine to thirty-five. The scale count from anus to chin shields lies between fifty-one and sixty-six. The lamellæ beneath the fourth toe vary from fifteen to twenty.

Highly variable in coloration, the main features are nevertheless fairly constant, summed up as the presence of a dark lateral band with scattered yellow scales, the upper labials invariably spotted with yellow, which often continues as a line through the ear to the axilla.

Mr. Chapin's description of No. 10819 in life may be quoted.

> Crown and back dark olive, with inconspicuous black spots. Iris grayish buff, black posteriorly. Rim of eyelids yellow, cheeks brownish black with a few yellowish spots, and an irregular creamy line, tinged with red, from the subocular to the ear. Tiny scales around the ear tinged with orange. Sides of neck and body dark olive shading to dirty orange-red, and spotted with yellowish white scales. Throat and belly orange in middle, shading to orange-red below. Hind limbs olive above, orange below. Tail olive above, with black spots, and a few whitish spots near its base, beneath whitish, finely speckled with dull red.

The venter varies from greenish white through lemon-yellow to orange-red. The back from light olive to dark brown, with or without dark spots in irregular longitudinal lines. The number of yellow spots (usually single scales) is very variable, as is also the extent of this spotting caudally and dorsally; they are faint in the young. Usually the males are spotted more profusely and further back than the females.

An examination of the ovaries gave the following results. April and May: No. 10786, many minute eggs; No. 10885, undeveloped eggs, about 1 mm.; No. 10884, seven eggs, about 7 mm.; and No. 10874, eight eggs, 8×14 mm. September and October: No. 10771, eggs undeveloped, about 2 mm.; No. 10838, $4 + 3$ eggs, about 5 mm.; No. 10841, $5 + 3$ eggs, 8×14 mm. November: No. 10799, $4 + 3$ eggs, 5×7 mm.; No. 10813, $3 + 3$ eggs, 7.5×12 mm.; No. 10824, six eggs, 7×12 mm.

The various stages of development observed at the same date support Sternfeld's conclusion (*loc. cit.*) that this species does not have a definite season for reproduction.

A deposit of seven eggs was found under a log, Aug. 29, 1909, at Stanleyville. An embryo is readily identified with this species, showing the dark sides with faint light spots anteriorly. Its scales are three-keeled; the evidence appears conclusive that the number of keels in this and other species increases with age (Tornier, 1901, p. 81).

Stomachs contained remains of small snails (No. 10824), spiders (Nos. 10813 and 10841), some orthopterous insect (No. 10770), cockroaches (Nos. 10771, 10838, and 10884), termites (Nos. 10813 and 10841), beetles (Nos. 10776 and 10872), and Muscidæ ? (Nos. 10776 and 10872).

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	30	124–270	219.7 mm.
	♀	21	171–233	214.0 mm.
	Juv.	5	83–154	129.4 mm.
Body	♂	68	59–95	76.6 mm.
	♀	61	57–89	76.4 mm.
	Juv.	7	31–52	44.3 mm.
Tail	♂	30	112–180	145.5 mm.
	♀	21	114–157	142.0 mm.
	Juv.	5	52–104	85.4 mm.
Tail/Length	♂	30	.62–.69	.66
	♀	21	.61–.69	.66
	Juv.	5	.63–.67	.65
Axilla to Groin	♂	65	33–53	42.7 mm.
	♀	60	31–54	44.5 mm.
	Juv.	7	17–29	24.3 mm.
Arm	♂	65	18–30	24.2 mm.
	♀	60	18–27	23.1 mm.
	Juv.	7	10–17	14.0 mm.
Leg	♂	65	25–40	31.8 mm.
	♀	60	24–39	31.6 mm.
	Juv.	7	14–24	19.6 mm.
Head Length	♂	65	13.0–21.0	16.1 mm.
	♀	60	13.2–18.5	16.2 mm.
	Juv.	7	8.0–12.0	10.6 mm.
Head Breadth	♂	65	9.0–15.0	10.7 mm.
	♀	60	8.6–13.0	10.2 mm.
	Juv.	7	5.0– 8.0	6.8 mm.
Scales about Body	♂	68	29–35	32.6
	♀	61	30–35	32.3
	Juv.	6	32–34	32.7

"This lizard is one of the forms common in the forest region and savannah and as numerous about the houses of Europeans as in native huts. Although excellent climbers, they are not typical of the virgin forest, preferring human settlements, and may be seen sporting about or basking on trees and oil-palms, from which, in case of danger, they readily jump from any height without injury. We saw one alight on a brick floor after leaping from a twenty-four foot wall and race off quite unhurt. They are often transported in porters' loads, into which they creep at nightfall, remaining there until the bundles are dropped again on the road" [H. L.].

Mabuya polytropis Boulenger

Plate XXIV, Figure 1

Mabuya polytropis BOULENGER, 1903, Ann. Mag. Nat. Hist., (7) XII, p. 433; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 576.

This large *Mabuya*, hitherto known only from Kamerun, Gaboon, and Fernando Po, is well represented in the collection from the Ituri Forest. *Mabuya boulengeri* Sternfeld in East Africa appears to be a closely related species, distinguished by having only four supraciliaries; but as only two specimens are known, future study may unite it with *M. polytropis*.

A list of specimens follows: A. M. N. H. No. 10891 (September 1909) is from Bafwamoko, between Bafwasende and Bafwaboli; 10892–93 (January 1910), 10894 (April 1914), 10895–902 (June 1914), 10903 (July 1914), 10904 (June 1914), 10906, Medje; 10905 (April 1914), Penge.

The chief characters of scutellation which distinguish this species from the closely allied *Mabuya maculilabris* and *raddoni* are the great number of keels on the dorsal scales of the adult and the large number of supraciliaries.

The maximum size is reached by a female 343 mm. in length, with a body length of 114 mm. The largest male measures 323 mm., with a body length of 100 mm. The tail is about twice as long as the body, .65 to .69 of the total length.

The prefrontals form a suture in all except one specimen. The supranasals are separate in three, meet in a point in five, and form a suture in eight specimens. The anterior loreal forms a suture with the first labial in all but two specimens, and in these touches it at a point. The supraciliaries number 5–6 in one specimen, 6–6 in one, 6–7 in five, 7–7 in eight, and 7–8 in one. Nuchals are present or absent, more or less developed in ten of the sixteen.

The scale rows about the body number from thirty to thirty-four; the ventrals from chin to anus fifty-three to sixty-one. The lamellæ beneath the fourth toe vary from seventeen to twenty-one. The keels of the dorsal scales vary from three (in very young specimens) to twelve to fifteen, usu-

PLATE XXIV

Figure 1. *Mabuya polytropis* Boulenger. A. M. N. H. No. 10895; ♀; length 321 mm.

Figure 2. *Feylinia currori* Gray. A. M. N. H. No. 11294; length 340 mm.

ally exceeding ten in adults. Three of these keels may be termed the original ones, readily distinguished by their regular development and spacing, the supernumerary keels being usually shorter and irregularly distributed. In the maximum count observed, there are four keels on each side of the original three and two in each interspace.

The coloration of most of the specimens is obscure, but the characteristic transverse wavy dark marks are evident in all of the juvenile specimens, which, although they have only three to five keeled scales, are readily distinguished from the young of *Mabuya raddoni* by the absence of the lateral light line.

The coloration in life, from the field notes (♀, No. 10895), is

greenish brown above with many wavelike transverse black markings. A few pale yellowish single scales more numerous on the base of the tail. Crown light brown, iris dark, eyelids with pale yellow edge. From before the eye to back of tympanum is black mark bordered below by a pale greenish area about the lips. Venter bright bluish green, on the sides yellowish green, throat and chin also more yellowish.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	2	300–323	311.5 mm.
	♀	5	272–343	309.6 mm.
Body	♂	5	95–112	103.2 mm.
	♀	8	93–114	104.8 mm.
Tail	♂	2	205–223	214. mm.
	♀	5	179–229	203.6 mm.
Tail/Length	♂	2	.68–.69	.685
	♀	5	.65–.67	.66
Axilla to Groin	♂	5	56–65	58.8 mm.
	♀	8	55–70	61.6 mm.
Arm	♂	5	31–34	32.4 mm.
	♀	8	30–34	32.4 mm.
Leg	♂	5	42–47	44.6 mm.
	♀	8	40–49	44.9 mm.
Head Length	♂	5	20.5–24	22.5 mm.
	♀	8	20–23	21.8 mm.
Head Breadth	♂	5	14–17	15.9 mm.
	♀	8	14–16	15.0 mm.
Scales about Body	♂	5	30–32	31.5
	♀	9	30–34	31.9

"Rather common near the villages. Its food shows a greater variety than that of most other skinks examined: grasshoppers, crickets, various beetles, large ants, snails, and the egg-cases of spiders were found in the stomachs" [H. L.].

Mabuya raddoni (Gray)

Euprepis raddoni GRAY, 1845, Cat. Lizards, p. 112.

Mabuia raddonii BOULENGER, 1887, Cat. Lizards, III, p. 165, Pl. x, fig. 1. BOETTGER, 1887, Ber. Senck. Ges., p. 56; 1888, p. 27. BOCAGE, 1895, Herpétol. Angola, p. 40. GÜNTHER, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 265. SJÖSTEDT, 1897, Bihang Svensk. Akad. Handl., XXIII, part 4, No. 2, p. 14. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 133. BOULENGER, 1900, Proc. Zool. Soc. London, p. 449; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 205. JOHNSTON, 1906, Liberia, II, p. 833. ANDERSON, 1908, Jahrb. Nassau. Ver. Naturk., LXI, p. 304. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 568. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 282.

Euprepis blandingii HALLOWELL, 1845, Proc. Acad. Nat. Sci. Phila., p. 58; 1857, p. 50; 1857, Trans. American Philos. Soc., (2) XI, p. 76. DUMÉRIL, 1858, Arch. Mus. Hist. Nat. Paris, X, p. 178, Pl. xv, fig. 2. BOCAGE, 1872, Jorn. Sci. Lisboa, IV, p. 80.

Euprepes (Euprepis) blandingi PETERS, 1876, Monatsber. Akad. Wiss. Berlin, p. 118; 1877, p. 614.

Euprepes frenatus HALLOWELL, 1857, Proc. Acad. Nat. Sci. Phila., p. 50.

Euprepes albilabris HALLOWELL, 1857, Proc. Acad. Nat. Sci. Phila., p. 51.

Euprepes (Euprepis) æneofuscus PETERS, 1864, Monatsber. Akad. Wiss. Berlin, p. 52; 1867, p. 21.

Euprepes gracilis BOCAGE, 1872, Jorn. Sci. Lisboa, IV, p. 77.

Euprepes (Euprepis) perrotetii PETERS, 1877, Monatsber. Akad. Wiss. Berlin, p. 614, 620.

Euprepes (Euprepes) pantænii FISCHER, 1885, Jahrb. Hamburg. Wiss. Anst., II, p. 88, Pl. III, fig. 3.

Euprepes cupreus FISCHER, 1885, Jahrb. Hamburg. Wiss. Anst., II, p. 88, Pl. III, fig. 2.

Mabuia perrotetii (*part*) BOCAGE, 1895, Herpétol. Angola, p. 39. TORNIER, 1901, Beiheft, Arch. Naturg., LXVII, p. 82; 1902, Zool. Jahrb. (Syst.), XV, p. 675. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 342.

Mabuia benitensis BOULENGER, 1901, Ann. Mag. Nat. Hist., (7) VIII, p. 15.

Müller (1910, p. 568) has presented a very careful discussion of the relations between this species and the two preceding, and the confusion with *Mabuya perrotetii*, which begins with Peters (1877, p. 614), may be considered at an end. Like *maculilabris*, this species ranges both north and south of the Rain Forest. It has not been recorded in any of the numerous recent collections from the Central African lake region. As in the present collection it is recorded only from Niangara outside the forest (leaving out of consideration the Lower Congo records), it appears to be more characteristically a forest form in this eastward extension of its range.

The nineteen specimens were collected as follows: A. M. N. H. No. 10907 (April 1910) is from Avakubi; 10908 (September 1910), 10910–15 (June 1914), 10916–18 (July 1914), Medje; 10909 (November 1910), Niangara; 10919–20 (April 1915), Stanleyville; 10921–25 (June 1915), Zambi.

The maximum length observed in the present series is 223 mm. (both sexes), the maximum body length 80 mm., closely in accord with Müller's measurements for Kamerun specimens (*loc. cit.*). The tail length varies from .63 to .71 of the total. One specimen (No. 10921) is much more slender than is normal for the species, but agrees otherwise in every character.

The snout length from tip of nose to frontal is less than the length of the frontal in fourteen specimens, equalling or exceeding it in six (see above under *M. maculilabris*).

The prefrontals are separate in nine specimens and form a suture in eleven. The supranasals are narrowly separate in eighteen specimens, and meet at a point in the remaining two. Three specimens lack the nuchals, which may be somewhat unsymmetrically developed. The supraciliaries are 5–6 in one specimen, 5–7 in one, 6–6 in one, 6–7 in five, 6–8 in one, 7–7 in seven, 7–8 in four and 8–8 in one.

The scale rows vary from twenty-eight to thirty-four. In this character the five specimens from Zambi differ slightly from their Upper Congo relatives, three having twenty-eight scale rows and two thirty, while in the latter series the minimum is thirty. The ventrals from chin to anus number forty-nine to sixty-two. The scales are three-keeled in fourteen specimens, three- to five-keeled in five, and 3–6 keeled in one.

The coloration is the normal one for the species, which has been carefully described by Boettger, Boulenger, Müller, and others. The most useful recognition character, the white lateral line from eye to insertion of hind limb, is present in every specimen save one from Zambi, in which it is indistinct.

It will be observed that the disposition of the prefrontals is so variable as to cast renewed doubt on the distinctness of Hallowell's *Euprepes albilabris*, revived by Boulenger (1905, Mem. Soc. Esp. Hist. Nat., p. 185). There is no *Mabuya* in the collection of the Academy of Sciences of Philadelphia labeled *albilabris;* and in a form so widespread and of so great variability as *raddoni* there seems little probability of a so closely allied form being distinguishable.

The field notes afford no specific ecological information, but the species appears to be closely associated in habitat with the two preceding and to be to a similar extent arboreal. Sjöstedt (1897, p. 15) has given an interesting account of its feeding upon army ants. The stomachs of several contained grasshoppers, roaches, and large crickets swallowed whole; beetles and caterpillars also could be identified, all probably taken on or near the ground. The digestive tracts examined were infested with tapeworms.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	3	181–223	203.3 mm.
	♀	6	142–232	178.3 mm.
Body	♂	6	65–80	72.0 mm.
	♀	11	48–80	63.1 mm.
Tail	♂	3	121–154	135.0 mm.
	♀	6	94–152	117.1 mm.
Tail/Length	♂	3	.63–.69	.66
	♀	6	.63–.67	.65
Axilla to Groin	♂	6	34–45	39.5 mm.
	♀	11	28–45	35.0 mm.
Arm	♂	6	22–28	24.5 mm.
	♀	11	17–28	21.9 mm.
Leg	♂	6	30–40	34.6 mm.
	♀	11	24–36	30.3 mm.
Head Length	♂	6	14–18	16.1 mm.
	♀	11	13–17	14.1 mm.
Head Breadth	♂	6	9.6–12.0	10.6 mm.
	♀	11	8.0–11.5	9.2 mm.
Scales about Body	♂	6	30	30
	♀	11	28–34	30.2

Mabuya sudanensis, new species

Plate XXV

Eleven specimens from localities in the Sudan appear to be closely allied to the very imperfectly described *Mabuya affinis* (Gray) (1838, Ann. Nat. Hist., II, p. 289) which has been reported from Togo by Matschie (1890, Zool. Jahrb., Syst., V, p. 612). The appearance of a Togo form in the

Uele region is made probable by the analogous distribution of other Sudanese lizards, and, while the present specimens are provisionally distinguished, the real status of the species can only be cleared up by the collection of further specimens from the Togo-Niger region.

A. M. N. H. No. 10927 (November 1911) is from Faradje; 10928–29 (May 1912), 10930–34 (June 1912), Garamba; 10935 (June 1912), South of Garamba River; 10936, Uele region; 10926 (November 1911), Yakuluku.

Diagnostic Characters

Habitus lacertiform, with an extremely long tail, three to four times the length of the body, slender trunk, and well developed limbs. Lower eyelid with an undivided transparent disc. Scales on soles not spinose. Subocular not narrowed inferiorly. Head shields normal. A postnasal. Dorsal scales tricarinate. Subdigital lamellæ smooth. Twenty-six or twenty-eight scales about the body. Ear lobules short, pointed. Distinguished from *Mabuya affinis* by longer snout and shorter limbs; hind leg reaching the wrist, not reaching the elbow of the adpressed fore limb, and by the extraordinarily long tail.

Detailed Description

Type: A. M. N. H., No. 10934, ♀.

Body slender, neck not constricted. Snout pointed, the distance from its tip to the frontal equalling the length of the frontal. Toes of the fore limb nearly reaching snout. Toes of hind limb reaching between wrist and elbow of fore limb. Tail-length, .78 of the total.

Nostril behind the rostro-labial suture. A postnasal present. Anterior loreal in contact with the first labial. Supranasals separated by a rostro-frontonasal suture. Frontonasal nearly as long as broad, separated from the frontal. Four supraoculars, second largest, second and third in contact with the frontal, parietals separated by the interparietal. Nuchals present. Supraciliaries 5–5. Subocular preceded by four upper labials, about equal to three in length. Lower eyelid with an undivided transparent disc, larger than the pupil, smaller than the ear opening. Ear opening oval, provided with two short pointed lobules in front.

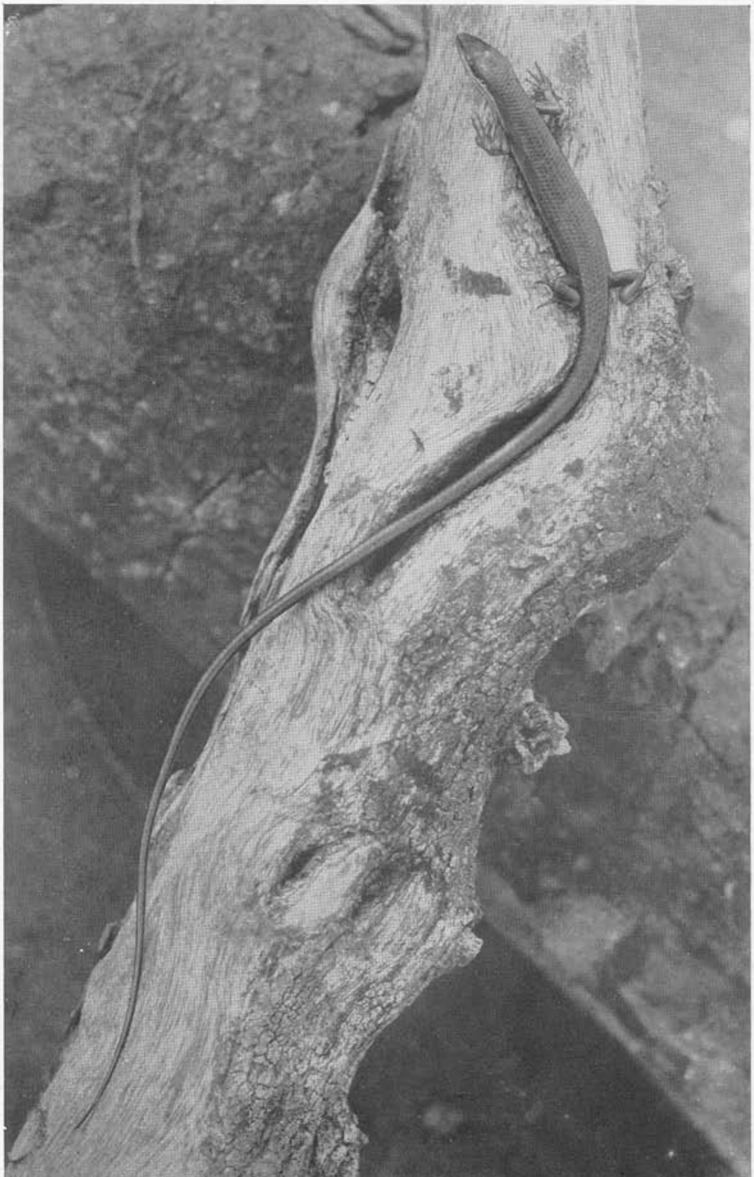
Dorsal scales sharply tricarinate, the middle keel shorter than the laterals. Twenty-six scales about the body, of which fourteen are keeled. Fifty-seven scales from anus to chin shields. Fourteen smooth lamellæ beneath the fourth toe.

The dorsum is light brown, darker on the crown. Irregular black markings beginning at the shoulder region, are arranged in four indefinite longitudinal rows on the six median dorsal scale rows. The two middle rows of black extend on the base of the tail. A well-marked white line extends from the subocular to the ear, bordered above by black. The venter (all of the smooth scales) is pearly gray with a tinge of yellow, bluish beneath the tail.

The paratypes present considerable variation. The tail-length varies from .70 to .80 of the total, averaging .76. The anterior loreal is separated from the first labial in five specimens; in contact on one side, separated on the other, in one. The supranasals are in contact in two specimens. The

PLATE XXV

Mabuya sudanensis, new species. A. M. N. H. No. 10934, type; ♀; length 264 mm.



parietals may form a short suture behind the interparietal. The nuchals are absent in one specimen. The supraciliaries are 5–5 in seven specimens, 5–6 in two, and 6–7 in two. The scale rows are twenty-six in ten specimens, twenty-eight in one.

The coloration of the smaller specimens is somewhat different and rather variable. In No. 10936 there are anteriorly five black lines on the edges of the six median scale rows, the middle one dropping out at the arms, leaving four continuous lines to a point above the hind limbs, where the lateral pair drops out, the two remaining lines continuing on the base of the tail. These lines nearly equal in width the brown interspaces; some of the lateral scale rows are narrowly dark edged. The white line from subocular to ear continues over the insertion of the arm to the hind limb, on the seventh and eighth scale rows from the vertebral line. It is bordered above (on the upper half of the seventh scale row) by a black line, below by dots of black on the separate scales. Between this coloration in the smallest specimen and that of the largest, the remaining specimens show varying intermediate phases. All show the lateral white line well past the arm, but it does not reach the groin. The black lines are broken up and the resulting spots more or less widened.

In essential points this coloration agrees with Matschie's description (1892, Zool. Jahrb., Syst., V, p. 612) of the unique Togo specimen of *Mabuya affinis*. It differs from that of *Mabuya wingatii* Werner (1907, Sitzber. Akad. Wiss. Wien, math.-natur., CXVI, part 1, p. 1849, Pl. II, fig. 3) in lacking the upper light line of that species as well as in the absence of the lower line in the adult. It lacks the black lateral band of *Mabuya diesneri* Sternfeld (1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 248).

The distinctions between the present form and *Mabuya diesneri* and *Mabuya wingatii* appear to exclude the possibility of confusion. Both of the latter are larger species, 85 to 103 mm. body length, and *wingatii* has not the extraordinarily long tail. The scales about the body in *wingatii* are 30 to 32, in *diesneri* 28 to 32. *Mabuya wingatii* has a very short frontonasal. From *Mabuya affinis* it is distinguished by having a longer snout; by the hind limb reaching between elbow and axilla; by the distinct suture of the prefrontals; and probably by the tail length, which has not been defined for either the type (with no locality) or the only other known specimens of *affinis*. It is difficult to understand the omission of *Mabuya affinis* from Tornier's list of Togoan reptiles (1901, pp. 63–88). The keeled scales distinguish it from *Mabuya megalura* in East Africa.

Measurements and Scale Characters

A. M. N. H. No.	10926	10927	10928	10929	10930	10931	10932	10933	10934	10935
Sex	♀	♂	♀	♀	♀	♀	♀	♀	♀	♂
Length	304	[260]	258	248	221	[171]	252	248	264	263 mm.
Body	78	67	56	50	51	53	55	56	58	61 mm.
Tail	226	[193]	202	198	170	[118]	197	192	206	202 mm.
Tail/Length	.74		.77	.80	.77		.78	.77	.78	.77
Axilla to Groin	46	38	32	28	29	30	33	32	34	34 mm.
Snout to Arm	25	25	20	19	18	20	20	20	20	22 mm.
Arm	21	19	18	16	16	17	18	18	18	20
Leg	25	24	23	22	21	20	22	22	22	24
Head Length	15.0	14.2	12.0	11.7	12.0	12.0	12.6	12.3	12.3	12.5 mm.
Head Breadth	9.0	9.0	7.6	7.5	7.2	7.5	7.7	7.5	7.0	7.6 mm.
Scales about Body	26	28	26	26	28	26	26	26	26	26
Scales Anus to Gulars	54	53	55	54	56	50	54	56	57	54
Lamellæ of Fourth Toe	15	15	16	14	16	16	16	15	14	15
Supraciliaries	6–7	5–5	5–6	5–5	5–6	5–5	5–5	6–7	5–5	5–5

"These agile, graceful lizards attain a foot in length and are typical of the savannah of the northeastern Belgian Congo and the adjoining Sudan (Pl. XXV). They are not attracted to the native villages, but occur nevertheless in plantations, cleared patches in the midst of brush, changed every two or three years. Though not really scarce, their light or dark brown bodies match the surroundings so well that they are hard to discover. Singly or in pairs, they bask in gnarled branches, ever on the alert; the slightest sound caused by a grasshopper or beetle alighting sends them running toward the prospective victim, which is gulped without much tearing; spiders also are taken. The termites in the thin-walled passageways so common on tree trunks and branches offer an ample repast.

"Over the densely growing branchlets of the stunted bushes they move with ease, deriving considerable assistance from the extremely long, slender tail, which, however, is not in the least prehensile. When pursued they run into hollows, and on being driven out on the branches jump into the grass from any height and usually succeed in escaping. Although chiefly arboreal, in these regions where trees or bushes are often widely scattered they may frequently be seen on the ground" [H. L.].

Mabuya perrotetii (Duméril and Bibron)

Plate XXVI; Map 18

Euprepes perrotetii Duméril and Bibron, 1839, Erpétol. Gén., V, p. 669. Gray, 1845, Cat. Lizards, p. 111. Bocage, 1866, Jorn. Sci. Lisboa, I, p. 44. Steindachner, 1870, Sitzber. Akad. Wiss. Wien (math.-natur.), LXII, part 1, p. 331. Bocage, 1872, Jorn. Sci. Lisboa, IV, p. 79. Boettger, 1881, Abh. Senck. Ges., XII, p. 103.

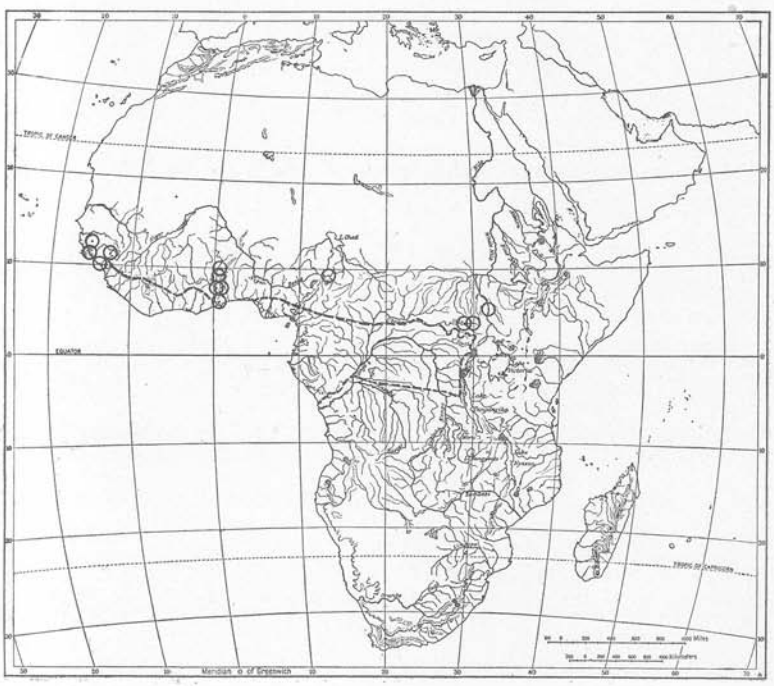
(*Euprepes Euprepis perrotetii* Peters, 1877, Monatsber. Akad. Wiss. Berlin, pp. 614, 620.)

Mabuia perrotetii Boulenger, 1887, Cat. Lizards, III, p. 168. (Bocage, 1895, Herpétol. Angola, p. 39). Tornier, 1901, Beiheft, Arch. Naturg., LXVII, p. 82. (Tornier, 1902, Zool. Jahrb. Syst., XV, p. 675). Werner, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 333, 336, (342). Boulenger, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206. Nieden, 1910, Arch. Naturg., LXXVI, part 1, p. 238. Klaptocz, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 283.

Euprepes (*Euprepis*) *pleurostictus* Peters, 1864, Monatsber. Akad. Wiss. Berlin, p. 52.

Euprepis inornata Gray, 1845, Cat. Lizards, p. 113.

Mabuia mongallensis Werner, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1850, Pl. i, fig. 2.

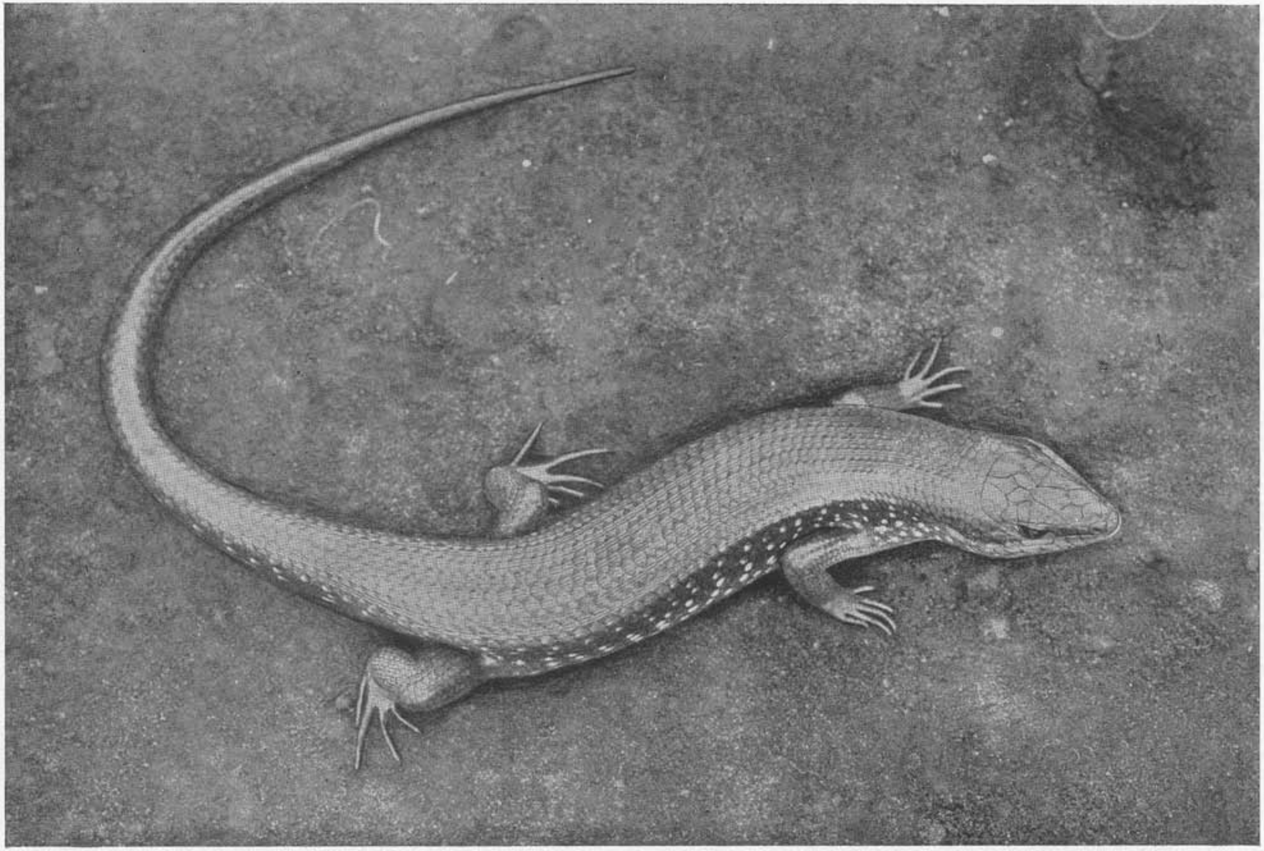


Map 18. Distribution of *Mabuya perrotetii*. Characteristic of the Sudanese Subprovince.

The references to this species which the writer believes should be transferred to *Mabuya raddoni* have been enclosed in parenthesis. The writer feels that Tornier's Togo specimens, which Boulenger (1905, Mem. Soc.

PLATE XXVI

Mabuya perrotetii (Duméril and Bibron). A. M. N. H. No. 10955; ♂; length 248 mm.



Esp. Hist. Nat., I, p. 185) has tentatively referred to *Mabuya albilabris* Hallowell, might with at least equal probability be simply young *perrotetii.*

The species is a typically Sudanese form like *Lygodactylus gutturalis* and *Varanus exanthematicus*, ranging from the Senegambia to the Upper Nile. The twenty-seven specimens were collected as follows:

A. M. N. H. Nos. 10937–38 (February 1911), 10939 (April 1911), 10941 (November 1911), 10956–62 (October 1912), 10963 (January 1913) are from Faradje; 10942–47, 10949–52 (May 1912), 10948 (March 1912), 10953–54 (June 1912), 10955 (July 1912), Garamba; 10940 (November 1911), Yakuluku.

The eastern specimens (which may prove to be distinguishable as subspecies *mongallensis* Werner) seem to be decidedly smaller than the West African representatives. The maximum length in the present series is 310 mm. with a body length of 118 mm., compared with 418 mm. total and 163 mm. body length (even 180 mm. in a still larger specimen) recorded by Boulenger (1887, p. 169). The tail length varies from .60 to .63 of the total, being much more uniform in this respect than in most species of *Mabuya.*

The prefrontals form a suture in twenty-three of the twenty-seven specimens. In three specimens they are separated (in a fourth, partly separated) by the development of a small interprefrontal shield. In only one specimen is there a suture between frontal and frontonasal. The supranasals in every case form a suture. The frontonasal is in two cases longitudinally divided. The labials before the subocular are uniformly four. The anterior loreal is well separated from the first labial. The supraciliaries are 6–6 in twenty-six specimens, 7–7 in one. There are no distinguishable nuchals in eighteen specimens. In five there are two enlarged scales on each side behind the parietals, and in the remaining four there are normally developed nuchal scales.

The scales about the body are usually thirty-two, sometimes thirty-three or thirty-four. The ventrals from anus to chin vary from fifty-two to sixty-two. The lamellæ beneath the fourth toe vary from fifteen to eighteen. They are normally smooth, but in one specimen are distinctly keeled, in others faintly. It may be noted that keeling of the subdigitals is often counterfeited in specimens whose toes have dried out before preservation, or which have been preserved in too strong alcohol. The keels of the dorsals are obtuse, very faint on the laterals (as in various descriptions), wholly distinct in character from those of *M. raddoni* and other species of the genus in the present collection.

The coloration in life is very striking:

Above glossy brownish gray, with scattered dark markings. A dark brown stripe from behind the eye nearly to base of hind limbs, below which is an indefinite diffused red band (often bright orange) starting at the mandible and continued past the hind-limbs on the anterior two-thirds of the tail. Many scattered pale bluish scales on the sides. Venter bluish white, underside of tip of tail grey. [L. and C.]

In alcohol, the red coloration of the sides is rarely distinguishable, and the indistinct dorsolateral light line is more noticeable, bounding the dark line (of the field notes) above. The dark markings of the back are frequently arranged in longitudinal lines between the scale rows. Since Werner (1907, p. 1851) describes the sides of a young specimen as dark brown (presumably from life), the red coloration appears to be an adult and probably a nuptial character.

The question of the distinctness of *mongallensis* Werner from the West African *perrotetii* appears to rest almost entirely on size. None of the characters proposed in his description (absence of nuchals, keeled subdigitals, and coloration) holds good in the present series. Pending more extensive study of the West African fauna, and of the intervening region, the writer prefers to unite *mongallensis* with *perrotetii,* though ultimately a trinomial may best represent the relationships involved.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	8	168–310	258.0 mm.
	♀	9	123–283	207.5 mm.
Body	♂	15	60–123	101.1 mm.
	♀	12	47–111	81.8 mm.
Tail	♂	8	103–192	159.0 mm.
	♀	9	76–173	128.2 mm.
Tail/Length	♂	8	.60–.63	.61
	♀	9	.60–.63	.61
Axilla to Groin	♂	15	31–71	55.7 mm.
	♀	12	25–65	46.1 mm.
Arm	♂	15	17–33	28.2 mm.
	♀	12	14–30	23.7 mm.
Leg	♂	15	22–41	36.3 mm.
	♀	12	17–39	30.3 mm.
Head Length	♂	15	14.0–28.0	23.0 mm.
	♀	12	11.5–24.0	17.8 mm.
Head Breadth	♂	15	10–19	15.3 mm.
	♀	12	7–15	11.6 mm.
Scales about Body	♂	15	32–34	32.6
	♀	12	32–34	32.6

"This large skink is one of the most typical of the savannah of the northeastern Uele and is not particularly attracted by settlements. The males attain more than one foot in length; the females are slightly smaller. In these arid plains the bright coloration of this species is a source of delight to the traveler who happens to get a glimpse of one or two of these wary and swift moving lizards. The dark greenish upper side, often separated by a dark line from the broad glossy, orange-red band on the flanks marked with small white or pale yellow dots, is the pattern distinctive of adults (Plate XXVI). The young are much duller and more uniform in color. Although fairly good climbers, they are seldom seen in the low, gnarled trees so common in the savannah, but bask in open spaces, on logs, stones, and the piles of débris in dried out riverbeds. They take refuge in any suitable hole and apparently do not burrow.

"Stomach contents show that the food consists of various insects, chiefly Orthoptera, Coleoptera, and termites, which may have been taken on the ground or trees. Some very large grasshoppers had been torn to pieces; others an inch long, like some crickets, had been swallowed whole, completely filling a portion of the tubular stomach, and the same was true of beetles; of the termites, only the chitinous head was left intact by the gastric fluids" [H. L.].

Mabuya quinquetæniata (Lichtenstein)

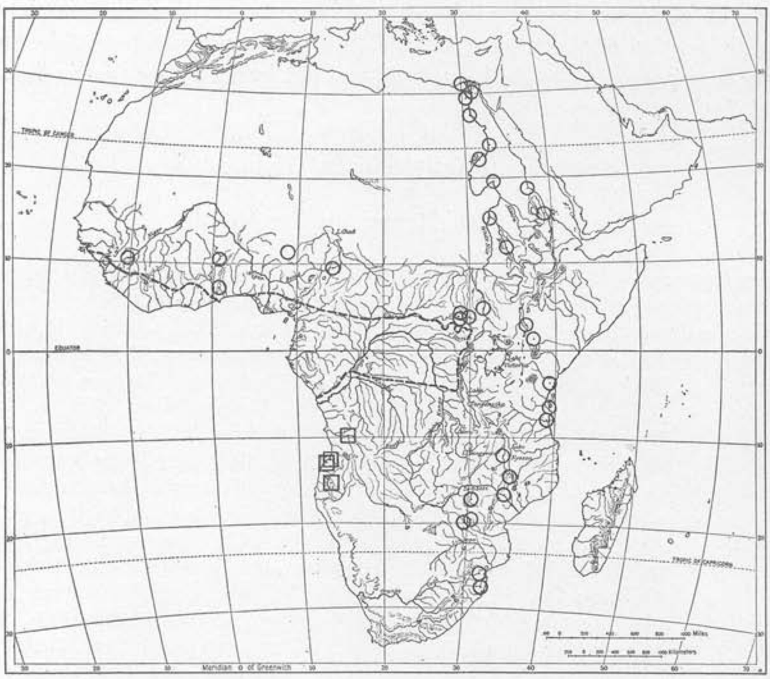
Plate XXVII, Figures 1 and 2; Map 19

Scincus quinquetæniatus Lichtenstein, 1823, Verz. Doubl. Mus. Berlin, p. 103.
Mabuya quinquetæniata Fitzinger, 1826, Neue Class. Rept., p. 52.
Mabuia quinquetæniata Boulenger, 1887, Cat. Lizards, III, p. 198. Günther, 1892, Proc. Zool. Soc. London, p. 555. Boettger, 1893, Kat. Rept. Mus. Senck., p. 100. Del Prato, 1895, Atti Soc. Italiana Sci. Nat., XXXV, p. 24. Jeude, 1895, Notes Leyden Mus., XVI, p. 228. (Anderson, 1896, Herpetol. Arabia and Egypt, p. 104.) Boulenger, 1896, Proc. Zool. Soc. London, p. 215; 1897, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 278. Werner, 1896, Jahrb. Ver. Magdeburg, p. 142. Boulenger, 1897, Proc. Zool. Soc. London, p. 800; 1897, Ann. Mus. Stor. Nat. Genova, (2) XVII, p. 278. Johnston, 1897, British Central Africa, p. 361. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 42. Anderson, 1898, Zool. Egypt, I, p. 187, Pl. xxiv, figs. 1–3. Tornier, 1900, Zool. Jahrb. (Syst.), XIII, p. 595; 1901, Beiheft, Arch. Naturg., LXVII, p. 85. Boulenger, 1902, Proc. Zool. Soc. London, II, p. 17. Werner, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 336. Boulenger, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 111. Tornier, 1905, Zool. Jahrb. (Syst.), XXII, p. 382. Boulenger, 1907, Mem. Proc. Manchester Lit. Philos. Soc., LI, No. 12, p. 8. Werner, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI,

part 1, p. 1851. Chubb, 1909, Proc. Zool. Soc. London, p. 594. Pellegrin, 1909, Bull. Mus. Hist. Nat. Paris, XV, p. 413; 1909, Bull. Soc. Zool. France, XXXIV, p. 204. Werner, 1909, Zool. Jahrb. (Syst.), XXVII, p. 611. Boulenger, 1910, Ann. S. African Mus., V, p. 484. Hewitt, 1910, Ann. Transvaal Mus., II, pp. 94 and 99. Meek, 1910, Publ. Field Mus. Zool., VII, p. 410. Nieden, 1910, Archiv Naturg., LXXVI, part 1, p. 239. Lönnberg, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 16. Sternfeld, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 249; 1911, Mitt. Zool. Mus. Berlin, V, p. 417. Barbour, 1913, Proc. Biol. Soc. Wash., XXVI, p. 147. Klaptocz, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 285. Nieden, 1913, Mitt. Zool. Mus. Berlin, VII, p. 85. Werner, 1913, in Brehm's, Tierleben, Ed. 4, V, p. 198.

Euprepes savignyii Duméril and Bibron, 1839, Erpétol. Gén., V, p. 677. Francaviglia, 1896, Boll. Soc. Romana Zool., p. 35.

For the synonymy of this series *ante* Boulenger, 1887, the reader is referred to Anderson, 1898, Zoology of Egypt, I, p. 187.



Map 19. Distribution of *Mabuya quinquetæniata*.

○ *Mabuya quinquetæniata*. The southern records probably are referable to a subspecies, *margaritifer*.
□ *Mabuya binotata*, an Angolan offshoot of *quinquetæniata*.
Mabuya quinquetæniata is a savannah species which has invaded Lower Egypt, following the Nile. (Cf. *Varanus griseus*, Map 12.)

The species is represented in the collection by 130 specimens, whose date and place of capture follow: A. M. N. H. Nos. 10964–66 (January 1910), are from Dungu; 10967–96 (February 1911), 10997–11004 (March 1911), 11005–11 (April 1911), 11012, 11021 (August 1912). 11022–32 (September 1912), 11033–91 (October 1912), 11092–94 (January 1913), Faradje; 11018–20 (May 1912), 11017, Garamba; 11013–16 (November 1911), Yakuluku.

Although Boulenger (1887, III, p. 198) has united the Angolan *Mabuya binotata* Bocage and the southeastern *margaritifer* Peters with *quinquetæniata*, the reasons urged for the distinctness of *binotata* by Bocage (1895, Herpétol. Angola, p. 47) appear to have been accepted by Boulenger in giving the range of *Mabuya quinquetæniata* for South Africa (1910, p. 484). To the writer, the higher average number of scale rows in the southern specimens seems to warrant the retention of the name *margaritifer* Peters for a southern subspecies of *quinquetæniata. Mabuya quinquetæniata quinquetæniata* is typically Sudanese in distribution, with a northward extension to Lower Egypt following the borders of the Nile much as aquatic species have followed the Nile itself. The record from Tripoli (Francaviglia, 1896, p. 35) has been questioned by Werner (1909, p. 611), and Werner's record from the other extreme of the range, Grahamstown, has not been confirmed by South African herpetologists. The absence of this species in the area between Mongalla, Khartoum, and Roseires noted by Werner (1907, p. 1851) is not readily explicable. The exact delimitation of the range evidently will require further records.

Variation in the Egyptian representatives of this species has been discussed by Anderson (1898, pp. 187–193). The present series, for which the data are tabulated below, is on the whole uniform. No regional variation is discoverable which would warrant a distinction from the Egyptian specimens.

The maximum lengths in the series are 245 mm., male, and 229 mm., female. The tail length varies from .55 to .62 of the total.

The prefrontals form a more or less extensive suture in one hundred and seven specimens, meet at a point with the frontal and frontonasal in thirteen, and are separated by a suture of the latter scutes in seven. In one specimen the prefrontals and frontonasal are irregularly fused, and in another these and the frontal are similarly united. Two specimens have the frontonasal longitudinally divided. In one specimen a pair of small supernumerary supranasals is split off from the nasals. The supraciliaries are normally 6; 4–5 in one specimen, 5–5 in eight, 5–6 in sixteen, 6–6 in ninety-nine, 5–7 in one, 6–7 in two, and 7–7 in two. Labials anterior to the subocular 3–4 in one specimen, 4–4 in one hundred and twenty, 4–5 in six, and 5–5 in two. The scales about the body vary from 36 to 41; the ventrals in a

PLATE XXVII

Figure 1. *Mabuya quinquetæniata* (Lichtenstein). A. M. N. H. No. 11025; ♂; length 233 mm.

Figure 2. *Mabuya quinquetæniata* (Lichtenstein). A. M. N. H. No. 11022; ♀; length 220 mm.

1

2

line from anus to chin shields vary from 56 to 66. The subdigital scales on the fourth toe number from 17 to 23.

The constancy of the system of coloration in this species, once the variations for age and sex are known, reminds one strongly of the similarly consistent variation in the *Plestiodon quinquelineatus* familiar to American herpetologists. The species has been beautifully illustrated by Anderson (*loc. cit.*). In the majority of instances the adult females retain the stripes, but in occasional specimens the coloration gives no clue to the sex.

The ovaries of specimens captured in February contained eggs as follows: Nos. 10974 and 10993, many minute eggs; No. 10985, nine eggs, and No. 10975, ten eggs, all about 14 × 8 mm.; and No. 10973, eleven eggs, 14 × 8 to 15 × 8.3 mm. In September: Nos. 11027 and 11033 had undeveloped eggs (maximum, 2 mm.); No. 11030, 8 + 8 eggs, 3 to 4 mm.; No. 11029, ten eggs, about 6 × 5 mm.; and No. 11060, 8 + 8 eggs, 15 × 9 mm. Since the eggs are in such different stages of development at widely separated seasons of the year, the conclusion must be drawn that there is no such regular breeding season as there is in Lower Egypt.

The stomach contents of thirteen specimens were as follows: a small fruit and seeds and a small earthworm (No. 11031); parasitic worms (Nos. 11002 and 11088); a small spider (No. 11002); earwigs (Nos. 11076 and 11060); cockroaches (Nos. 11028, 11029, 11031); grasshoppers (Nos. 10976, 10999, 11008, and 11013); crickets (Nos. 10997, 10999, 11002, 11009, 11028, and 11030); termite workers (No. 11088); Heteroptera (Nos. 10976 and 11028); beetles (Nos. 11028, 11031, a weevil and a chrysomelid, and No. 11088 a carabid); muscid flies (Nos. 11028 and 11031); and a compacted mass of skin and scales of a scincid lizard (No. 11030).

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	22	150–245	232.6 mm.
	♀	32	155–229	200.5 mm.
	Juv.	8	108–142	121.7 mm.
Body	♂	59	60–105	99.7 mm.
	♀	59	63–102	86.6 mm.
	Juv.	9	40–56	47.6 mm.
Tail	♂	22	89–150	130.3 mm.
	♀	32	85–138	118.5 mm.
	Juv.	8	65–86	73.1 mm.
Tail/Length	♂	22	.56–.62	.591
	♀	32	.55–.62	.589
	Juv.	8	.57–.62	.595

	Sex	No. of Specimens	Extremes	Average
Axilla to Groin	♂	59	32–56	50.1 mm.
	♀	59	33–60	47.1 mm.
	Juv.	11	20–31	26.1 mm.
Arm	♂	59	19–33	28.4 mm.
	♀	58	20–36	26.1 mm.
	Juv.	11	14–20	16.0 mm.
Leg	♂	58	28–45	40.0 mm.
	♀	57	28–43	36.6 mm.
	Juv.	11	19–28	23.1 mm.
Head Length	♂	59	14.0–23.0	20.8 mm.
	♀	59	15.0–21.0	19.0 mm.
	Juv.	11	10.5–14.0	12.3 mm.
Head Breadth	♂	59	9.3–16.0	13.9 mm.
	♀	59	10.0–15.0	12.7 mm.
	Juv.	9	7.0–10.0	8.0 mm.
Scales about Body	♂	59	36–40	37.8
	♀	59	36–40	38.0

"In the Ituri Forest, lizards, excepting the Agamas, are not numerous and one seldom sees more than two or three together, but in the savannah of the northeastern Uele, where they are of more frequent occurrence, *Mabuya quinquetæniata* is the most common form observed. In all villages north of the Uele and east of Niangara dozens of them sport about during the hottest hours of the day on the cracked mud walls, the thatch of native huts, and on bridges, and oil palms. At first the traveler might believe he sees three different species, but the various color phases are soon easily recognized: the generally more numerous blue-tailed young, especially in the larger stages, resemble the brownish females, with their five yellow stripes [Plate XXVII, Fig. 2]; the blue-gray males, with black throat dotted with yellow or orange [Plate XXVII, Fig. 1], are equally conspicuous; although less well defined, transitional color patterns are numerous.

"The whitish, oblong eggs are easily located beneath logs in the outskirts of villages or on plantations. Though the well-developed condition of as many as eleven eggs in the ovaries would point to large sets, only three or five are grouped together, slightly imbedded in the soft ground and decaying pieces of bark. Beneath a twenty foot log I collected as many as forty eggs, in all stages of development, including a dozen shriveled old shells.

"This swift lizard often entangles itself in a little trap set by the children and made of tiny grass-stalks, the ends of which are fastened to the poles supporting the thatching. How to make this cage is known throughout

West Africa and has been taught to American children by their black nurses. At other times the boys stun or kill lizards by a well directed blow with a flexible rod or show great skill in shooting them with arrows" [H. L.].

Mabuya acutilabris (Peters)

Text Figures 22 and 23

Euprepes acutilabris PETERS, 1862, Monatsber. Akad. Wiss. Berlin, p. 19; 1877, p. 614. BOCAGE, 1872, Jorn. Sci. Lisboa, IV, p. 80.

Mabuia acutilabris BOULENGER, 1887, Cat. Lizards, III, p. 208. BOCAGE, 1895, Herpétol. Angola, p. 46. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 434. BOULENGER, 1910, Ann. S. African Mus., V, p. 486. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 349, Pl. VII, fig. 9. STERNFELD, 1911, Fauna Deutschen Kolonien, Reihe 4, Heft 2, p. 40, fig. 48; 1911, Mitt. Zool. Mus. Berlin, V, p. 408.

Euprepes damaranus STEINDACHNER, 1870, Sitzber. Akad. Wiss. Wien (math.-natur.), LXII, part 1, p. 338, Pl. III, figs. 1–3.

There are ninety-nine specimens in the collection, as follows: A. M. N. H. No. 11098 (January 1915) is from Boma; 11097 (June 1909), Matadi; 11095–96 (June 1909), Noki (Angola); 11099–11193 (August 1915), St. Antonio (Angola).

Mabuya acutilabris ranges southward along the coast into German Southwest Africa.

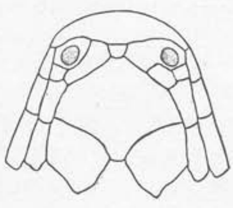


Fig. 22. Variation in the nasal region in *Mabuya acutilabris* (11142). Showing fusion of the nasal and supranasal.

This large series is remarkably uniform in most respects, with a very distinctive color pattern, more plainly marked than appears in Werner's figure (1910, Pl. VIII, fig. 9). Variation is chiefly noticeable in the nasal region. In the normal disposition, the nostril is pierced directly above the rostro-labial suture in the upper posterior part of a small nasal; with a supranasal above meeting its fellow; and a small postnasal. In thirty-four of the ninety-five specimens the supranasals are separated by a median internasal, which may be minute or fairly well developed. The supranasals, moreover, are frequently divided on one or both sides, so that three scales surround the nasal; 2–1 in seventeen, 2–2 in eighteen, 2–3 in two, 3–3 in one specimen, normal (i. e., 1–1) in the remaining fifty-seven. In the case of this division of the supranasals the anterior part is frequently fused with the nasal proper. The prefrontals are normally separated, but form a short suture in four specimens. One specimen has an irregular inter-prefrontal scale. A single specimen has the interparietal imperfectly separated, fused posteriorly with the parietals, but with the sutures present anteriorly. The parietals meet behind the interparietal in all but two cases.

The ground color is grayish brown above. There is a light stripe on the suture between the two median scale rows, beginning eight or ten scales

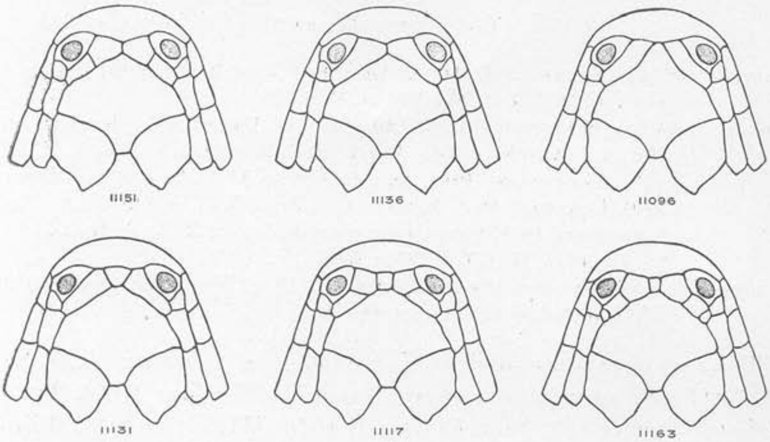


Fig. 23. Variation in the nasal region in *Mabuya acutilabris*. Serial variation in six specimens. Intermediate, asymmetric variations not illustrated.

behind the occipital, as wide as a scale row. A similar lateral stripe on each side on the fourth and fifth scale rows, beginning at the corner of the parietals. The sixth and upper half of the seventh rows are darker brown, below which is another light line beginning on the subocular, passing through the ear, over the arm, and to the groin. This lower lateral stripe is defined below by gray instead of brown. The interspaces between these longitudinal lines are more or less uniformly cross-barred with darker brown, each bar about as wide as the length of a scale, and frequently with one or two light scales at its posterior edge. Ten or twelve of these transverse marks are distinguishable between the head and the base of the tail. Venter pure white. Steindachner's figure (1870, Pl. III, fig. 1) is excellent; that of Werner (1910, Pl. VIII, fig. 9) is either less successful or represents a different color phase.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	15	121–165	147.3 mm.
	♀	39	116–157	138.1 mm.
Body	♂	21	40–56	50.0 mm.
	♀	50	40–59	51.2 mm.

	Sex	No. of Specimens	Extremes	Average
Tail	♂	15	80–110	96.4 mm.
	♀	39	74–104	91.0 mm.
Tail/Length	♂	15	.60–.67	.651
	♀	39	.60–.67	.657
Axilla to Groin	♂	22	20–32	27.8 mm.
	♀	49	20–34	26.6 mm.
Arm	♂	21	16–21	18.6 mm.
	♀	49	15–21	17.8 mm.
Leg	♂	22	28–37	33.0 mm.
	♀	50	26–36	31.7 mm.
Head Length	♂	22	10.0–13.5	12.3 mm.
	♀	50	10.0–13.5	11.8 mm.
Head Breadth	♂	22	6.8–10.0	8.4 mm.
	♀	50	6.5–10.0	8.1 mm.
Scales about Body	♂	22	28–31	29.9
	♀	50	28–32	29.7

"Few of these skinks were found at Boma or Matadi and none at Zambi and Banana; but at Noki, on the Angolan shore, they were more numerous, and at Shark Point, at the mouth of the Congo, abundant. Here a Portuguese fishery, with heaps of refuse upon which numerous insects and their larvæ fed, formed a great attraction for these lizards. Hundreds of them burrowed in the sandy beach, sometimes so close to the sea that they were washed from their hiding places by the waves. Places slightly covered with vegetation were usually chosen, where their tunnels would not cave in easily. Instead of running to escape capture, they preferred to dig into the loose sand and remain quiet for awhile. On the mangrove-covered or muddy shore none of these skinks were found and in St. Antonio nearby they were scarce. They probably like to frequent the sandy banks of rivers and the shores of the Atlantic" [H. L.].

Lygosoma Gray

Section *Leiolopisma* Duméril and Bibron

Lygosoma reichenowii Peters

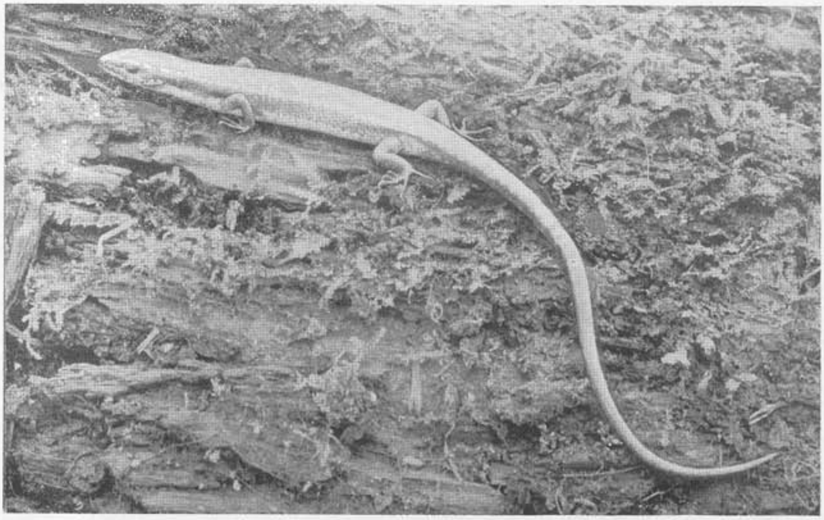
Plate XXVIII, Figure 1

Lygosoma (*Mocoa*) *reichenowii* Peters, 1874, Monatsber. Akad. Wiss. Berlin, p. 160.
Lygosoma reichenovii Boulenger, 1887, Cat. Lizards, III, p. 266. Mocquard, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. Boulenger, 1900, Proc.

PLATE XXVIII

Figure 1. *Lygosoma reichenowii* Peters. A. M. N. H. No. 11196; ♀; length 123 mm.

Figure 2. *Lygosoma breviceps* (Peters). A. M. N. H. No. 11197; ♂; length 160 mm.



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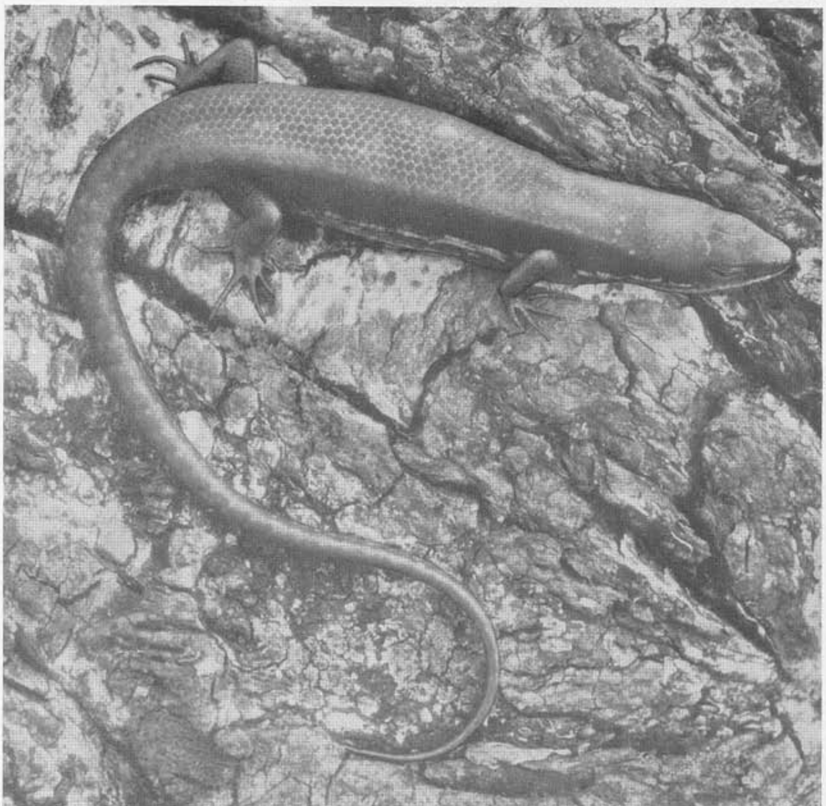

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Zool. Soc. London, p. 450. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 675. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 580.

Euprepes reichenowii REICHENOW, 1874, Arch. Naturg., XL, p. 294.

Three specimens of this graceful and delicately colored species were taken in the Ituri Forest: A. M. N. H. Nos. 11194–95 (April 1914), 11196 (May 1914) from Medje.

This species has been recorded hitherto only from Kamerun, Gaboon, and the island of Fernando Po. A specimen in the collection of the University of Michigan, from Kribi, Kamerun, has been available for comparison, and adds to the evidence of the great uniformity of the forest species throughout its range.

Only one of the present specimens has a complete tail, with a total length of 123 mm., and a body length of 45 mm.; a specimen without a tail measures 46 mm. from anus to snout. The tail length is .62 to .63 of the total — midway between the measurements of Boulenger (1887, p. 266), .66, and Müller (1910, p. 581), .58.

The prefrontals form a suture. The anterior loreal touches the first labial in a point, or is narrowly separated from it. The parietals meet behind the interparietal. The supraciliaries number 7–7 in one specimen, 8–8 in two. There are three upper labials before the subocular.

The scales about the body are 24 in one specimen, 22 in two, the two mid-dorsal rows wider. The preanal scutes are noticeably enlarged. The ventrals from anus to chin shields number from 51 to 58. The scales beneath the fourth toe number 21 (25 in the Kamerun specimen).

The coloration in life, from the field notes, accords well with previous descriptions:

> Dorsum brown, with numerous darker brown and some yellowish markings. Crown dark greenish gray. A dark lateral band from tip of snout to base of hind limbs. Throat gray, venter pale yellowish, including lower sides of limbs and tail. Scattered black spots on the venter, beginning at the arms, more numerous toward the anus and on the tail. [L. and C.]

The lateral band in the Kamerun specimen is faint, but Müller (1910, p. 580) has recorded variation in this character in the same region.

Measurements and Scale Characters

A. M. N. H. No.	11194	11195	11196	Zool. Mus. U. M. No. 35617
Sex	♂	♂	♀	♀
Length	111		123	107 mm.
Body	42	46	45	40 mm.
Tail	69		78	67 mm.

A. M. N. H. No.	11194	11195	11196	Zool. Mus. U. M. No. 35617
Tail/Length			.63	.62
Axilla to Groin	23	26	24	22 mm.
Snout to Arm	15	16	17	15 mm.
Arm	13	13	13	13 mm.
Leg	17	17	17	16 mm.
Head Length	9.3	10	10	9 mm.
Head Breadth	6.5	6.	6.	6 mm.
Scales about Body	24	22	22	24
Scales Anus to Gulars	51	58	56	56
Supraciliaries	7–7	8–8	8–8	8–8

Section *Emoia* Gray

Lygosoma breviceps (Peters)

Plate XXVIII, Figure 2; Text Figure 24

Euprepis (*Mabuia*) *breviceps* Peters, 1873, Monatsber. Akad. Wiss. Berlin, p. 604.
Euprepis breviceps Reichenow, 1874, Arch. Naturg., XL, part 1, p. 294.
Euprepis (*Mabuia*) *breviceps* Peters, 1875, Monatsber. Akad. Wiss. Berlin, p. 197.
Lygosoma breviceps Boulenger, 1887, Cat. Lizards, III, p. 300. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 676. Boulenger, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206. Müller, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 588.
Mabuia batesi Boulenger, 1900, Proc. Zool. Soc. London, p. 449, Pl. xxi, fig. 2. Mocquard, 1902, Bull. Mus. Hist. Nat. Paris, VIII, p. 410.
Lygosoma buchneri Werner, 1909, Jahrs. Ver. Naturk. Württemberg, LXV, p. 62.

Four specimens from the forest region have been identified with this species, which has previously been recorded from Kamerun, Gaboon, and Fernando Po: A. M. N. H. Nos. 11197 (April 1914), 11198–99 (June 1914), 11200 (July 1914) are from Medje.

All of the present specimens have the pterygoid suture well-developed, and *Mabuya batesi* is placed in the synonymy on the authority of Müller (1910, p. 588). The pattern of coloration of the dorsum figured by Boulenger (1900, Pl. xxxi, fig. 2) seems very distinctive, and its presence in specimens with the typical *Lygosoma* palate is perhaps the best evidence in support of Müller's view. A metatype of *M. batesi* at the Museum of Comparative Zoology is certainly a *Lygosoma*.

The greatest length in the Ituri specimens is 160 mm., body length 59 mm. The single female specimen is of much stouter proportions than the males and reaches a body length of 70 mm. The tail is .60 to .63 of the total length.

The prefrontals form a suture in two specimens, meet in a point in one, and are separated in the fourth, separate also in a specimen from Kamerun (Mus. Zool. Univ. Mich., No. 38312). The anterior loreal region presents an interesting anomaly. In No. 11200, as well as in the Kamerun specimen, there are two loreals, of which the anterior is much the shorter and higher, with a forward projection above so that it meets the frontonasal and supranasal. In the three remaining specimens, there is only a single scale between the preoculars and the postnasal, but the forward projection of the normal anterior loreal remains as a distinct scale, suggesting a second supranasal rather than a loreal (Fig. 24). This difference, in view of the known variability in the supranasal region in this species, does not, on the present material, warrant distinction. The supraciliaries number 7–7 in four specimens, 7–8 in the one remaining.

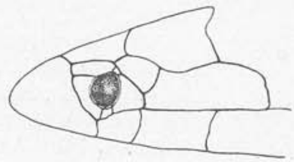


Fig. 24. Nasal region in *Lygosoma breviceps* (11199). The anterior loreal is much reduced.

The scale rows about the body are 36 in two specimens, 38 in two, and 32 in the Kamerun example. The ventrals from anus to chin shields vary between 57 and 61; they are 52 in the Kamerun specimen.

The coloration is almost exactly portrayed in Boulenger's figure of *Mabuya batesi* (1900, Pl. xxxi), but is distinct in only two of the six specimens examined. Traces of light spots preceded by black ones can, however, be made out in all. A lateral light line similar to that of *Mabuya raddoni* is present in three of the five specimens. The colors in life are:

Greenish brown above with lighter dots in two rows, and darker dots between these. A broad dark brown lateral band, edged above with a pale yellow line and below with a white stripe, extending from eye to base of hind limb. Tip of tail pale reddish brown. Venter glossy white, mottled with brown and yellow below the lateral white stripe. Throat and chin with dark lines between the scale rows. Tail indefinitely spotted with yellow. [L. and C.]

Measurements and Scale Characters

A. M. N. H. No	11197	11198	11199	11200	Zool. Mus. U. M. No. 38312
Sex	♂	♂	♂	♀	♂
Length	160	143	135	125	165 mm.
Body	59	57	65	70	60 mm.
Tail	101	86	70	55	105 mm.
Tail/Length	.63	.60	r	r	.63
Axilla to Groin	33	31	36	41	35 mm.
Snout to Arm	20	21	22	22	21 mm.
Arm	18	17	19	19	18 mm.
Leg	23	21	26	24	22 mm.
Head Length	12.5	12	15	14	14 mm.
Head Breadth	9	9	10	10	9.5 mm.
Scales about Body	38	36	36	38	32
Scales Anus to Gulars	61	57	58	58	52
Lamellæ of Fourth Toe	14	11	12	13	10
Supraciliaries	7–7	7–8	7–7	7–7	7–7

Section *Riopa* Gray

Lygosoma fernandi (Burton)

Tiliqua fernandi BURTON, 1836, Proc. Zool. Soc. London, part 4, p. 62. GRAY, 1845, Cat. Lizards, p. 110. PETERS, 1874, Monatsber. Akad. Wiss. Berlin, p. 372.

Lygosoma fernandi BOULENGER, 1887, Cat. Lizards, III, p. 304. BOETTGER, 1887, Ber. Senck. Ges., p. 29. BOULENGER, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 401. MOCQUARD, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 8. SJÖSTEDT, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 13. WERNER, 1899, Verh. Zool.-Bot. Ges. Wien., XLIX, p. 134. BOULENGER, 1900, Proc. Zool. Soc. London, p. 450. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 342. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, p. 676. BOULENGER, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206. JOHNSTON, 1906, Liberia, II, p. 814, fig. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 540. PERACCA, 1909, in Il Ruwenzori, I, p. 169. NIEDEN, 1910, Arch. Naturg., LXXVI, part 1, p. 239. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 199.

Plestiodon harlani HALLOWELL, 1845, Proc. Acad. Nat. Sci. Phila., p. 170.

Euprepis harlani HALLOWELL, 1857, Trans. American Philos. Soc., (2) XI, p. 74, Pl. III, fig. 2.

Euprepis striatus HALLOWELL, 1854, Proc. Acad. Nat. Sci. Phila., p. 98; 1857, Trans. American Philos. Soc., (2) XI, p. 74, Pl. III, fig. 1. DUMÉRIL, 1858, Arch. Mus. Hist. Nat. Paris, p. 178, Pl. XV, fig. 1.

Euprepis (Tiliqua) elegans FISCHER, 1883, Oster Prog. Akad. Gymn. Hamburg, p. 3, Pl., figs. 13–15.

Euprepes leoninus FISCHER, 1884, Abh. Naturw. Ver. Hamburg, VIII, Heft 2, p. 7.

Tiliqua nigripes MÜLLER, F., 1885, Verh. Ges. Basel, VII, p. 704.

Eleven specimens of this species were collected: A. M. N. H. No. 11210 (June 1914) is from Avakubi; 11207 (August 1910), 11208 (September 1910), 11209 (June 1914), Medje; 11211 (November 1910), Niangara; 11201–06 (August 1909), Stanleyville.

Lygosoma fernandi is one of the typical species of the Rain Forest, but it is of frequent occurrence in the forest "islands" outside of the continuous forest and is possibly able to adapt itself to varying conditions. The nearest records to the present are those of Peracca (1909, p. 169) in Uganda to the east, and of Boulenger (1897, p. 277) to the south at Nyangwe on the Lualaba.

The largest specimen, a male, measures 366 mm., with a body length of 165 mm. The total length is somewhat less, the body length somewhat greater than the measurements given by Boulenger (1887, p. 304). The tail is broken or reproduced in seven of the eleven specimens, ranging from .52 to .55 of the total length when uninjured.

The scales about the body vary from 34 to 38 (mean 37), the highest number quoted by Boulenger being 36. The specimens examined from Gaboon and Liberia have a smaller number of scale rows, 32–34. The number of scales from anus to occiput, 57–65, is also somewhat higher in the present series than in the western specimens, in which the range is 56–61.

The coloration in life is dark brownish above, the sides bright salmon-red with black vertical (or V-shaped) bars; venter, and under side of limbs, pale straw-color, with the exception of the darker toes. The head above is darker brown than the rest of the body. The venter may be tinged with pink. The tail is dark brown above, with intermixed whitish scales, or with irregular cross-bars or rings; these, in some specimens, especially for the posterior two-thirds, are light blue. The lateral bars are usually bordered with scattered white scales, or with scales of brighter red than the interspaces. The tip of the lower jaw is red in two male specimens. [L. and C.]

The black bars are usually confluent into a longitudinal band anterior to the arm. Only in a few cases is an approach to the V-shape observable in the lateral dark marks (see Duméril's figure, above cited). No longitudinal streaks are observable on the belly and throat. The longitudinal striation of the back, between the scale rows, seems to become much more distinct in faded specimens. No mention is made of it in the field notes. The reproduced tail is black, without the vivid markings described above. The scales on the reproduced portion are smooth, somewhat wider than the normal scales, and there is a row of markedly widened scales beneath. In the normal tail the keels fade gradually, disappearing about midway, and the scales above and below are equal.

Parasitic worms were taken from the anus of one specimen, and another had a tick between the scales of the tail.

Measurements and Scale Characters

A. M. N. H. No.	11201	11202	11203	11204	11205	11206	11207	11208	11210	11211	
Sex	♂	♂	♀	♀	♂	♂	♂	♂	♀	♂	
Length	324	[231]	264		[224]	[248]	303	366	253	[264]	mm.
Body	152	162	117	105	127	158	138	165	122	142	mm.
Tail	172	[69]	147		[97]	[90]	165	201	131	[122]	mm.
Tail/Length	.53		.55				.54	.54	.52		
Axilla to Groin	91	92	70	63	77	91	82	97	74	88	mm.
Snout to Arm	50	53	41	33	40	53	47	56	40	45	mm.
Arm	39	37	31	26	31	39	36	38	31	34	mm.
Leg	46	46	36	31	39	48	42	45	36	41	mm.
Head Length	29	30	23	20	24	30.5	28	32.5	23	28	mm.
Head Breadth	25	26.5	18.5	16	20	26.5	23	29	20	23	mm.
Scales about Body	34	37	38	38	36	38	38	37	36	38	
Scales from Occiput to Anus	61	63	64	65	64	64	63	64	63	64	
Labials	7–7 / 7–7	8–8 / 8–9	8–8 / 8–9	8–8 / 8–9	8–8 / 8–8	8–8 / 8–8	8–8 / 8–8	8–8 / 8–8	8–8 / 8–8	8–8 / 8–8	
Lamellæ beneath Fourth Toe	17	14	15	16	12	17	12		15	12	

"This is the largest skink we saw in the Rain Forest and it occurs also in the forest galleries of the savannah of the northeastern Uele as far north as Dungu. Of the thirty specimens taken, a male more than 14 inches in total length holds the record; the females are not only smaller but are also duller in color. The size of the somewhat cylindrical body, the glossy, bright salmon-red flanks marked with a series of white-edged, black cross-bars, the dark-brown back, and partly bluish tail readily distinguish this species from any other lizard occurring in these regions.

"It loves the moister sites and in the soft ground digs a single channel leading to a spacious burrow, which in plantations is often hollowed beneath a heavy root, perhaps as an added protection. The earth is loosened with the small legs, and the blunt head and stout neck play an important part in pressing aside and smoothing the particles of soil in the gallery. Most of the specimens caught were taken in nooses laid at the entrance to the burrow, which is easily recognized from those made by other animals by its unusual smoothness. Although these skinks can be dug out easily, the natives are horrified at the thought of touching them alive, and just to see one scurry off is considered so bad an omen by the Medje, Mangbetu, and other tribes, that they abandon all plans for the day and return to the village. The skin breaks easily and many of the lizards were rendered useless for our collection by their endeavor to tear away from the noose. It is surprising that the tail of so large a lizard can be dropped with such ease, and regenerates so well.

"This giant skink is relatively scarce and habitually lives singly; only once was a pair caught in the same refuge. The natives assured me that each skink has a number of galleries, a fact I was never able to ascertain, but of twelve burrows dug up in a plantation at Medje eleven were empty and only one contained a specimen. These lizards are not dependent on the warmth of the sun; and, although individuals were seen during the day, those caught at night prove that they are at least partly nocturnal. To their sluggishness is probably due the fact that they never move far from their homes. In case of danger they disappear in any cavity offering a suitable retreat. When held, they show considerable muscular power in attempting to wrench themselves free and they bite readily, but from personal experience I know scratches made by their little teeth are not harmful although the natives consider the species dangerous. The food consists of various insects, many of them hard-shelled, gathered from the ground among the leaves and other débris" [H. L.].

Lygosoma sundevallii (Smith)

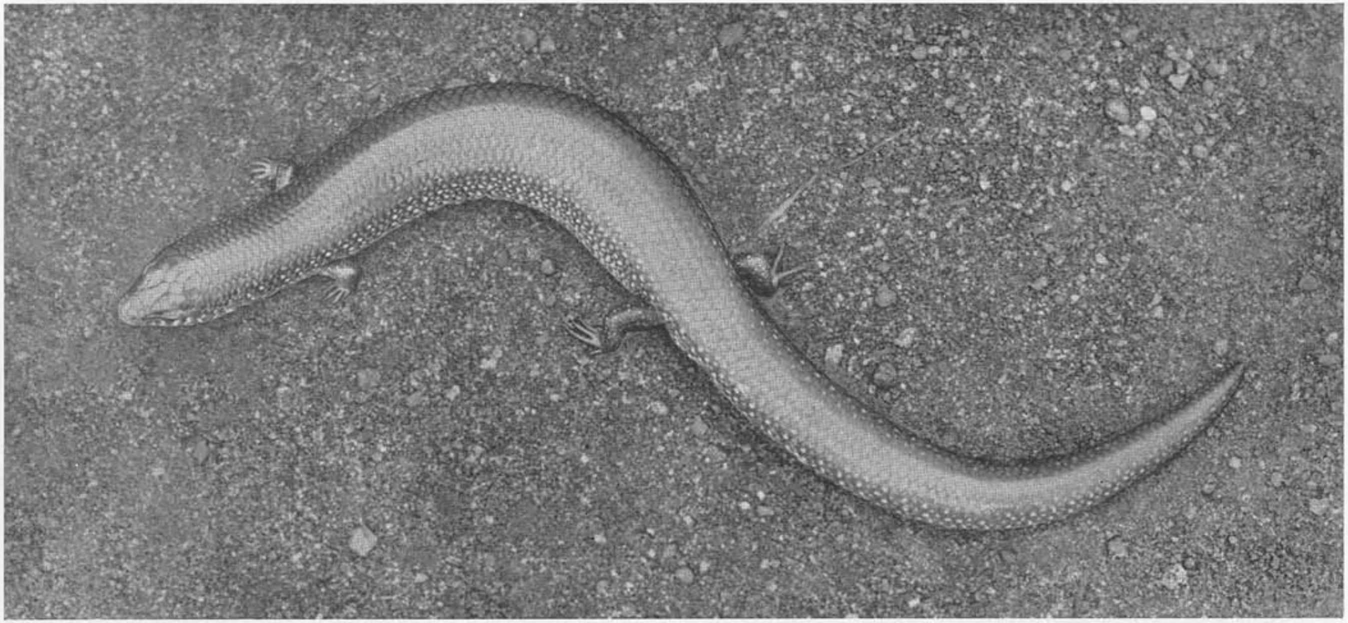
Plate XXIX

Eumeces (*Riopa*) *sundevallii* SMITH, 1849, Ill. Zool. S. Africa, III, App. p. 11.
Lygosoma sundevallii BOULENGER, 1887, Cat. Lizards, III, p. 307. MOCQUARD, 1888, Mém. Cent. Soc. Philom. Paris, p. 118. BOULENGER, 1891, Proc. Zool. Soc. London, p. 306. STEINDACHNER, 1891, Sitzber. Akad. Wiss. Wien (math.-natur.), C, part 1, p. 313. PFEFFER, 1892, Jahrb. Hamburg. Wiss. Anst., X, p. 75. GÜNTHER, 1893, Proc. Zool. Soc. London, p. 618. STEJNEGER, 1893, Proc. U. S. Nat. Mus., XVI, p. 722. BOCAGE, 1895, Herpétol. Angola, p. 49. BOULENGER, 1896, Proc. Zool. Soc. London, p. 215; 1896, Ann. Mus. Stor. Nat. Genova, (2) XVII, pp. 10, 20, and 278. JOHNSTON, 1897, British Central Africa, p. 361. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 45; 1900, Zool. Jahrb. (Syst.), XIII, p. 599, fig. BOULENGER, 1902, in Johnston, Uganda Protectorate, p. 446; 1902, Proc. Zool. Soc. London, II, p. 17. MOCQUARD, 1902, Bull. Mus. Hist. Nat. Paris, VIII, p. 405. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, p. 335. BOULENGER, 1907, Proc. Zool. Soc. London, p. 486; 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 310. CHUBB, 1909, Proc. Zool. Soc. London, p. 594. BOULENGER, 1910, Ann. South African Mus., V, p. 486. MEEK, 1910, Field Mus. Publ. Zool., VII, p. 412. PERACCA, 1910, Boll. Mus. Torino, XXV, No. 624, p. 3. SCHEBEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 295, figs. WERNER, 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 350. BOULENGER, 1911, Ann. Mus. Stor. Nat. Genova, (3) V, p. 163. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 249; 1911, Mitt. Zool. Mus. Berlin, V, p. 408. BOULENGER, 1912, Ann. Mus. Stor. Nat. Genova, (3) V, p. 330. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 245. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 87.
Eumeces afer PETERS, 1854, Monatsber. Akad. Wiss. Berlin, p. 619.
Eumeces reticulatus PETERS, 1862, Monatsber. Akad. Wiss. Berlin, p. 23.
Eumeces perdicilor COPE, 1868, Proc. Acad. Nat. Sci. Phila., p. 317.
Eumeces (*Senira*) *dumerili* STEINDACHNER, 1870, Sitzber. Akad. Wiss. Wien, LXII, part 1, p. 341, Pl. III, fig. 5.
Eumeces sundevallii PETERS, 1882, Reise nach Mossambique, III, p. 75, Pl. XI, fig. 2.
Mochlus punctatus GÜNTHER, 1864, Proc. Zool. Soc. London, p. 317; 1864, Zool. Rec., p. 111.
Euprepes chaperi VAILLANT, 1884, Bull. Soc. Zool. France, p. 346, Pl. XII, fig. 2; 1884, Bull. Soc. Philom. Paris, (7) VIII, p. 169.

Nieden (1913, p. 87) and other herpetologists have united *Lygosoma læviceps* (Peters), = *L. modestum* (Günther), with *L. sundevallii* (Smith). It appears probable, in the writer's opinion, from geographic analogy, that *L. guineense* (Peters) inhabiting Portuguese Guinea, Togo, and the Niger region of West Africa may prove to intergrade with the present form in the

PLATE XXIX

Lygosoma sundevallii (Smith). A. M. N. H. No. 11225; ♂; length 179 mm.



intermediate region. *L. sundevallii* inhabits practically the whole of the open country of Africa south of the Sahara, with the exception of the range of *L. guineense.*

A. M. N. H. Nos. 11213–14 (May 1912), 11215–25 (June 1912) are from Garamba; 11212 (November 1911), Yakuluku.

The largest specimen procured by the American Museum Congo Expedition measures 179 mm., with a body length of 90 mm. The maximum body length is 95 mm. The tail length varies from .45 to .53 of the total. Much larger specimens are recorded by Sternfeld (1912, p. 246).

The squamation of the head is normal and uniform. The scales about the body vary from 26 to 30, from anus to chin between 62 and 72. The lamellæ beneath the fourth toe are constant in number, 10–12. The supraciliaries are 5–7 in one specimen, 6–6 in eight, 6–7 in one, and 7–7 in four.

The coloration (in alcohol) of a juvenile specimen is brown above, with an iridescent sheen, creamy white below. Upper labials each with a dark mark, with fainter ones on the head shields. A few dark spots on gulars and sides of throat. Sides of tail somewhat varied with light and dark spots.

An adult is similarly colored, but with faint longitudinal lines on the middle third of each scale row on the back. These lines are interrupted on the sides, but the resulting spots are much more distinct, due to the absence of pigment on the lateral portions of the scales. The upper and lower labials are strongly marked with black. Dark spots along the sides of chin and throat, and scattered beneath the tail.

Measurements and Scale Characters

A. M. N. H. No.	11213	11214	11215	11216	11220	11222	11224	11225
Length	78	118	81	112	119	120	121	179 mm.
Body	43	55	40	56	56	58	60	90 mm.
Tail	35	63	41	56	63	62	61	89 mm.
Tail/Length	.45	.53	.50	.50	.53	.51	.50	.50
Axilla to Groin	27	34	23	36	37	36	37	57 mm.
Snout to Arm	13	17	13	17	19	17	17	29 mm.
Arm	8	10	8	10	9	10	9	11 mm.
Leg	11	14	11	13	14	14	14	17 mm.
Head Length	8	10	8	10	10	10	10	14 mm.
Head Breadth	6.7	8.0	6.2	8.0	7.5	8.0	8.0	11 mm.
Scales about Body	26	28	26	28	27	28	28	26
Scales, Anus to Chin-shields	71	65	62	68	68		66	69
Scales beneath Fourth Toe	12	12	11	12	12	10	10	12
Supraciliaries	7–7	6–6	7–7	6–6	6–6	6–6	6–6	6–6

"These skinks are related to the *Mabuya* and can be recognized easily by the short, blunt head and thick, cylindrical body and tail, which is abruptly pointed. Most specimens have a regenerated tail, much shorter than that of the lizard illustrated, an especially fine specimen, measuring 7 inches (178 mm.) in total length (Pl. XXIX). In rapid progression, the smooth, glossy, dark-brown body moves in snakelike fashion, for the feet are so reduced as to be of little assistance. We found them only in the northeastern Congo, and although their true habitat is undoubtedly the open savannah, nearly all of those taken came from native plantations. They were in the loose earth beneath heaps of decaying vegetable matter, logs, and pieces of bark, where, near the surface, they burrow passageways large enough to turn around in. They move about much less than one might expect of a lizard, and may stay for months at a time in one spot, perhaps owing to the fact that in their hiding places they can rest securely and yet have an abundance of food about them, for the animals most suitable to their taste either live there in numbers, such as termites, or come there occasionally to seek refuge, such as crickets and spiders. Indeed, these and beetle larvæ, the egg cases of spiders and sometimes a grasshopper, furnish easy subsistence" [H. L.].

Ablepharus Fitzinger

Ablepharus cabindæ Bocage

Ablepharus cabindæ Bocage, 1866, Jorn. Sci. Lisboa, I, p. 64; 1867, III, p. 8. Peters, 1877, Monatsber. Akad. Wiss. Berlin, p. 614. Bocage, 1887, Jorn. Sci. Lisboa, XI, p. 3. Boulenger, 1887, Cat. Lizards, III, p. 352. Boettger, 1887–1888, Ber. Senck. Ges., p. 29. Bocage, 1895, Herpétol. Angola, p. 51, Pl. v, fig. 3. Boulenger, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277.

Panaspis æneus Cope, 1868, Proc. Acad. Nat. Sci. Phila., p. 317.

Ablepharus æneus Boulenger, 1887, Cat. Lizards, III, p. 352.

This small skink is represented by sixty-three specimens: A. M. N. H. Nos. 11232–44 (July 1915), are from Banana; 11226 (June 1915), Boma; 11245–88 (July 1915), Malela; 11227 (June 1915), 11228–31 (July 1915), Zambi.

Ablepharus cabindæ is known only from a relatively limited area on the West Coast from Capangombe in Mossamedes to Chinchoxo in Loango.

Boettger, (1888, p. 29) has given reasons for uniting *Ablepharus æneus* Cope with *cabindæ,* from which it is distinguished only by the fewer supraoculars. This is fully borne out in the present series; except that there are many more specimens with 4 supraoculars than with 3: seven with supraoculars 3–3, four with 3–4, and fifty-two with 4–4. Since these forms inhabit the same region, with no other distinction, they are undoubtedly variations of a single species.

Slight variation is observable in other scale characters. The supraciliaries vary from 4 to 6, usually 5. The supralabials anterior to the subocular, normally 4, may be 5. The normal wide suture between rostral and frontonasal is much narrowed in a single specimen. The extent of the small suture between the frontonasal and frontal is more variable. In one specimen the prefrontals form a suture; in one they are separated by a small inter-prefrontal; and in one they are united into a single transverse shield. In the latter specimen, the frontonasal is transversely divided into a small anterior and large posterior shield. In seven specimens the frontonasal, frontal, and prefrontals meet in a point.

The regenerated tail is usually covered with scales much larger than the normal, four in a series around it.

Six of the dorsal rows are brown, and these and the two lateral rows are traversed on their centers by a longitudinal darker line (one-fourth to one-third the width of the scale). Between the outer two of these dark lines, the interspace is light, especially anteriorly. Below this, the sides are somewhat darker brown, outlined in some cases, with a second light line below, which begins at the lower posterior corner of the eye and extends backward through the ear, and above the arm. Tail like dorsum; sides more or less spotted. The dorsal brown varies in shade and hue. The venter may be greenish white or yellow, the scales somewhat outlined with darker.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Length	♂	8	75–99	86.6 mm.
	♀	26	65–98	86.8 mm.
Body	♂	18	32–42	36.9 mm.
	♀	41	26–42	35.3 mm.
Tail	♂	8	43–63	50.2 mm.
	♀	26	37–60	51.0 mm.
Tail/Length	♂	8	.56–.63	.58
	♀	29	.51–.64	.58
Axilla to Groin	♂	18	19–28	25.9 mm.
	♀	41	16–27	22.2 mm.
Arm	♂	18	7.0–8.0	7.3 mm.
	♀	41	5.5–8.0	7.0 mm.

	Sex	No. of Specimens	Extremes	Average
Leg	♂	18	10.0–11.5	10.6 mm.
	♀	41	8.0–12.0	10.0 mm.
Head Length	♂	18	6.5–7.7	7.0 mm.
	♀	40	5.5–7.5	6.6 mm.
Head Breadth	♂	18	4.3–5.5	5.0 mm.
	♀	40	4.0–5.5	4.6 mm.
Scales about Body	♂	18	22–24	23.6
	♀	43	22–24	23.6
Scales from Anus	♂	18	51–64	56.7
to Chin Shields	♀	43	51–62	56.5

"The habits of these little brown skinks are most interesting. Although common in all localities recorded above, one has to know their haunts, for they seldom expose themselves to sunlight, and the patches of short grass, rather dense near the ground, on the sandy flats near the shore furnish excellent hiding places. Only on searching through and separating the grass can these skinks be observed moving about swiftly, more in the fashion of snakes than lizards. For a long time I wondered what they fed upon until stomach contents proved that termites, from the richly provided storerooms covered with but little soil, formed their exclusive diet. Only slight effort with the tip of the head is needed to break into the galleries of these termites, which hurry out in numbers to repair the damage, offering themselves easy prey" [H. L.].

Anelytropidæ

Feylinia Gray

Feylinia currori Gray

Plate XXIV, Figure 2

Feylinia currori Gray, 1845, Cat. Lizards, p. 129. Bocage, 1873, Jorn. Sci. Lisboa, IV, p. 214. Peters, 1877, Monatsber. Akad. Wiss. Berlin, p. 614 Bocage, 1887, Jorn. Sci. Lisboa, XI, pp. 3, 179. Boulenger, 1887, Cat. Lizards, III, p. 431. Boettger, 1888, Ber. Senck. Ges., p. 33. Bocage, 1895, Herpétol. Angola, p. 57. Boulenger, 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 277. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 47. Werner, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 134. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 676. Boulenger, 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 206; 1905, Mem. Soc. Esp. Hist. Nat., I, p. 185; 1908, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 7. Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 199. Nieden, 1913, Mitt. Zool. Mus. Berlin, VII, p. 90.

Feylinia currori grandisquamis MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 591.
Anelytrops elegans DUMÉRIL, 1856, Rev. Mag. Zool., (2) VIII, p. 420, Pl. XXII, fig. 1. BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 45.

There are six specimens of this species in the collection from the forest region of the northeastern Congo. A. M. N. H. No. 11294 (October 1913), is from Akenge; 11291 (April–May 1910), 11292–93 (June 1914), Medje; 11289 (August 1909), 11290 (November 1914), Stanleyville.

These specimens serve to connect the records from Bukoba, German East Africa, and the Sesse Islands in Victoria Nyanza, with the well-known distribution of this species on the West Coast. Obviously it is essentially a forest species.

Boettger (1888, p. 34) has discussed the question of even or odd scale rows in this species. In the six specimens at hand the even numbers predominate. No variation is observable in the squamation of the head. The measurements lie between the recorded extremes. The tail length averages .27 of the total, .33 being the average from the literature. The body diameter is .061 to .077 of the body length. The number of scales about the body is constant, 26–27.

The colors in life are dark bluish gray, appearing black at a distance, the venter somewhat lighter, or of the same color, the snout light gray. One of the specimens was taken in the grass at Stanleyville. [L. and C.]

In the tabulation below, the scale counts are taken at the first regular scale row behind the head, at the middle of the body, and immediately in front of the anals. The length of the head is measured to the posterior border of the interparietal.

Measurements and Scale Characters

A. M. N. H. No.	11289	11290	11291	11292	11293	11294
Length	358			291	324	340 mm.
Body	246	163	232	215	231	258 mm.
Tail	112			76	93	82 mm.
Tail/Length	.31			.26	.29	.24
Head Length	10.7	7.5	10	9.2	10.5	11 mm.
Body Diameter	18	10			18	19 mm.
Diameter/Body	.073	.061			.077	.073
Scales about Body	26–26–24	26–27–24	25–26–23	25–26–24	26–26–22	26–26–22

"This degraded skink glides with great ease on its smooth, slightly flattened, legless body, unhampered by the fact that its eyes are concealed beneath the skin. Sunlight apparently causes no inconvenience, as a specimen from Stanleyville was caught in the grass at noon. Hearing, however, seems to be well developed, for footsteps may bring them to a standstill. Perhaps this is an important faculty in finding their food supply, which consists mostly of termites; these, when disturbed, make considerable noise in their movements. *Feylinia currori* likes to rest under decaying logs and other vegetable matter, and the termites, rushing toward the intruder. there, can readily be eaten. Occasionally a small centiped is swallowed. To reach such places they need not exert much muscular power, since the ground near the surface is soft, and the smooth tipped head and mandible can easily burrow through such a substance. These skinks have no means of defending themselves, and, when held, not even the broadened short tongue is thrust forward; but they may feign death and [Plate XXIV, Fig. 2] have a curious way of doubling up and suddenly jerking either half of the body when touched. The natives are afraid to pick them up, believing that these reptiles possess a head on either end and can, unnoticed, enter and escape from the body of any person during the night, causing his death. Those who discover the skink in its lair, however, and do not disturb it will never be visited thus — a reason that the natives refuse to kill them" [H. L.].

Artificial Key to the Species of Scincidæ and Anelytropidæ Occurring in the Rain Forest

A. Limbs well developed; palatines meeting in the middle line of the palate.
- B. Palatal notch extending as far forward as the middle of the eye; dorsal scales keeled; a transparent disc in the lower eyelid. (*Mabuya*).
  - C. Supraciliaries 3; scales of back tricarinate... *M. bensonii.*
  - CC. Supraciliaries 5 or more.
    - D. Supraciliaries 5; dorsal scales quinque-carinate, sometimes 6–9-carinate; dorsum and sides, especially in the male, flecked with yellow...... *M. maculilabris.*
    - DD. Supraciliaries 6–8.
      - E. A well marked lateroventral light line from ear to groin (rarely absent); dorsal scales tricarinate, sometimes quinque-carinate.......... *M. raddoni.*
      - EE. No lateroventral line; dorsal markings more or less distinct, transverse; dorsal scales mostly 9–15-carinate..................... *M. polytropis.*

BB. Palatal notch not extending as far forward as the middle of the eye; dorsal scales keeled; no transparent disk in the lower eyelid; transverse lateral black and red bars.... *Lygosoma fernandi.*

BBB. Palatal notch not extending to middle of eye; lower eyelid with a transparent disc; dorsal scales smooth........ (*Lygosoma*, part).

C. Scales about body 37–38; a dorsal pattern of dark spots arranged in two longitudinal rows, each spot preceded by a light spot of about equal size.............. *L. breviceps.*

CC. Scales 20–24; dorsum not as above.

D. Habitus slender; adpressed limbs overlap. *L. reichenowii.*

DD. Habitus plump; adpressed limbs separated by about the length of the arm.................. *L. vigintiserierum.*

CCC. Scales 24–26.

D. Habitus slender; adpressed hind limb reaching the elbow of fore limb............................ *L. rohdei.*

DD. Habitus stouter; adpressed limbs separated by the length of the fourth finger.......... *L. gemmiventris.*

AA. Limbs absent; palatines separated on the median line of the palate.

B. Eye external, small; nostril between the rostral and first labial. *Melanoseps occidentalis.*

BB. Eye covered by a scale, scarcely visible; nostril pierced in the rostral.. (*Feylinia*).

C. Eye behind the 2nd upper labial; scales about body, 20. (? Gaboon).................................. *F. elegans.*

CC. Eye behind 3rd upper labial; scales, 20–28.... *F. currori.*

Chamæleontidæ

Chamæleon Gronovius

Artificial Key to the Species of *Chamæleon* Occurring in the Rain Forest (Based on Nieden, Fauna Deutsch. Kol., Reihe I, Heft 2)

A. Scales homogeneous, or nearly so; parietal crest present.

B. A gular-ventral crest; male with tarsal process. (Sudanese forms, occasional in the forest).

C. Occipital lobes rudimentary, immovable.......... *gracilis.*

CC. Occipital lobes flap-like, movable................ *dilepis.*

BB. No gular-ventral crest; male without tarsal spur.

C. A faint dorsal crest of isolated tubercles, anteriorly; no occipital lobes; no horns in male. (Ituri)..*adolfi-friderici.*

CC. No dorsal crest; small, rounded, movable occipital lobes; horns in the male.
D. Male with three horns. (Entire forest)......*owenii.*
DD. Male with one horn. (Western)...........*unicornis.*
AA. Scales heterogeneous; parietal crest present or absent, no tubercular dorsal crest.
B. A dorsal "sail" supported by neural spines, at least in males; no parietal crest. (Known only from West Africa).
C. A gular crest.
D. A ventral crest; male with four horns....*quadricornis.*
DD. No ventral crest; male with two horns......*pfefferi.*
CC. No gular or ventral crest.
D. Male with two horns......................*montium.*
DD. Male without horns......................*cristatus.*
BB. No dorsal "sail."
C. A gular-ventral crest. (West Africa).......*wiedersheimi.*
CC. No gular or ventral crest.
D. Occipital lobes faintly indicated; a parietal crest; a nasal tubercle. (Ituri)...................*ituriensis.*
DD. Occipital lobes absent; no parietal crest; no nasal tubercle. (West African)..............*camerunensis.*

Artificial Key to Species of *Chamæleon* Occurring in the Sudan

A. Casque much elevated behind, with very high parietal crest. *basiliscus.*
AA. Casque nearly flat above, little raised above the nape.
B. Occipital lobes present; male with tarsal spur.
C. Occipital lobes rudimentary, immovable..........*gracilis.*
CC. Occipital lobes flap-like, movable................*dilepis.*
BB. No occipital lobes; males without tarsal spur.
C. Lateral crests distinct; casque raised from nape. (Western). *senegalensis.*
CC. Lateral crests indistinct, faint parietal crest nearly continuous with the low dorsal crest. (Eastern)......*lævigatus.*

Chamæleon gracilis (Hallowell)

Plate XXX, Figure 1.

Chamæleo gracilis Hallowell, 1842, Journ. Acad. Nat. Sci. Phila., p. 324, Pl. xviii; 1857, Proc. Acad. Nat. Sci. Phila., p. 99.
Chamæleo gracilis Duméril, 1861, Arch. Mus. Hist. Nat. Paris, X, p. 173.

Chamæleon gracilis GRAY, 1864, Proc. Zool. Soc. London, p. 471.
Chamæleo gracilis BOCAGE, 1866, Jorn. Sci. Lisboa, I, pp. 41, 219.
Chamæleon gracilis DOLLO, 1886, Bull. Mus. Roy. Hist. Nat. Belgique, IV, p. 154. BOULENGER, 1887, Cat. Lizards, III, p. 448, Pl. XXXIX, fig. 4. MOCQUARD, 1888, Mém. Cent. Soc. Philom. Paris, p. 112. BOETTGER, 1888, Ber. Senck. Ges., p. 36. MATSCHIE, 1892, Zool. Jahrb. (Syst.), V, p. 613. BOETTGER, 1893, Zool. Anz., XVI, p. 116. BOCAGE, 1895, Herpétol. Angola, p. 61. BOULENGER, 1895, Proc. Zool. Soc. London, p. 535; 1896, p. 213; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278. WERNER, 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 397. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451. TORNIER, 1900, Zool. Jahrb. (Syst.), XIII, p. 606; 1901, Beiheft, Arch. Naturg., LXVII, p. 88; 1902, Zool. Jahrb. (Syst.), XV, p. 676. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 333, 337, 343; 1902, Zool. Jahrb. (Syst.), XV, p. 336, Pl. XVIII. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7), XVI, p. 112; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 207. TORNIER, 1905, Zool. Jahrb. (Syst.), XXII, p. 383. JOHNSTON, 1906, Liberia, II, p. 833. WERNER, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1861. BOULENGER, 1908, Ann. Mus. Stor. Nat. Genova, (3) V, p. 163. LÖNNBERG, 1910, in Sjöstedt, Kilimandjaro-Meru Exp., I, pp. 4, 9. NIEDEN, 1910, Arch. Naturg., LXXVI, part 1, p. 239. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentral Afrika Exp., IV, p. 247. KLAPTOCZ, 1913, Zool. Jahrb. (Syst.), XXXIV, p. 285. WERNER, 1913, in Brehm's Tierleben, V, p. 222.
Chamæleo granulosus HALLOWELL, 1856, Proc. Acad. Nat. Sci. Phila., p. 147.
Chamæleo burchelli HALLOWELL, 1856, Proc. Acad. Nat. Sci. Phila., p. 147.
Chamæleon senegalensis gracilis PETERS, 1878, Monatsber. Akad. Wiss. Berlin, p. 612; 1879, p. 202.
Chamæleo (Chamæleo) simoni, BOETTGER, 1884 (1885), Ber. Offenbacher Ver. Naturk., p. 175.

Fifty-seven specimens of this widely distributed chameleon indicate its abundance in the eastern Sudan. Two specimens are recorded from the forest border at Poko. The nearest previous record is that of Werner at Gondokoro on the Nile. The distribution map of Werner (1902, p. 312) is unfortunate, as is also the range given by Boulenger, "Tropical Africa," since they miss the cardinal fact in the distribution of the species. It is essentially an open country form, though it may occasionally be recorded from the forest (Kamerun and Liberia). It is one of the forms whose range circumscribes the forest: Angola to Lake Tanganyika, the Central African lake region, Abyssinia, and the whole of the Sudan to Portuguese Guinea.

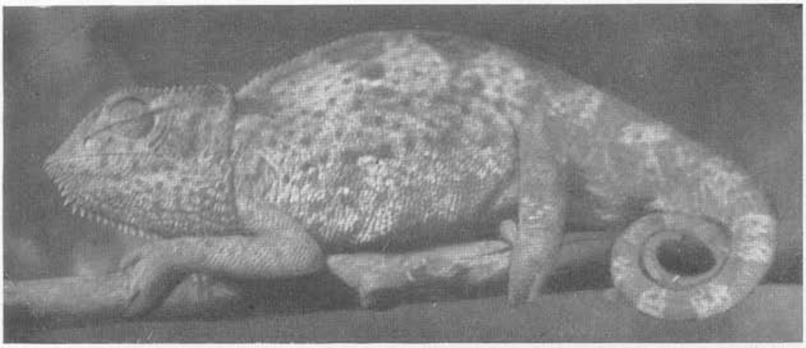
A. M. N. H. Nos. 11331 (March 1911), 11332 (April 1911), 11333–36 (January–March 1912), 11337–38 (February 1912), 11339 (September 1912), and 11344 (October 1912) are from Faradje; 11340 (March 1912), 11341–43 (May 1912), Garamba; 11295–330 (November 1910), 11608 (December 1910), 11345–48 (April 1913), Niangara; 11349–50 (August 1913), Poko.

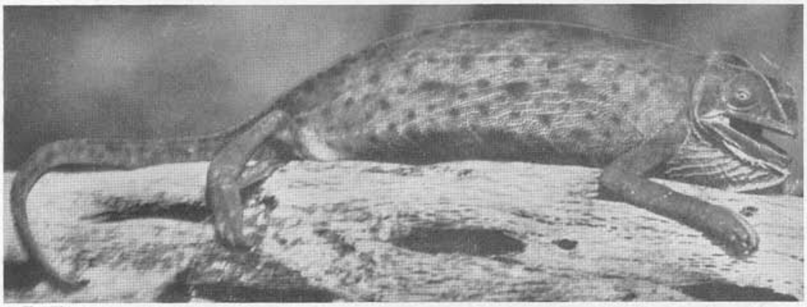
PLATE XXX

Figure 1. *Chamæleon gracilis* Hallowell. A. M. N. H. No. 11335; ♀; length 239 mm.

Figure 2. *Chamæleon senegalensis lævigatus* Gray. A. M. N. H. No. 11394; ♀; length 177 mm.

Figure 3. *Rhampholeon boulengeri* Steindachner. A. M. N. H. No. 11576; ♀; length 66 mm. Matching the light gray stump upon which it rests. Compare the color-phases shown on Plate XXXII, Figures 7 and 8. The two oblique marks on the back have been compared with the ribs of a dead leaf.


1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3

In the specimens of this species which have been available to the writer there is no approach to *Chamæleon dilepis* to support Sternfeld's statement that there exists no valid reason for separating these species. Certainly the relationship between the forms of *dilepis* is much closer *inter se* than that of any of them with *gracilis*.

The present series contains a female specimen of 343 mm. long — by far larger than the 308 mm. recorded by Boulenger (1887, p. 448) and still quoted by Werner (1911, p. 12); and this specimen measured 357 mm. when freshly killed. The largest male measures only 278 mm., although the males are reported larger than the females in West African specimens. The tail length varies from .43 to .52 of the total, mean .49.

The series is, on the whole, remarkably uniform in the development of the occipital lobes, the cranial crests, and the dorsal and ventral serrations. The tarsal spur of the male is well developed in all cases.

When the animal is annoyed, the gular pouch is enlarged; it opens its mouth widely and hisses hoarsely, trying to bite. When it has taken hold of one's finger, its jaws are with difficulty disengaged. Color changes are frequently observed. A specimen in hand is dark green, with a brownish lateral band and pale white mid-ventral line. Another specimen kept in a white box is pale orange with brighter orange cross-bars and dirty white lateral band. The skin is shed in patches, perfectly colorless. One specimen (No. 11331) was disgorged by a snake.

The general color in life is dark green, with several irregular darker bands from the vertebral line to the broad orange stripe on the sides, which extends from the insertion (n) of the arm three-fourths of the distance to the groin. The ventral serration is pale yellowish. The venter is paler green, dotted with irregular black markings. The gular pouch as well as the head and eyeballs are usually green. The folds of skin between the scales on the throat (often invisible) are usually bright orange. There is a whitish or brownish line beneath the tail. The claws are brownish with black tips. The iris is golden, scarcely visible. [L. and C.]

The ovaries in a specimen taken in March contain 30–30 eggs, about 10 mm. in diameter. In a specimen taken in April they are about 5 mm. in diameter. In specimens taken in August and November they are undeveloped.

Stomach contents show that the species lives chiefly on Orthoptera as Werner observed in the nearby Lado district.

The stomachs contained grasshoppers (Nos. 11334, 11335, and 11341), a mantid (No. 11310), caterpillars and a weevil (No. 11341), a cicada, numerous winged ants and termites, and a muscid fly (No. 11331), and (No. 11335) a carpenter bee (*Xylocopa*) and a wasp (*Polistes marginalis*). A large proportion of stomachs of all of the species of *Chamæleon* have been empty, due probably to their being captured alive and not killed immediately.

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♂	20	159–278	205.6 mm.
	♀	36	194–343	254.6 mm.
Body	♂	20	78–142	103.7 mm.
	♀	36	92–175	130.0 mm.
Tail	♂	20	72–136	102.4 mm.
	♀	36	93–176	124.5 mm.
Tail/Length	♂	20	.45–.52	.49
	♀	36	.43–.52	.49
Arm	♂	20	35–60	45.9 mm.
	♀	36	44–70	55.1 mm.
Leg	♂	20	34–59	45.7 mm.
	♀	36	43–69	55.2 mm.
Head Length	♂	20	26–43	32.9 mm.
	♀	36	31–48	38.4 mm.
Snout to Angle of Mouth	♂	20	16.5–28	21.0 mm.
	♀	36	22–31	27.8 mm.
Angle of Mouth to Occiput	♂	20	16.5–27	20.7 mm.
	♀	36	19–31	24.7 mm.
Greatest Width of Head	♂	20	11–19	13.7 mm.
	♀	36	13–21.5	15.4 mm.

Chamæleon etiennei, new species[1]

?*Chamæleon gracilis* Boettger, 1888, Ber. Senck. Ges., p. 36.

Twenty-one specimens (A. M. N. H. Nos. 11351–71, July 1915) of a chameleon from the hills near Banana at the mouth of the Congo are not referable either to *C. gracilis* or *C. dilepis*, although manifestly belonging to the *gracilis-dilepis* group. The fifty-nine specimens recorded as *C. gracilis* from the same locality by Boettger (1888, p. 36) probably belong to the present form, should it prove valid.

Diagnostic Characters

Cranial crests as in *C. dilepis;* occipital lobes as in *C. gracilis;* a dorsal, gular, and ventral serration; no tarsal spur in the male; skin uniformly coarsely granular as in *C. gracilis*.

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[1] Named after Dr. Etienne, the best-known medical authority in the Belgian Congo, who accompanied King Albert on his trip through the Congo Basin and who has made many contributions to the natural history of Banana. During the three months' stay there of the American Museum Expedition he gave every possible assistance to the furtherance of its work.

Detailed description

Type: No. 11370.

Habit as in *C. gracilis*, body scarcely as deep, though this character is variable in *gracilis*. Casque nearly flat above, the distance from the angle of the mouth to the occiput equalling the distance to the snout. Tail shorter than the head and body, .46 of the total length.

Casque slightly raised, with only a faint parietal crest. Lateral crests not continued to the point of the occiput, disappearing where the casque begins to narrow posteriorly, as in the specimens of *C. dilepis* available for comparison. Lateral crests divergent instead of nearly parallel, as they frequently are in *C. gracilis*. The occipital lobes distinct, but not more developed than in *gracilis*. Gular-ventral crest well developed, dorsal crest moderate. Body covered with uniform granular scales, indistinguishable on this character from the Sudanese *gracilis* examined. No tarsal process. In even the female *gracilis* from the Sudan there is a slight indication of a spur, and in the males it is well developed at all ages. In the large male selected as type, and in all of the six male paratypes, the spur is less distinct than in female *gracilis*.

The coloration is in every respect similar to that of *gracilis*.

Measurements of the type: Length, 256; body, 137; tail, 119; tail/length, .46; arm, 58; leg, 56; length of head, 40; snout to angle of mouth, 25; angle of mouth to occiput, 25; width of head, 17 mm.

The tail length in the series varies only from .44 to .48 of the total, mean .46 (compare *gracilis* above). The development of the occipital lobes is constant. The lateral crests may be more or less parallel, but with the widest point usually well behind the eyes.

In view of the described and figured variations in the cranial crests of *C. gracilis*, these characters alone are insufficient to distinguish the present species; but the entire absence of the tarsal process in the male appears to be a character of more importance. It will be observed that Boettger (*loc. cit.*) devotes a special paragraph to the discussion of the sex differences in the series before him without mention of the tarsal process; and it is the writer's conviction that this character must have been overlooked. *C. simoni* Boettger (1885, p. 175) has almost exactly the characters of the occipital lobes and cranial crests of the present form, but is described as having a well-developed tarsal spur. Specimens sent by Dr. Boettger himself to the Harvard Museum of Comparative Zoology as *C. simoni* are undoubtedly *gracilis*, but do not agree with the original description of *simoni*.

It is interesting to note that a specimen, apparently also representative of this form, in the Museum of Comparative Zoology bears the note by Dr. Thomas Barbour, dated 1902: "This specimen is not referable to any species mentioned in Boulenger, Cat. Lizards, Brit. Mus., neither *gracilis, dilepis* nor *parvilobus*."

The writer feels some hesitation in thus proposing a new species in this group of chameleons from a relatively well-known locality, and it is earnestly hoped that its relations may be cleared up by a revision of existing Angolan material.

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♂	7	124–256	199.7 mm.
	♀	14	118–245	179.8 mm.
Body	♂	7	68–137	106.7 mm.
	♀	14	63–134	97.5 mm.
Tail	♂	7	56–119	93.0 mm.
	♀	14	55–111	81.5 mm.
Tail/Length	♂	7	.44–.47	.46
	♀	14	.44–.48	.455
Arm	♂	7	31–58	46.8 mm.
	♀	14	27–60	42.3 mm.
Leg	♂	7	29–56	46.3 mm.
	♀	14	27–57	42.3 mm.
Head Length	♂	7	21–40	31.8 mm.
	♀	14	19–47	30.7 mm.
Snout to Angle of Mouth	♂	7	15–25	21.1 mm.
	♀	14	13–23	18.8 mm.
Angle of Mouth to Occiput	♂	7	14–25	20.8 mm.
	♀	14	13–25	18.9 mm.
Greatest Width of Head	♂	7	8.5–15	12.5 mm.
	♀	14	9–17	13.3 mm.

"Through the kindness of Dr. Etienne, my attention was called to the chameleons to be found in the bushes on the hills and in the savannah and more rarely the mangrove thickets near Banana. In life the general color is a bright apple green, changing to dark greenish brown and pale yellowish green. The under side is paler and the numerous gular folds and the gular-ventral crest are yellowish or orange and a band from the axilla to the base of the hind limbs always shows lighter mottlings occasionally turning to orange; a series of dark bands or round spots on the body becomes noticeable at times. When irritated these chameleons hiss, puff up the body, open the mouth, and in general behave like most of their relatives. The tail is very prehensile. The food consists of a variety of insects, chiefly grasshoppers, crickets, roaches, and flies; even bees (*Trigona*), however, had been taken. All specimens were caught in July, the height of the dry season, and were in every sense alert, a further proof that chameleons do not estivate in these latitudes" [H. L.].

Chamæleon dilepis (Leach)

Map 20

Chamæleo dilepis LEACH, 1819, in Bowdich, Miss. Ashantee, App., p. 493.

Chamæleon dilepis GRAY, 1827, Philos. Mag., (2) II, p. 211; 1828, Spicileg. Zool., part 1, p. 2, Pl. II, figs. 4 and 5. GRIFFITH, 1831, Cuvier's Anim. Kingd., IX, p. 237, Pl. GRAY, 1831, Synopsis, p. 53, in Griffith, Cuvier's Anim. Kingd., IX.

Chamæleo dilepis DUMÉRIL AND BIBRON, 1836, Erpétol. Gén., III, p. 225. GRAY, 1845, Cat. Lizards, p. 266. SMITH, 1849, Ill. Zool. South Africa, III, App., p. 3. BIANCONI, 1850, Spec. Zool. Mossamb., p. 7. DUMÉRIL, 1852, Arch. Mus. Hist. Nat. Paris, VI, Pl. XXII, fig. 8; 1856, Rev. Mag. Zool., (2) VIII, p. 418; 1861, Arch. Mus. Hist. Nat. Paris, X, p. 173. PETERS, 1862, Monatsber. Akad. Wiss., Berlin, p. 15.

Chamæleon dilepis GRAY, 1864, Proc. Zool. Soc. London, p. 472.

Chamæleo dilepis PETERS, 1877, Monatsber. Akad. Wiss. Berlin, p. 612; 1878, p. 202; 1882, Reise nach Mossambique, III, p. 21.

Chamæleon dilepis DOLLO, 1886, Bull. Mus. Roy. Hist. Nat. Belgique, IV, p. 154. BOULENGER, 1887, Cat. Lizards, III, p. 450. BOETTGER, 1888, Ber. Senck. Ges., p. 40. MOCQUARD, 1888, Mém. Cent. Soc. Philom. Paris, p. 112. GÜNTHER, 1892, Proc. Zool. Soc. London, p. 555. PFEFFER, 1892, Jahrb. Hamburg. Wiss. Anst., IX, p. 75. GÜNTHER, 1893, Proc. Zool. Soc. London, p. 618. STEJNEGER, 1893, Proc. U. S. Nat. Mus., XVI, p. 724. BOCAGE, 1895, Herpétol. Angola, p. 59. PERACCA, 1896, Boll. Mus. Torino, XI, No. 255, p. 1. BOULENGER, 1897, Proc. Zool. Soc. London, p. 800; 1897, Ann. Mag. Nat. Hist., (6) XIX, p. 278.

Chamæleon dilepis JOHNSTON, 1897 British Centr. Africa, p. 361*a*. TORNIER, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 47. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451. TORNIER, 1900, Zool. Jahrb. (Syst.), XIII, p. 606; 1901, Beiheft, Arch. Naturg., LXVII, p. 88. BOULENGER, 1902, Proc. Zool. Soc. London, II, p. 17; in Johnston, Uganda Protectorate, I, p. 446. TORNIER, 1902, Zool. Jahrb. (Syst.), XV, pp. 587 and 676. WERNER, 1902, Verh. Zool.-Bot. Ges. Wien, LII, pp. 339 and 343. BOULENGER, 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112; 1905, Ann. Mus. Stor. Nat. Genova, (3) II, p. 207; 1907, Proc. Zool. Soc. London, p. 486. CHUBB, 1909, Proc. Zool. Soc. London, p. 594. BOULENGER, 1910, Ann. South African Mus., V, p. 492. LÖNNBERG, 1910, in Sjöstedt, Kilimandjaro Meru Exp., I, part 4, p. 10. MEEK, 1910, Publ. Field Mus. Zool., VII, p. 414. MÜLLER, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 592. NIEDEN, 1910, Sitzber. Ges. Naturf. Freunde Berlin, p. 443. STERNFELD, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 249; 1911, Mitt. Zool. Mus. Berlin, V, pp. 418 and 420. STERNFELD AND NIEDEN, 1911, Mitt.

Zool. Mus. Berlin, V, p. 385. WERNER, 1911, Chamæleontidæ, p. 13. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 247. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 90; 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 457. WERNER, 1913, in Brehm's Tierleben, 4th Ed., V, p. 222, Pl., figs. 3 and 4.

Chamæleo bilobus KUHL, 1820, Beiträge Kennt. Amph., p. 104.

Chamæleon planiceps MERREM, 1820, Tent. Syst. Amph., p. 162.

Chamæleon petersii GRAY, 1864, Proc. Zool. Soc. London, p. 470, fig.

Chamæleo capellii BOCAGE, 1866, Jorn. Sci. Lisboa, I, p. 59.

Chamæleo dilepis quilensis BOCAGE, 1866, Jorn Sci. Lisboa, I, p. 59.

Chamæleon dilepis quilensis WERNER, 1902, Zool. Jahrb. (Syst.), XV, p. 339; 1910, Denkschr. Med. Naturw. Ges. Jena, XVI, p. 352. LÖNNBERG, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 18. WERNER, 1911, Chamæleontidæ, p. 13. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 248. WERNER, 1913, in Brehm's Tierleben, 4th Ed., V, p. 222, Pl.

Chamæleon parvilobus BOULENGER, 1887, Cat. Lizards, III, p. 449, Pl. XXXIX, fig. 5. BOETTGER, 1887, Ber. Senck. Ges., p. 152. BOULENGER, 1892, in Distant, Naturalist in the Transvaal, p. 174. FLECK, 1894, Ber. Senck. Ges., p. 84. BOETTGER, 1894, Ber. Senck. Ges., p. 91. WERNER, 1896, Jahrb. Ver. Magdeburg, p. 142; 1897, Verh. Zool.-Bot. Ges. Wien, XLVII, p. 402. SCHENKEL, 1902, Verh. Naturf. Ges. Basel, XIII, p. 193.

Chamæleon dilepis parvilobus GÜNTHER, 1892, Proc. Zool. Soc. London, p. 555.

Chamæleon quilensis BOCAGE, 1895, Herpétol. Angola, p. 60, Pl. VIII, fig. 3. MATSCHIE, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 5. BOULENGER, 1900, Proc. Zool. Soc. London, p. 451; 1905, Ann. Mag. Nat. Hist., (7) XVI, p. 112; 1907, Proc. Zool. Soc. London, p. 486. ROUX, 1907, Zool. Jahrb. (Syst.), XXV, p. 439. ODHNER, 1908, Ark. Zool. Stockholm, IV, No. 18, p. 5. CHUBB, 1909, Proc. Zool. Soc. London, p. 594. BOULENGER, 1910, Ann. S. African Mus., V, p. 492. STERNFELD, 1911, Mitt. Zool. Mus. Berlin, V, p. 409.

Chamæleon isabellinus GÜNTHER, 1892, Proc. Zool. Soc. London, p. 556, Pl. XXXIII. JOHNSTON, 1897, British Central Africa, p. 361a.

Chamæleon dilepis isabellinus WERNER, 1902, Zool. Jahrb. (Syst.), XV, p. 344; 1911, Chamæleontidæ, p. 13. LÖNNBERG, 1911, Svenska Vetensk. Akad. Handl., XLVII, No. 6, p. 19.

Chamæleon ruspollii BOETTGER, 1893, Zool. Anz., XVI, p. 116.

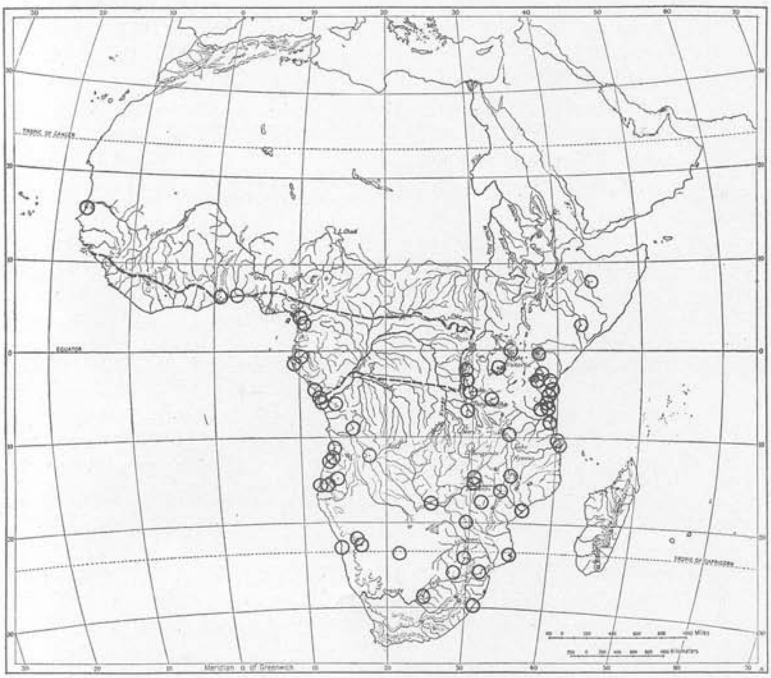
Chamæleon roperi BOULENGER, 1890, Proc. Zool. Soc. London, p. 85, Pl. VIII, fig. 4. STEJNEGER, 1893, Proc. U. S. Nat. Mus., XVI, p. 724. GÜNTHER, 1894, Proc. Zool. Soc. London, p. 87.

Chamæleon dilepis roperi TORNIER, 1901, Beiheft, Arch. Naturg. LXVIII, p. 88. WERNER, 1902, Zool. Jahrb. (Syst.), XV, p. 343; 1911, Chamæleontidæ, p. 13. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 247. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 90.

Chamæleon dilepis dilepis WERNER, 1902, Zool. Jahrb. (Syst.), XV, p. 340; 1911, Chamæleontidæ, p. 13. STERNFELD, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 387; 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 248. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 90.

A single specimen (A. M. N. H. No. 11372) of this species was taken on a bush in the savannah near Malela, June, 1915.

Chamæleon dilepis with its subspecies has a very wide distribution in Africa, perhaps the widest of any chameleon. The distinction of the subspecies *quilensis* appears to be doubtful, and *roperi* and *isabellinus* are not different in range from *dilepis dilepis*. Although the great majority of records for *dilepis* are from the open country of Africa, it is recorded also from localities well within the Rain Forest of Gaboon and Kamerun. The writer is inclined to believe that these indicate an extension of range due to the modification of the habitat by human settlements and plantations. At any rate, the species appears to be absent in the Ituri Forest. Its absence from the entire eastern Sudan is unexplained; and the distribution of the several forms offers an interesting problem.



Map 20. Range of *Chamæleon dilepis*, inclusive of its subspecies and varieties. A savannah species?

The writer has examined the type of *Chamæleon angusticoronatus* Barbour (Mus. Comp. Zool., No. 6712), which, while belonging to the *dilepis* group, appears to be specifically distinct, although *Chamæleon dilepis* has also been recorded from the island of Zanzibar. In the collection of the Harvard

Museum of Comparative Zoology there is also a series of *Chamæleon roperi* Boulenger, (Nos. 11477–11482), in which the males lack the spur of the typical *dilepis*. This character appears to be of greater importance than the other distinctions of *roperi;* and, as the type of *roperi* was spurless, the subsequent identifications of spurred *dilepis* with *roperi* may be fallacious. On this hypothesis *roperi* would be a distinct species bearing the same relation to *dilepis* as the above described *Chamæleon etiennei* to *gracilis*.

Measurements of the Malela Specimen and Two from Rhodesia

A. M. N. H. No.	11372	5843	5867
Sex	♀	♀	♂
Length	223	241	204 mm.
Body	115	125	94 mm.
Tail	108	116	110 mm.
Tail/Length	.48	.48	.54
Arm	49	52	44 mm.
Leg	49	47	42 mm.
Head Length	35	37	32 mm.
Head Breadth	16.5	15	14 mm.
Mouth	22	24	21 mm.
Angle of Mouth to Occiput	23	23	19 mm.
Occ. Lobe at Base	13.5	14	11.3 mm.

Chamæleon senegalensis lævigatus Gray

Plate XXX, Figure 2; Map 21.

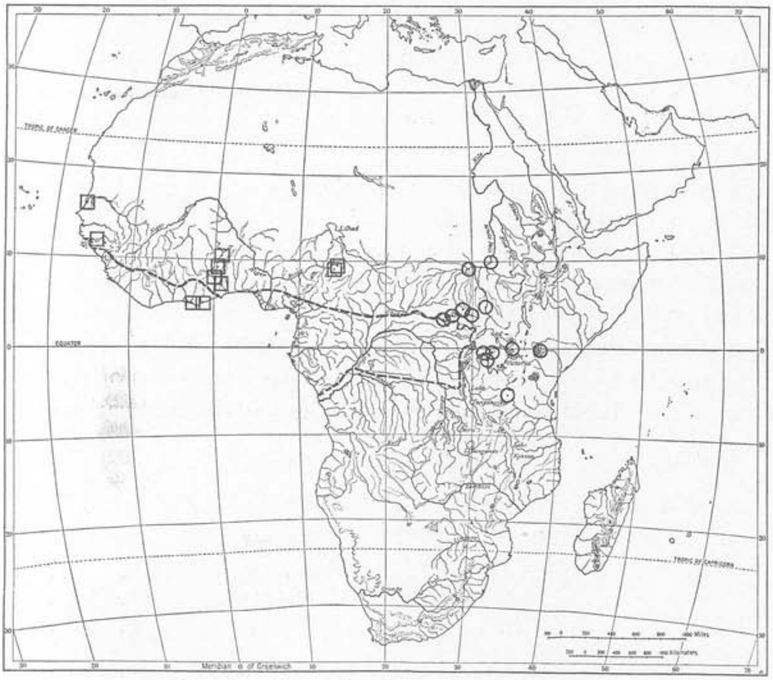
Chamæleon lævigatus Gray, 1863, Proc. Zool. Soc. London, p. 95; 1864, p. 471. Tornier, 1900, Zool. Jahrb. (Syst.), XIII, p. 603; 1902, XV, p. 587. Boulenger, 1902, in Johnston, Uganda Protectorate, p. 446. Werner, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, part 1, p. 1862. Peracca, 1909, in Il Ruwenzori, I, p. 171. Werner, 1911, Chamæleontidæ, p. 18. Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp. IV, p. 257. Nieden, 1913, Mitt. Zool. Mus. Berlin, VII, p. 94.

Chamæleon senegalensis lævigatus Günther, 1888, Proc. Zool. Soc. London, p. 50; 1895, Ann. Mag. Nat. Hist., (6) XV, p. 524. Tornier, 1897, Kriechtiere Deutsch-Ost-Afrikas, p. 55. Boulenger, 1909, Ann. Mus. Stor. Nat. Genova, (3) IV, p. 302. Roux, 1910, Rev. Suisse Zool., XVIII, p. 97.

From the previous discussions of the relations between the fauna of the eastern Sudan and the Senegalese region, the present use of the trinomial for this form appears to be sufficiently justified. Unfortunately, there have been no specimens of *C. senegalensis senegalensis* available for comparison. The nearest record of *lævigatus* is that of Werner in the Lado (1907, p. 1862).

It is of interest that Nieden (1910, p. 239) records *senegalensis* from the Lake Chad region.

Thirty-nine specimens were secured by the present expedition in the upper Uele region. A. M. N. H. Nos. 11392–94 (January–March 1912), 11401–4 (October 1912), 11405–6 (January 1913), are from Faradje; 11398 (March 1912), 11399 (May 1912), 11400 (June 1912), Garamba; 11373–91 (November 1910), Niangara; 11407–11 (August 1913), Poko; 11395–97 (November 1911), Yakuluku.



Map 21. Distribution of *Chamæleon senegalensis*.
□ *Chamæleon senegalensis senegalensis.*
○ *Chamæleon senegalensis lævigatus.*

The series is uniform in most characters. The largest male measures 200 mm., body length 103 mm.; the largest female 218 mm., body 120 mm. The tail length is variable, ranging from .41 to .52 of the total, mean .46. The mean tail length in males is .47, in the females .44 of the total.

The colors are obscure (in formalin material) and the dark lateral lines, regarded as characteristic by Werner (1911, p. 18) are discerned in only a few specimens. The alcoholic specimens in the series may be arranged serially to show progressive color changes.

I.— Uniform dark green, limbs lighter beneath. Ventral crest yellow, light lateral lines scarcely discernible.
II.— Much lighter, greenish gray. Ventral crest yellow.
III.— Light bluish green, darker on the vertebral line, limbs white beneath, ventral crest white. Two distinct light lateral bands, with indications of black pigmentation.
IV.— Uniform gray. Skin between the scales white; limbs gray beneath, ventral line white. Lateral lines distinct, white posteriorly, merging into the gray body color anteriorly.
V.— Ground color light gray, lateral lines white, rest of body spotted all over with darker gray, spots about equalling the interspaces.
VI.— White, no lateral light lines. Irregular isolated black marks on the vertebral line, a smudge of black on each side, elbows and knees black.

A juvenile specimen, apparently just out of the egg, is greenish gray over all, with two light lateral lines distinct.

No. 11401, taken October 4, contained 16 + 20 eggs about 6 mm. in diameter. All other specimens examined in this respect (Nov.–March) contained undeveloped eggs.

The stomachs of Nos. 11375, 11382, and 11388 contained grasshopper remains and parasitic worms which may have been parasites of the grasshoppers; of No. 11392, fragments of millipedes (Julidæ) and various insect remains.

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♂	12	155–200	175.0 mm.
	♀	18	170–218	192.1 mm.
	Juv.	9	52–122	102.4 mm.
Body	♂	12	85–106	92.6 mm.
	♀	18	90–120	106.6 mm.
	Juv.	9	27–66	54.4 mm.
Tail	♂	12	70–97	83.2 mm.
	♀	18	73–98	85.5 mm.
	Juv.	9	25–58	48.0 mm.
Tail/Length	♂	12	.45–.52	.475
	♀	18	.41–.49	.44
	Juv.	9	.45–.48	.47
Arm	♂	12	36–45	40.8 mm.
	♀	18	40–51	46.1 mm.
	Juv.	9	12–31	22.5 mm.

	Sex	No. of Specimens	Extremes	Average
Leg	♂	12	35–43	38.6 mm.
	♀	18	39–52	44.3 mm.
	Juv.	9	11–27	21.7 mm.
Head Length	♂	12	22–28	24.2 mm.
	♀	18	24–30	24.2 mm.
	Juv.	9	8.5–19	15.7 mm.
Snout to Angle of Mouth	♂	12	14–18	16.0 mm.
	♀	18	17–21	18.4 mm.
	Juv.	9	6–13	10.4 mm.
Angle of Mouth to Occiput	♂	12	12.5–16.0	13.9 mm.
	♀	18	14.0–19.0	15.7 mm.
	Juv.	9	5–11.5	9.4 mm.
Greatest Width of Head	♂	12	7.5–10 0	8.8 mm.
	♀	18	7 5–11.0	9.4 mm.
	Juv.	9	3 0–8.0	6.0 mm.

"These chameleons may be found everywhere in the savannah; most of those collected were taken from bushes near swamps, watercourses, and plantations. Vegetation is denser during the rainy season and few chameleons are seen then, but in the dry season (January to March), when the bareness of the brush facilitates their discovery, many were gathered, proving that this species does not estivate. They change from dark green to pale yellow and from greenish brown to greenish gray, colors not always in harmony with the surroundings. The series of dark spots, which may form lateral lines, is more definite in life than in the preserved specimens (Plate XXX, Fig. 2)" [H. L.].

Chamæleon owenii (Gray)

Plate XXXI, Figure 1; Plate XXXII, Figure 6; Map 22

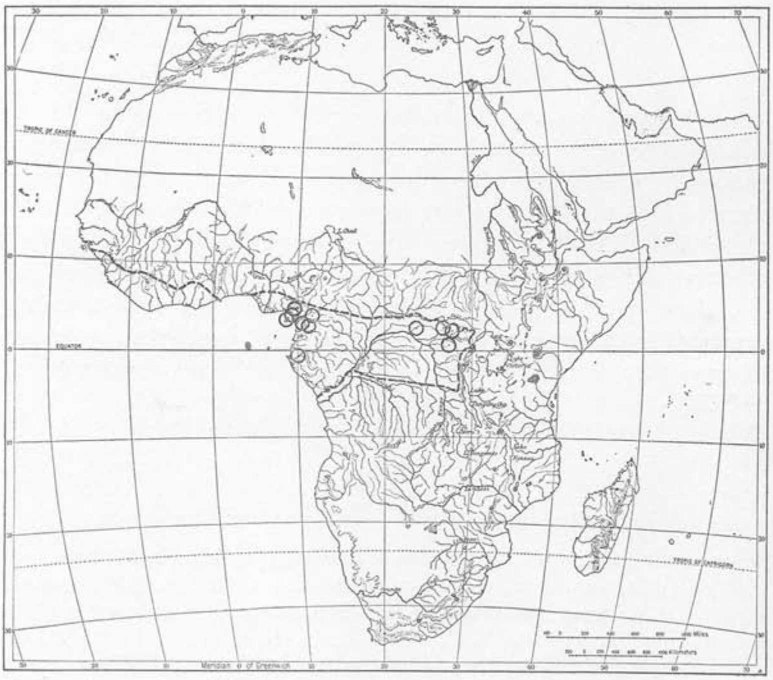
Chamæleo owenii Gray, 1831, in Griffith, Cuvier's Anim. Kingd., IX, Syn., p. 54; [1831, Zool. Misc., p. 7, Pl. iv]; 1845, Cat. Lizards, p. 269. Buchholz, 1874, Monatsber. Akad. Wiss. Berlin, p. 85.

Chamæleon owenii Boulenger, 1887, Cat. Lizards, III, p. 470. Mocquard, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 5. Sjöstedt, 1897, Bihang Svenska Vetensk. Akad. Handl., XXIII, part 4, No. 2, p. 20. Werner, 1899, Verh. Zool.-Bot. Ges. Wien, XLIX, p. 133. Boulenger, 1900, Proc. Zool. Soc. London, p. 451. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 676. Werner, 1902, Zool. Jahrb. (Syst.), XV, p. 405. Johnston, George Grenfell and the Congo, II, p. 950. Müller, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 592. Werner, 1911, Chamæleontidæ, p. 34. Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 259.

Chamæleon owenii cristatus Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 259.
Chamæleon mitchelli Müller, 1913, Zool. Anz., XLI, p. 230.

Thirty specimens in the collection: A. M. N. H. No. 11429 (September 1913) is from Akenge; 11440 (January 1910), Bafwabaka; 11441, Ituri Forest; 11412–21 (April–May 1910), 11422–24 (August 1910), 11425–26 (September 1910), 11427–28 (October 1910), 11430–31 (April 1914), 11432–34 (June 1914), 11435–39 (July 1914), Medje.

This species, hitherto recorded from the Upper Congo region only in the single specimen described as *Chamæleon mitchelli* by Müller (1913, p. 230), is one of the most distinctive of the forms characteristic of the forest area. It has not been recorded west of Kamerun.



Map 22. Distribution of *Chamæleon owenii*, a chameleon characteristic of the Forest Province.

The largest male measures 330 mm., body 148 mm.; the largest female 338 mm., body 144 mm. The tail length varies from .55 to .60 of the total, mean .58, the sexes being scarcely distinguishable in this respect. The longest rostral horn measured is 20 mm., and the preorbital horns usually equal the rostral.

The type of *Chamæleon mitchelli* Müller (1913, p. 230) was taken at Gô, in the Uele district, about two hundred miles west of the area reached by the present expedition, within the limits of the continuous forest. It is differentiated from *Chamæleon owenii* in the following points: (1) legs somewhat longer and stouter; (2) occipital lobes larger and more widely separate; (3) dorsal scales somewhat larger and slightly enlarged scales scattered on the limbs; (4) diameter of orbit nearly equalling its distance from snout to occiput; (5) lateral and parietal crests more strongly developed; lateral crests rising from the orbits at an angle with the direction of the mouth (parallel with it behind the orbits in *owenii*); lateral crests converging from the orbits, parallel or divergent anteriorly in *owenii;* and (6) interorbital region more deeply concave.

Three male *owenii* from Kamerun in the collection of The American Museum of Natural History, and another from Kribi, loaned by the Museum of Zoology of the University of Michigan, have been available for comparison with the Ituri series.

The measurements show that the limbs are of approximately the same length, the figures for the West African specimens falling within the limits of variation of the eastern series.

The development of the occipital lobes is highly variable in the Ituri series; they may be separated by only a very shallow notch or by a deep nearly square emargination; and again, the lobes of the specimens from Gaboon are between the extremes in the larger series.

Sternfeld (1912, p. 259) has shown that *owenii* has slightly heterogeneous scales, and has, in fact, named a new variety to represent the extreme development in this direction. The three Gaboon specimens examined exhibit this characteristic which is about as well developed in the Ituri specimens.

The diameter of the orbit proves to be of relatively the same size in eastern and western specimens.

The lateral and parietal crests are developed to about a similar extent in both series, the parietal crest being especially variable. The convergence of the lateral crests, viewed from above, is as described for *mitchelli,* and the angle with the direction of the mouth also appears more pronounced.

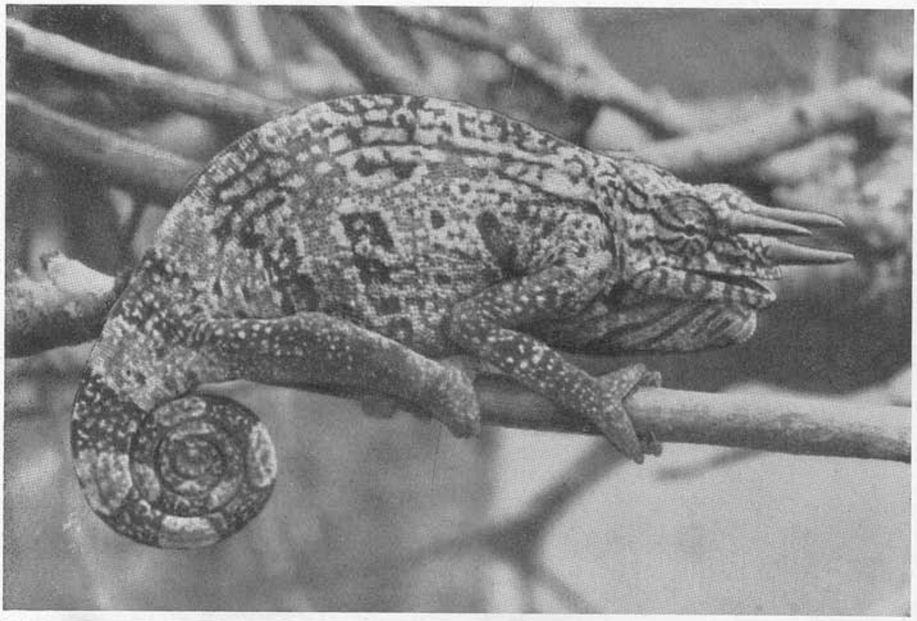
Finally, the interorbital region is more deeply concave and narrower in the eastern specimens, although subject to considerable variation.

Passing over minor distinctions, which also prove untenable (scales of temporal region, enlarged supralabials, etc.), it will be observed that the validity of *mitchelli* rests on the slender basis of two comparative characters, the convergence and slope of the lateral crests and the concavity of the interorbital region. These differences appear so slight to the present writer

PLATE XXXI

Figure 1. *Chamæleon owenii* Gray. A. M. N. H. No. 11425; ♂; length 303 mm.

Figure 2. *Chamæleon iturensis*, new species. A. M. N. H. No. 11494; ♀; length 213 mm.



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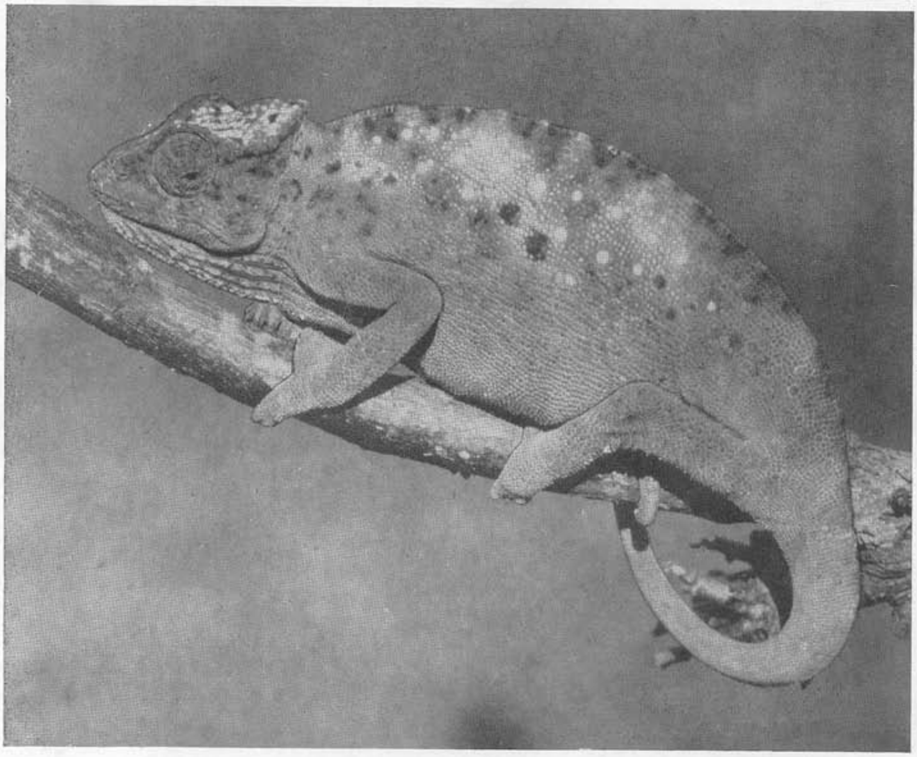

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that, pending the examination of a larger series of West African *owenii*, *mitchelli* is placed in the synonymy. The relation would be so close that intergradation may be postulated, making *mitchelli*, at most, an eastern subspecies.

Chamæleon owenii cristatus Sternfeld (*loc. cit.*) is not geographically distinct and, in the writer's opinion, is invalid. In any case, the subspecific name *cristatus* is preoccupied by *C. cristatus* Stutchbury.

The ovaries of No. 11412 had undeveloped eggs; of No. 11413, 7 + 8 eggs, 20 × 11 mm.; of No. 11429, 8 + 9 eggs, 18 × 10 mm.

The stomach of No. 11429 contained a cockroach and three millipedes (Julidæ).

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♂	13	250–330	293.1 mm.
	♀	15	235–338	307.0 mm.
Body	♂	13	110–148	125.3 mm.
	♀	15	99–144	130.4 mm.
Tail	♂	12	138–186	171.2 mm.
	♀	15	136–197	176.5 mm.
Tail/Length	♂	12	.55–.60	.58
	♀	15	.55–.60	.57
Arm	♂	13	48–58	53.3 mm.
	♀	15	42–60	55.1 mm.
Leg	♂	13	44–59	52.6 mm.
	♀	15	43–61	55.3 mm.
Head Length	♂	13	29–37	32.8 mm.
	♀	15	27–37	34.1 mm.
Snout to Angle of Mouth	♂	13	20–25	22.3 mm.
	♀	15	18.5–25	23.5 mm.
Angle of Mouth to Occiput	♂	13	18–23	20.5 mm.
	♀	15	16.5–23	21.2 mm.
Orbital Width	♂	13	10–12.5	11.0 mm.
	♀	15	9–13	11.5 mm.
Greatest Width of Head	♂	13	12–17	14.4 mm.
	♀	15	12–17	15.6 mm.

On Plate XXXII, Fig. 6, is reproduced an excellent water-color of this species, as made in the field by Mr. J. P. Chapin.

"The variety of color phases is greater than in other species which we met. These changes are not instantaneous but progressive, however rapid the transformation, and during all of them the creatures show the large, irregular, interrupted, black cross-bars, four on each side of the body, the last above the anal region. Green in all shades, brown, white, and yellow are the predominating colors; great excitement causes mottlings of bright reddish brown to appear. There is a more or less distinct light mid-ventral line and about ten dark longitudinal lines on the throat, corresponding to the gular folds. The limbs are usually darker than the general color, green or strongly mottled with black. The spherical eyelid is always more brilliantly colored above, green or yellow; white or gray below, with radiating brown lines which are reddish above. The upper surface of the head is reddish brown. Iris golden, but scarcely visible. As in other species, the eyeballs are turned backward and forward or up and down quite independently of each other.

"The three horns of the male, two in front of the eyes and one projecting still further from the nose are quite striking, although the females show no trace of such adornment. The total length of this species, often as much as 13 inches in both sexes, makes it by far the largest species we saw in the Rain Forest; the typical color pattern, excitable nature, and relative swiftness of movements are equally noticeable distinctions. They jump from branch to branch, chiefly downward, with considerable accuracy, for as much as two feet. They spring to the ground from any height, usually land on their feet, and walk off rapidly with tail straight in the air or spirally coiled. *C. owenii* moves with ease on either the upper or lower surface of tiny twigs. It sits motionless for hours in the shade, often anchored to a twig by the tail, which is very prehensile and so strong that the tip alone is sufficient to support the animal. Dangling in this way they may swing to another twig or bend the body forward and clamber up on the tail to the supporting branch.

"Our captives often moved close to skeletons laid in the sun to dry and fed on the flies, butterflies, beetles and bees swarming thereon; the tongue was then shot out more than a foot at the selected prey, always with unfailing accuracy. Stomach contents showed that grasshoppers, roaches and millipeds were also taken; in three instances bits of leaves had been swallowed, probably by accident in anger. When held in the hand they usually hiss hoarsely, inflating the body until the skin appears stretched to the utmost, and with surprising rapidity and quite unexpectedly snap at one's finger, biting with force. When taken behind the neck they lash the tail and scratch one's hand with their little claws.

"These chameleons are not rare and occur for the most part in bushes along forest paths and in the second growth of deserted plantations. Far from seeking concealment by remaining still when approached by the natives, they hiss and actually jump from a branch in a rage. The Mangbetu, Medje, Makere, and some of the Azande believe this to be an omen announcing sudden death; part of the smoked and burned body is worn as a talisman, warding off immediate calamity, though all agree that a man warned thus will never reach old age. No native would ever touch one, preferring to use a rod and noose, which is passed over the head and keeps the animal at a safe distance. Others are warned not to approach at such a time, as it would be a grave offense if the chameleon should happen to hiss at anyone" [H. L.].

Chamæleon ituriensis, new species

Plate XXXI, Figure 2; Plate XXXII, Figures 1 to 5

?*Chamæleon johnstoni affinis* STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 262, Pl. VII, fig. 3.

The common chameleon of the Ituri region, apparently an undescribed species, is represented in the collection by ninety-nine specimens, eighty-four females and fifteen males: A. M. N. H. No. 11540 (March 1914) is from Avakubi; 11442 (September 1909), Batama; 11445–70 (February 1910) Gamangui; 11443–44 (January 1910), 11471–80 (April 1910), 11481–83 (August 1910), 11484–93 (September 1910), 11494–508 (April 1914), 11509–22 (June 1914), 11523–39 (July 1914), Medje.

Diagnostic characters

Habitus rather slender, tail slightly shorter than the body or equal in length. Casque somewhat elevated behind, parietal crest distinct. Lateral crests strong. Occipital lobes indicated. No dorsal, gular, or ventral crest. Dorsum compressed, wavy in outline. Squamation heterogeneous. A mid-ventral light line.

Detailed description

Type: No. 11490.

Habitus moderately slender, tail .51 of the total length. Length of mouth exceeds the distance from its angle to the occiput. Casque considerably narrowed at the orbits.

Casque sharply angular, canthus distinct. Orbits raised, their diameter equaling the distance from their anterior border to the snout, slightly less than from their posterior border to the occiput. Lateral crest horizontal or slightly descending behind the orbit, then rising abruptly to meet its fellow. Parietal crest well developed, short, reaching forward as far as the posterior border of the orbits. Temporal crest slightly developed. Occipital lobes indicated, immovable.

No dorsal crest. Vertebral line more or less compressed, wavy in outline from the side, with a row of undifferentiated flat scales on each side. No gular or ventral crest. Median gular scales much smaller than the ventral. Enlarged conical tubercles at intervals along the gular folds.

Squamation heterogeneous, the enlarged flat scales arranged in irregular longitudinal lines, equaling in diameter two or three of the smaller scales. Latter flat on back and sides, convex ventrally.

No tarsal spur. No preorbital or nasal horn. An enlarged subconical tubercle on the juncture of the *canthi rostrales*, no trace before the orbits.

Coloration of formalin specimens is uniform dark gray with a mid-ventral light line beginning between the arms and continuing to the anus, two scales wide. The coloration in life has been beautifully illustrated in Mr. Chapin's series of color sketches made in the field to show the range of color change (Pl. XXXII).

Measurements of the type: length, 181; body, 89; tail, 92; tail/length, .50; arm, 36; leg, 36; length of head, 26; snout to angle of mouth, 18; angle of mouth to occiput, 15; width of casque at eyes, 9; greatest width of casque, 11 mm.

The males are much smaller than the females, which may in part account for the great preponderance of females in the series (eighty-four out of ninety-nine). The largest male measures 185 mm.; body 94 mm.; the largest

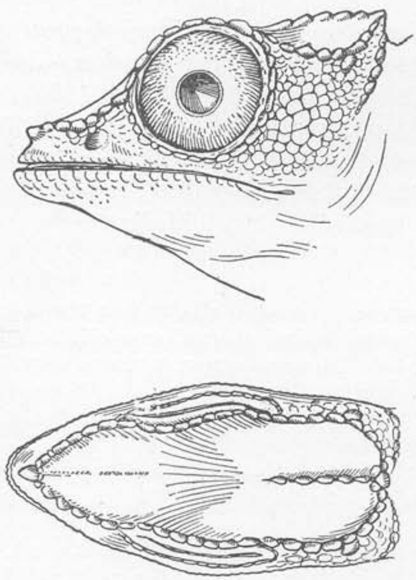


Fig. 25. Head of *Chamæleon iturienis*, (type, 11490 × 2).

female 248 mm., body 122 mm. The tail length varies from .44 to .53 of the total, mean in the females .49, in the males .50.

The temporal crest is more or less distinct. The condition of the specimens has much to do with the distinctness of the rudimentary occipital lobes, which are entirely invisible in shrunken specimens. The area on each side of the parietal crest (above the supratemporal fossa) appears to be normally convex but is plane or concave in many specimens, also probably due to conditions of preservation. The enlarged tubercle on the snout is frequently double instead of single, often scarcely discernible, and is equally developed in both sexes.

It is with considerable hesitation and only tentatively that Sternfeld's subspecies *affinis* of *C. johnstoni* (1912, p. 262, Pl. VII, fig. 3) is referred to the present form. Of his specimens, the large female figured came from the forest northwest of Lake Tanganyika, while the juvenile male came from the Irumu-Mawambi forest, i. e., from the Ituri region. In the figure, the female specimen appears to be much stouter; the limbs appear to be thicker than in the form here described; and the canthus rostralis does not correspond in outline; the posterior part of the casque is similar, but the orbit is less raised.

Whatever the affinities of the female, there seems to be considerable probability that the young male from the Ituri (included under the same head) belongs in reality to *C. ituriensis*, the most abundant Ituri chameleon, and it is indistinguishable from Sternfeld's brief description. Reference to Boulenger's figure of *C. johnstoni* shows that the present form is not closely related. A male specimen of *johnstoni* in the Harvard Museum of Comparative Zoology (No. 7257), no larger than the males of the present series, has well-developed horns. It may be remarked that the subspecific name *affinis* is preoccupied by *C. affinis* Rüppell.

Chamæleon camerunensis Müller is the only West African form with which *ituriensis* may be compared. The present form is at once distinguished by its stouter habitus, higher casque, shorter tail, and less serrated vertebral line. (Müller, 1910, Abh. Bayerischen Akad. Wiss., 2 Kl., XXIV, p. 592, Pl. I, fig. 5). *C. camerunensis* lacks the parietal crest, the indications of occipital lobes, and the nasal tubercle.

Without material for comparison, it is impossible for the writer to draw any conclusion as to the relationships of the present species. It appears equally distinct from *C. johnstoni* to the east and *C. camerunensis* to the west, and must stand for the present as a form characteristic of the Ituri region.

The stomachs contained a snail (No. 11520), a spider and several crickets (No. 11446), a mantid and nymphs of Hemiptera (No. 11520), muscid flies of the genus *Pycnosoma* and various worker ants (No. 11468), and two species of ichneumons (No. 11520).

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♂	15	125–189	165.6 mm.
	♀	84	154–248	207.3 mm.
Body	♂	15	64–94	83.2 mm.
	♀	84	80–130	106.4 mm.
Tail	♂	15	61–95	82.4 mm.
	♀	84	74–126	101.8 mm.
Tail/Length	♂	14	.48–.51	.498
	♀	84	.44–.53	.488
Arm	♂	15	27–42	34.6 mm.
	♀	84	34–50	43.1 mm.
Leg	♂	15	28–40	34.1 mm.
	♀	84	32–53	43.0 mm.
Head Length	♂	15	18–28	23.9 mm.
	♀	84	23–35	29.6 mm.
Snout to Angle of Mouth	♂	15	13–18	16.4 mm.
	♀	84	16–24	20.5 mm.
Angle of Mouth to Occiput	♂	15	10.5–16.0	14.4 mm.
	♀	84	14.0–21.0	18.2 mm.
Orbital Width	♂	15	6.0–10.0	8.6 mm.
	♀	84	7.0–12.0	9.7 mm.
Greatest Width of Head	♂	15	8.5–12.0	10.6 mm.
	♀	84	10.0–16.5	13.4 mm.

"The general color in life is dark brownish green above, changing with its moods or to match the environment to light brown, grayish green and pale yellowish green. In the darkest and lightest phases the dusky markings on the head and the darker pattern on body and tail completely fade, but the rows of light round spots on the body persist in all color phases, though varying in distinctness (Plate XXXII, Figs. 1 to 5). The wrinkled skin around the eyes is usually somewhat lighter than the general color. No red or blue colors are observed in this species. When killed in a cyanide jar they become a light bronze-green.

"In the forest this species is more common than the discovery of a specimen here and there would indicate. Occasionally one is seen creeping along a pathway; but during the day they perch on tiny twigs in the lower bushes and are made out only with difficulty in the maze of green foliage. We never saw one jump from twig to twig, and, on the whole, they are much slower in movement and of a less excitable temper than *C. owenii*, yet their manner of progressing is the same, the tail being equally prehensile. Although they do not hiss, they are greatly feared by the superstitious natives" [H. L.].

Chamæleon adolfi-friderici Sternfeld

Text Figure 26

Chamæleon adolfi-friderici Sternfeld, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 258.

This small species, described from the Ituri Forest, is represented in the present collection by four specimens, a male and three females. Having been described originally from a single female specimen, a more complete definition of the species is now possible. A. M. N. H. Nos. 11541–42 (March 1910), 11543 (April 1910), 11544 (June 1914) are from Medje.

Fig. 26. Lateral view of *Chamæleon adolfi-friderici* with dorsal view of head. (11541, × 1.75).

The chief characteristics, from the original description, are absence of dorsal, gular, and ventral crests; homogeneous squamation; temporal crests convergent, uniting; parietal crest of isolated pointed tubercles; enlarged conic scales on the canthus rostralis; and small size.

The scales of the body, while not heterogeneous as in *C. bitæniatus*, for example, consist of scales of varying size, smaller and larger usually grouped together. The dorsal crest is discernible only by the closest attention in one of the specimens, but is very evident in the male, consisting of isolated low-conic tubercles, five to ten in number, on the anterior third of the dorsum. The temporal crests rise obliquely from the orbit in one specimen (as described in the type), but in the others run horizontally for three mm. before rising and converging, consisting of six rather large conic scales on each side. The parietal crest consists of pointed tubercles, the anterior isolated and in pairs, i. e., parietal crest forked; three tubercles in the main line and one or two in each of the forks. The conical scales on the canthus rostralis are equally developed in the male and female.

The largest specimen measures 134 mm., with a body length of 57 mm. The tail length varies from .54 to .57 of the total, .53 in the type.

The species was not distinguished in the field from juvenile *C. ituriensis*, and the color of the formalin specimens, which is uniform gray, light gray in one specimen, very dark gray in the remaining three, affords no information as to the coloration in life.

The eggs of the largest female are well developed, three in number.

Measurements

A. M. N. H. No.	11541	11542	11543	11544	Type (Berlin)
Sex	♂	♀	♀	♀	♀
Length	131	112	132	134	116 mm.
Body	56	51	57	57	54 mm.
Tail	75	61	75	77	62 mm.
Tail/Length	.57	.54	.57	.57	.53
Arm	23	21	24	24 mm.	
Leg	21	21	22	23 mm.	
Head Length	15.5	15	15	16 mm.	
Mouth	10.5	10.5	12	11 mm.	
Angle of Mouth to Occiput	10	9	10	10 mm.	
Breadth at Orbit	5	5	6	5 mm.	
Greatest Breadth	9	7	9	9 mm.	

"In the field we considered this species the young of *C. ituriensis*. Through interest in the breeding habits of chameleons we offered a high reward to any native who could show us either a nesting place or the very young. The relatively few specimens of *C. adolfi-friderici* secured prove how scarce the species must be. The natives assured us, however, that chameleons deposit their eggs in the humus under moldering logs or in the hollows of decaying trees" [H. L.].

Rhampholeon Günther

Rhampholeon boulengeri Steindachner

Plate XXX, Figure 3; Plate XXXII, Figures 7 and 8

Rhampholeon boulengeri STEINDACHNER, 1911, Anz. Akad. Wiss. Wien, No. 10, p. 178. WERNER, 1911, Chamæleontidæ, p. 46. STERNFELD, 1912, Wiss. Ergeb. Deutsch. Zentr. Afrika Exp., IV, p. 262, Pl. VII, fig. 4. NIEDEN, 1913, Mitt. Zool. Mus. Berlin, VII, p. 99.

Rhampholeon boulengeri is the common representative of the genus in the Ituri Forest. It had already been recorded from the border of the Rain Forest by Sternfeld (1912, p. 262) but has hitherto been known chiefly from the lake region. The present collection contains sixty-three specimens, all, curiously, females: A. M. N. H. Nos. 11545–71 (April–May 1910), 11572–73 (September 1910), 11576 (April 1914), 11577–93, 11607 (June 1914), 11594–606 (July 1914) are from Medje; 11574–75 (August 1913), Poko.

The species is closely related to *R. spectrum* of the western forest region. The spinose scales of the plantar surfaces are often distally enlarged, an approach to the condition in *spectrum*, which is probably to be derived from an East African parent stock by the way of *boulengeri*.

The largest of the present series reaches a length of 79 mm., tail length 17 mm. The average, excluding three obviously immature specimens, is 70 mm. The tail length varies from .17 to .25 of the total, mean .20. Boulenger (1887, Cat. Lizards, III, p. 476) and Werner (1911, p. 46) record 75 mm. and 18 mm. tail length in females of *spectrum*, while a female in The American Museum of Natural History measures 77 mm. with a tail length of 21 mm. Although the difference in this respect is relatively slight, it appears that *R. spectrum* is a larger species with a longer tail. It will be observed that Sternfeld's series of nine specimens from the lake region differs strikingly in size from the present specimens. He records a range in size in the males from 57.5 to 63 mm., in the females from 50 to 61 mm., and evidently was dealing with mature individuals. It is not improbable that further study may make it possible to differentiate the Ituri form from that of the lake region, possibly as a subspecies.

The rostral appendage varies in length from .4 to 1.3 mm., 2 to 2.3 in *R. spectrum*.

The field notes record the coloration as usually dark or light brown, occasionally changing to ashy gray, but invariably with two oblique black cross-bands on each side.

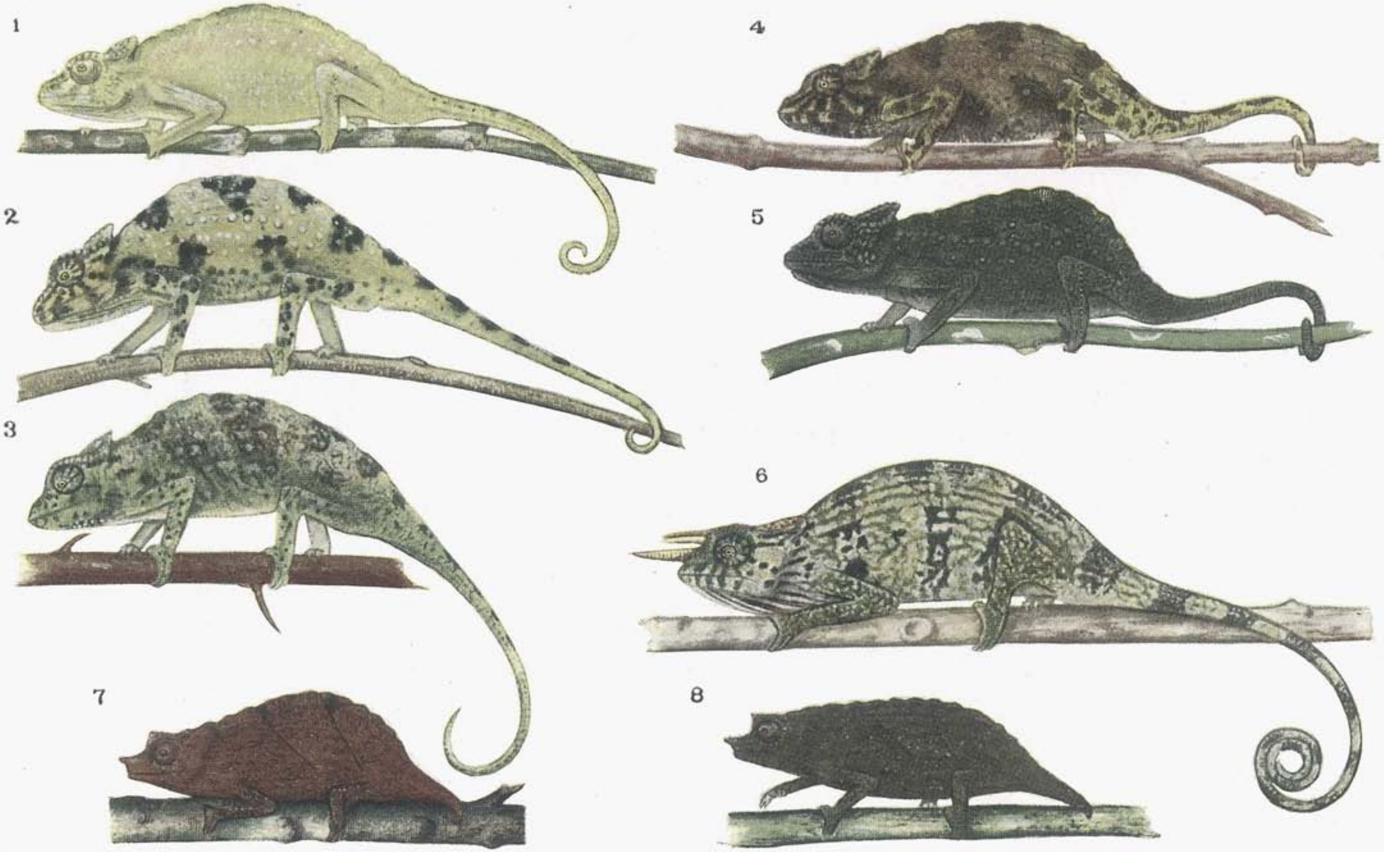
The ovaries observed in American Museum specimens contained eggs as

Plate XXXII

Figures 1–5. Successively darker color phases in *Chamæleon ituriensis*, new species. A. M. N. H. Nos. 11521–22; length 196 and 234 mm.

Figure 6. *Chamæleon owenii* Gray. A. M. N. H. No. 11439; ♂; length 250 mm. The color usually assumed in bright sunlight.

Figures 7–8. Two color phases of *Rhampholeon boulengeri* Steindachner. A. M. N. H. No. 11607; ♀; length 65 mm.



Figures 1-5. Successively darker color phases in *Chamæleon ituriensis* Schmidt

Figure 6. *Chamæleon owenii* Gray

Figures 7-8. Extremes of color change in *Rhampholeon boulengeri* Steindachner follows. Captured during April and May: No. 11545, 1 + 1 eggs, 4 mm.; No. 11547, 1 + 1 eggs, 5 mm.; No. 11548, 1 + 0 eggs, 13 × 8.2 mm., uniform oblong-oval, striate. Captured during June and July: No. 11582, 1 + 1 eggs, 6 mm.; No. 11593, 1 + 1 eggs, 7 mm.; No. 11605, 1 + 1 eggs, 12 × 7 mm. Captured September: No. 11573, 2 + 1 eggs, 12 × 7 mm.

The stomachs contained spiders (No. 11601), nymphal cockroaches (Nos. 11593 and 11601), a nymphal cricket (No. 11568), a grasshopper (No. 11591), a heteropteron (No. 11594), and caterpillars (No. 11568).

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length	♀	63	46–79	69.3 mm.
Body	♀	63	37–62	55.2 mm.
Tail	♀	63	9–17	14.0 mm.
Tail/Length	♀	63	.17–.25	.20
Arm	♀	63	15–24	21.6 mm.
Leg	♀	63	15–24	21.6 mm.
Head Length	♀	63	12–18	16.2 mm.
Snout to Angle of Mouth	♀	63	7.5–11.0	10.3 mm.
Angle of Mouth to Occiput	♀	63	8–12	10.8 mm.

"The dwarfed appearance of the tiny, stump-tailed forest chameleons, which seldom become more than 3 inches in length, at once distinguishes them from other species. They would hardly be so well represented in our collection were it not for their liking for sunny clearings, especially plantations, where the natives cannot fail to find them when working. With color phases restricted to changes from dark greenish brown to reddish brown and pale gray (Plate XXXII, Figs. 7 and 8; Plate XXX, Fig. 3), their adaptability to the environment at first appears to be more limited than that of other forms observed. Yet when sitting or climbing on branches, dry banana leaves, logs and even the ground, they are indistinguishable from their surroundings. In forest regions, where leaves of all sizes and shapes attract little attention, the strongly curved, irregular outline of the back, the dull shriveled skin with the two peculiar dark markings suggesting the venation of a leaf, make the simulation perfect in every color phase. At the slightest noise they usually stop in any position, even with one front and one hind leg lifted, and may remain motionless for hours. The short tail, although of slight use, is often bent to secure purchase on any available roughness. When annoyed they do not hiss but inflate themselves considerably and feign death. Their food consists of a great variety of insects; spiders and caterpillars are occasionally taken" [H. L.].

APPENDIX A.—LISTS OF THE TURTLES, CROCODILES, LIZARDS, AND CHAMELEONS

The Rain Forest

Testudinidæ

1. *Kinixys erosa* (Schweigger)
2. *Kinixys homeana* Bell

Pelomedusidæ

3. *Pelusios derbianus* (Gray)
4. *Pelusios niger* (Duméril and Bibron)
5. *Pelusios gabonensis* (A. Duméril)

*6. *Pelomedusa galeata* (Schoepff)[1]

Trionychidæ

7. *Amyda triunguis* (Forskål)
8. *Cycloderma aubryi* (A. Duméril)

Crocodylidæ

9. *Crocodylus cataphractus* Cuvier
10. *Crocodylus niloticus* Laurenti
11. *Osteolæmus tetraspis* Cope
12. *Osteoblepharon osborni,* new species

Geckonidæ

*13. *Stenodactylus elegans* Fitzinger
14. *Gonatodes dickersoni,* new species
15. *Ancylodactylus spinicollis* L. Müller
*16. *Phyllodactylus porphyreus* (Daudin)
17. *Diplodactylus palmatus* (Mocquard)
18. *Diplodactylus weileri* L. Müller
*19. *Hemidactylus mabouia* (Moreau de Jonnès)
20. *Hemidactylus ansorgii* Boulenger
21. *Hemidactylus muriceus* Peters
22. *Hemidactylus steindachneri* Tornier

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[1] Species marked with asterisk are regarded as accidental in the forest, as importations, or as invaders, characteristic of a different province.

*23. *Hemidactylus brookii* Gray
24. *Hemidactylus echinus* O'Shaughnessy
25. *Hemidactylus fasciatus* Gray
26. *Hemidactylus ituriensis*, new species
27. *Hemidactylus richardsoni* (Gray)
*28. *Lygodactylus capensis* (Smith)
29. *Lygodactylus fischeri* Boulenger
30. *Lygodactylus conraui* Tornier
31. *Lygodactylus depressus*, new species

Agamidæ

*32. *Agama colonorum* Daudin
33. *Agama mehelyi* Tornier
*34. *Agama atricollis* Smith

Varanidæ

35. *Varanus niloticus* (Linnæus)

Amphisbænidæ

36. *Amphisbæna bifrontalis* Boulenger
37. *Amphisbæna liberiensis* Strauch
38. *Amphisbæna haugi* Mocquard
39. *Chirindia schæferi* Sternfeld
40. *Anopsibæna africanus* (Gray)
41. *Monopeltis boveei* Mocquard
42. *Monopeltis galeata* (Hallowell)
43. *Monopeltis jugularis* Peters
44. *Monopeltis koppenfelsii* (Strauch)
45. *Monopeltis magnipartita* Peters
46. *Monopeltis unirostralis* Mocquard

Lacertidæ

47. *Poromera fordi* (Hallowell)
48. *Lacerta echinata* Cope
49. *Lacerta langi*, new species
50. *Lacerta vaueresellii* Tornier
51. *Bedriagaia tropidopholis* Boulenger
52. *Algiroides africanus* Boulenger
*53. *Eremias guineensis* Boulenger
54. *Holaspis guentheri* Gray

Scincidæ

55. *Mabuya maculilabris* (Gray)
56. *Mabuya polytropis* Boulenger
57. *Mabuya raddoni* (Gray)
58. *Mabuya bensonii* (Peters)
59. *Lygosoma reichenowii* Peters
60. *Lygosoma vigintiserierum* Sjöstedt
61. *Lygosoma gemmiventris* Sjöstedt
62. *Lygosoma rohdei* L. Müller
63. *Lygosoma breviceps* (Peters)
64. *Lygosoma fernandi* (Burton)
65. *Melanoseps occidentalis* (Peters)

Anelytropidæ

66. *Feylinia elegans* (Hallowell)
67. *Feylinia currori* Gray

Chamæleontidæ

*68. *Chamæleon gracilis* (Hallowell)
*69. *Chamæleon dilepis* (Leach)
70. *Chamæleon adolfi-friderici* Sternfeld
71. *Chamæleon owenii* (Gray)
72. *Chamæleon unicornis* Mocquard
73. *Chamæleon quadricornis* Tornier
74. *Chamæleon pfefferi* Tornier
75. *Chamæleon montium* (Buchholz)
76. *Chamæleon cristatus* Stutchbury
77. *Chamæleon wiedersheimi* Nieden
78. *Chamæleon ituriensis,* new species
79. *Chamæleon camerunensis* L. Müller
80. *Rhampholeon spectrum* Buchholz
81. *Rhampholeon boulengeri* Steindachner

The Sudanese Subprovince[1]

Testudinidæ

1. *Kinixys belliana* Gray
2. *Testudo calcarata* Schneider
3. *Testudo pardalis* Bell

Pelomedusidæ

4. *Pelusios adansonii* (Schweigger)
5. *Pelusios derbianus* (Gray)
6. *Pelusios niger* (Duméril and Bibron)

[1] Khartum, Sennar, White Nile, Lake Chad, Togo, and Senegal.

7. *Pelusios nigricans* (Donndorff)
8. *Pelomedusa galeata* (Schœpff)

TRIONYCHIDÆ

9. *Cyclanorbis elegans* (Gray)
10. *Cyclanorbis oligotylus* Siebenrock
11. *Cyclanorbis senegalensis* (Duméril and Bibron)
12. *Amyda triunguis* (Forskål)

CROCODYLIDÆ

13. *Crocodylus cataphractus* Cuvier
14. *Crocodylus niloticus* Laurenti
15. *Osteolæmus tetraspis* Cope

GECKONIDÆ

16. *Stenodactylus elegans mauritanica* Guichenot
17. *Tropiocolotes steudneri* (Peters)
18. *Gymnodactylus kotschyi* Steindachner
19. *Pristurus flavipunctatus* Rüppell
20. *Ptyodactylus hasselquisti togoensis* Tornier
21. *Hemidactylus mabouia* (Moreau de Jonnès)
22. *Hemidactylus brookii* Gray
23. *Hemidactylus stellatus* Boulenger
24. *Hemidactylus fasciatus* Gray
25. *Hemidactylus tropidolepis* (Mocquard)
26. *Bunocnemis matschiei* Tornier
27. *Lygodactylus picturatus gutturalis* (Bocage)
28. *Tarentola annularis* (Geoffroy)
29. *Tarentola senegalensis* Boulenger
30. *Tarentola ephippiata* O'Shaughnessy
31. *Tarentola delalandii* (Duméril and Bibron)

EUBLEPHARIDÆ

32. *Hemitheconyx caudicinctus* (A. Duméril)

AGAMIDÆ

33. *Agama pallida* Reuss
34. *Agama colonorum* Daudin
35. *Agama bibroni* A. Duméril
36. *Agama boulengeri* Lataste

VARANIDÆ

37. *Varanus griseus* (Daudin)
38. *Varanus exanthematicus exanthematicus* (Bosc)
39. *Varanus exanthematicus ocellatus* Rüppell
40. *Varanus niloticus* (Linnæus)

AMPHISBÆNIDÆ

41. *Amphisbœna kraussi* Peters
42. *Amphisbœna leonina* F. Müller
43. *Amphisbœna leucura* Duméril and Bibron
44. *Amphisbœna mülleri* Strauch
45. *Amphisbœna oligopholis* Boulenger
46. *Placogaster feæ* Boulenger

LACERTIDÆ

47. *Latastia longicaudata* (Reuss)
48. *Latastia siebenrocki* (Tornier)
49. *Acanthodactylus boskianus* Daudin
50. *Acanthodactylus scutellatus* Audouin
51. *Acanthodactylus vulgaris* Duméril and Bibron
52. *Ichnotropis chapini*, new species
53. *Eremias nitida nitida* Günther
54. *Eremias nitida nigerica* Klaptocz
55. *Eremias nitida garambensis*, new subspecies
56. *Eremias guineensis* Boulenger
57. *Eremias sextæniata* Stejneger

GERRHOSAURIDÆ

58. *Gerrhosaurus zechi* Tornier
59. *Gerrhosaurus flavigularis flavigularis* Wiegmann

SCINCIDÆ

60. *Mabuya maculilabris* (Gray)
61. *Mabuya raddoni* (Gray)
62. *Mabuya affinis* (Gray)
63. *Mabuya sudanensis*, new species
64. *Mabuya büttneri* Matschie
65. *Mabuya wingatii* Werner
66. *Mabuya perrotetii* (Duméril and Bibron)
67. *Mabuya quinquetæniata* (Lichtenstein)
68. *Mabuya striata* (Peters)
69. *Mabuya varia* (Peters)
70. *Lygosoma durum* (Cope)
71. *Lygosoma fernandi* (Burton)
72. *Lygosoma togoense* Werner
73. *Lygosoma kitsoni* Boulenger

74. *Lygosoma sundevallii* (Smith)
75. *Lygosoma læviceps* (Peters)
76. *Lygosoma guineense* (Peters)
77. *Lygosoma simulans* (Vaillant)
78. *Scincopus fasciatus* Peters
79. *Scincus officinalis* Laurenti
80. *Scincus albifasciatus* Boulenger
81. *Chalcides ocellatus* (Forskål)
82. *Chalcides sphenopsiformis* (A. Duméril)
83. *Chalcides de l'Islei* (Lataste)
84. *Chalcides bottegi thierryi* Tornier

CHAMÆLEONTIDÆ

85. *Chamæleon gracilis* (Hallowell)
86. *Chamæleon dilepis* (Leach)
87. *Chamæleon senegalensis senegalensis* (Daudin)
88. *Chamæleon senegalensis lævigatus* Gray
89. *Chamæleon basiliscus* (Cope)

APPENDIX B.— NOTES ON THE TYPES OF HALLOWELL'S WEST AFRICAN SPECIES IN THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, NOT INCLUDED IN THE FOREGOING REPORT

Monopeltis galeata (Hallowell)

Phractogonus galeatus HALLOWELL, 1852, Proc. Acad. Nat. Sci. Phila., VI, p. 62, figs.; 1857, IX, p. 50. DUMÉRIL, A., 1856, Rev. Mag. Zool., (2) VIII, p. 424; 1861, Arch. Mus. Hist. Nat., X, p. 184.
Lepidosternon galeatum STRAUCH, 1883, Bull. Acad. Sci. St. Pétersbourg, XXVIII, p. 121.
Monopeltis galeata BOULENGER, 1885, Cat. Lizards, II, p. 457.
Lepidosternon dumerilii STRAUCH, 1883, Bull. Acad. Sci. St. Pétersbourg, XXVIII, p. 121.
Monopeltis dumerilii BOULENGER, 1885, Cat. Lizards, II, p. 457.
?*Monopeltis unirostralis* MOCQUARD, 1903, Bull. Mus. Hist. Nat. Paris, p. 210.

The type (No. 9684) and two paratypes of this species have been examined. Boulenger, in quoting Hallowell's description, questions the number of mandibular teeth, stated to be 5–5. In the type, the base of a sixth, which has been broken away, can be distinguished, and six are present in the paratypes. In 1857 Hallowell states that his drawing of the nasals was incorrect, but does not leave the description quite clear. Instead of being in contact, as in the figure, they are well separated by a rostral, which in the type is longitudinally divided by an impressed line; the error in drawing is obviously due to the faintness of the sutures between the nasals and rostrals and to the more distinct median line. The rostral is especially distinct in the two paratypes. I follow Hallowell's correction of the original locality (Liberia), which is stated in 1857 to be Gaboon.

Eleven, possibly twelve, species of this genus have been described from the region including Kamerun and the Lower Congo. Two of these appear to be closely allied to the species in question, whose distinction rested chiefly on the approximated nasals. The specimens on which *dumerilii* Strauch was founded were previously referred to Hallowell's species by Duméril and were differentiated by Strauch on the basis of the rostral and the presence of a narrow bandlike plate between the two large head shields. Mocquard (1903, Bull. Mus. Hist. Nat. Paris, p. 211), in describing two species allied to *dumerilii*, states that Strauch's narrow cross shield between the two large ones of the head is erroneous, based on the somewhat raised condition of the anterior border of the posterior head shield. This condition is partially developed in the type and still more so in one of the paratypes of *galeata* (No. 9682), as Strauch had rightly inferred from the figure. The distinction of *dumerilii*, then, is confined to the slightly greater number of body rings (210–214, *galeata;* 224–225, *dumerilii*) and seven premaxillary teeth in place of four (or five ?) in *galeata*, in which there are three maxillary and at least two premaxillary on each side. Mocquard (*loc. cit.*) fails to give the tooth formula and his *unirostralis* is distinguishable from *galeata* only by the somewhat fewer (195) body rings. Hallowell's specimens are intermediate between *unirostralis* and *dumerilii*.

Measurements and Scale Characters

Phila. Acad. No.	9682	9683	9684
Length	487	390	421 mm.
Head	15	12	11 mm.
Tail	40	36.5	36 mm.
Annuli to Base of Pectorals	8	8	9
Body Annuli	216	210	214
Tail Annuli	19	19	18
Longitudinal Segments	12 8	10 8	10 8
Preanal Pores	1–1	1–1	1–2
Anal Segments	6	6	6

Poromera fordi (Hallowell)

Tachydromus fordi Hallowell, 1857, Proc. Acad. Nat. Sci. Phila., p. 48.
Poromera fordi Boulenger, 1887, Cat. Lizards, III, p. 6. Günther, 1896, Ann. Mag. Nat. Hist., (6) XVII, p. 264. Boulenger, 1900, Proc. Zool. Soc. London, p 449, Pl. xxxi. Tornier, 1902, Zool. Jahrb. (Syst.), XV, p. 674.
Poromera haugi Mocquard, 1897, Bull. Soc. Philom. Paris, (8) IX, p. 6.

The type of this beautiful species has been reexamined by Dr. Boulenger (1900, p. 449). The measurements and scale counts are here tabulated, with those of a specimen in the American Museum from the Kribi River, Kamerun, for comparison. The colors (Ridgway, Nomenclature of Colors) of the latter specimen are as follows: head, *dark olive;* two mid-dorsal rows of scales and edges of the next row on each side, black, fading posteriorly to the ground color of the body and tail on the base of the latter; on each side of the dorsal black band, on the edges of the second and third scale rows, a narrow light line, *light glaucous blue* anteriorly, changing to greenish before the middle of the body and merging in the general body color several scales anterior to hind legs; this line widens posteriorly to include the whole of the third scale row; the lower half of the third scale row and the fourth, black at the head, fading posteriorly and merging (with the adjacent light line) into the body color five or six scales anterior to the hind legs; the "body color" confined to the sides and rump and upper surface of the tail, *citrine drab;* venter, *glaucous green,* lighter beneath the tail; the large chin shields, the chin, throat, and collar, pale dull *glaucous blue;* enlarged femoral scales, *straw yellow.*

Measurements and Scale Characters

	Phila. Acad. No. 9202	A. M. N. H. No. 5278
Sex	♂	♂
Length		182 mm.
Body	50	57 mm.
Tail		125 mm.
Arm	22	22 mm.
Leg	31	34 mm.
Head Length	14	15 mm.
Head Breadth	8.2	9 mm.
Ventrals, Transversely	23	24
Ventrals, Longitudinally	6	8
Femoral Pores	12–13	13–13
Labials	7–7 / 8–8	7–7 / 8–8
Scales in Collar	11	14

Feylinia elegans (Hallowell)

Text Figure 27

Acontias elegans Hallowell, 1852, Proc. Acad. Nat. Sci. Phila., VI, p. 64, text fig.
?*Feylinia currori* Boulenger, 1887, Cat. Lizards, III, p. 431.
Feylinia currori (part) Bocage, 1895, Herpétol. Angola, p. 58.

Under the name of *Sphenorhina elegans* there are in The Academy of Natural Sciences of Philadelphia three specimens, and one labeled *Sphenorhina* species. Of these, the latter and one of the three are specimens of *Acontias elegans* Cuvier, the third is a *Feylinia currori* Gray[1] and the fourth remains as the type on which *Acontias elegans* was based. Its measurements (length, 206; tail, 64 mm.) check satisfactorily with those of Hallowell: length, 207; tail, 63 mm.

[1] The writer believes that he is justified in identifying this specimen with Hallowell's second specimen of *Sphenorhina elegans,* from Gaboon. It is extremely improbable that the specimens of true *Acontias* came from that locality. It is, however, impossible to check absolutely the identity of the specimen in question, which is at present a mere skin, with the tail missing. There are twenty-three scale rows in place of Hallowell's twenty-two. The matter is further complicated by the citation, in 1857, of two new measurements, neither of them the original of 1852, although he expressly states that he has but two specimens.

Hallowell distinctly states in his original description that the internasals articulate (as they do in the specimen), although his figure shows them separate. The remaining difficulty, his "single scale in front of the anus" is contradicted in the redescription of 1857 which gives "four scales in front of the anus."

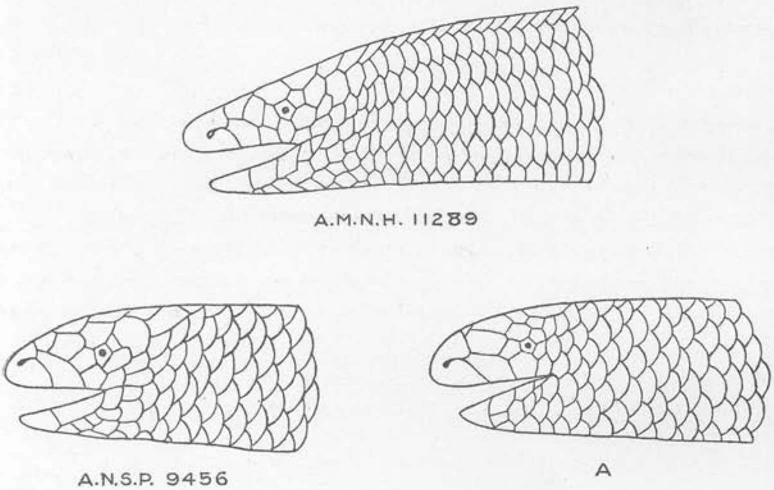

Fig. 27. Heads of *Feylinia currori* (11289, × 1.2), *Feylinia elegans*, type, (A. N. S. P. 9456, × 2.7), and *Feylinia macrolepis* (A, after Boettger).

Hallowell's original description in 1852, with the correction in the figure and number of anals noted, is fairly satisfactory. There are twenty scale rows around the middle of the body, and the ocular is in contact with the second labial, between that scute and the third labial, but well separated from the latter by an anterior prolongation of the lower postocular. This position of the eye in front of, instead of behind, the third supralabial, in combination with the more slender habitus and the low number of scale rows, seems to be adequate to distinguish between *elegans* and *currori*.

Hallowell's remarks in 1857 add almost nothing. After quoting Gray's characters of *Feylinia*, he says "a description which does not fit our animal," and forthwith proposes the genus *Sphenorhina*, founded on a specimen of Gray's *Feylinia currori* and one of *Feylinia elegans*.

The measurements and scale characters of the type of *Acontias elegans* are: length, 206 mm.; body, 142 mm.; tail, 64 mm.; tail/length, .31; head length, 6.5 mm. (evidently not the same measurement as taken by Hallowell); body diameter, 7.1 mm.; body diameter/body length, .050 (cf. this figure for *F. currori*, average .072); anal scales, 4; longitudinal scale rows, 23–30–19. The parietal scute is somewhat more elongate than in the *F. currori* of the Congo collection.

The original locality given by Hallowell in 1852 is Liberia; his failure to mention Liberia in 1857, however, introduces an unfortunate element of doubt as to whether Gaboon is meant as a correction, or whether the failure to mention Liberia is an oversight.

Boulenger, in his report on the Fea Collection (1906, Ann. Mus. Stor. Nat. Genova, (3) II, p. 11) states that specimens of *currori* may have the ocular in contact with the second instead of the third labial, and in the same list accords *polylepis* Bocage full specific rank. It is of course possible that both Boettger's *Feylinia macrolepis*[1] and Hallowell's species, agreeing in the essential point of the position of the ocular, may have to be united with *F. currori.* Pending study of the specimens of all of the species for the status of this character, the writer follows Werner and Boettger in regarding it of specific importance. The essential distinction between *elegans* and *macrolepis* lies in the lack of a loreal in the latter, a character readily explicable on the assumption of a fusion of the loreal with the internasal. *F. macrolepis,* however, does not have the slender body of *elegans.*

The synopsis of the genus on this basis follows.

A. Ocular in contact with the third labial and posterior to it.
  B. Scale rows 19–28; snout moderate.................. *currori.*
    C. Scale rows 19–20.................. *currori grandisquamis.*
    CC. " " 24–28......................... *currori currori.*
  BB. " " 28–30; snout elongate.............. *polylepis.*
AA. Ocular in contact with the second labial, cut off from third by postocular.
  B. Loreal present; body slender......................... *elegans.*
  BB. Loreal absent; body moderately thick.............. *macrolepis.*

Chamæsaurus macrolepis (Cope)

Mancus macrolepis COPE, 1862, Proc. Acad. Nat. Sci. Phila., p. 339.
Chamæsaurus macrolepis BOULENGER, 1885, Cat. Lizards, II, p. 264. BOCAGE, 1895, Herpétol. Angola, p. 25. WERNER, 1896, Jahrb. Ver. Magdeburg, p. 414. ODHNER, 1908, Ark. Zool., IV, No. 18, p. 3. BOULENGER, 1910, Ann. South African Mus., V, p. 470.

Bocage (1895, p. 25) finds minute anterior extremities in the adult (not in the young) of this species, and counts twenty-four longitudinal scale rows. Werner, recording three specimens from Natal, describes anterior limbs in

[1] *Feylinia macrolepis* Boettger, 1887, Zool. Anz., X, p. 650; 1888, Ber. Senck, Ges., p. 35. Werner, 1902, Verh. Ges. Wien, LII, p. 342.

two specimens, well developed in one; it is difficult to understand on what basis he has referred his specimens to Cope's species.

The following notes refer to the type (No. 9709). Rostral broad, emarginate behind on either side, forming a blunt median point between the nasals. Nasals large, entire, meeting behind the rostral, the nostrils pierced somewhat posteriorly in their lateral face. Frontonasal elongate, situated between the prefrontals and the nasals, in contact with the frontal, with curved suture. Frontal in contact with the two large supraoculars on each side, with the frontoparietals posteriorly and the prefrontals anteriorly. Enlarged parietals two pairs, the interparietal as long as the two parietals, and separating the posterior pair. The distinct pineal eye is situated anteriorly on the interparietal. The head shields on top of the head, except the nasals, are many keeled, the frontonasal and the frontal least rugose. There are three supraciliaries, the anterior much the longest. There are four pair of enlarged chin shields, the anterior in contact. Mental large, nearly as long as broad, with a median point between the first chin shields. A large postnasal; two loreals, of which the anterior is the larger, and deeper than long. The subocular (= fourth labial) extends anteriorly above the third labial, and extends slightly posteriorly. A sharp keel beginning on the second loreal extends on this plate below the eye. (See below for scale counts and measurements.)

The paratype (No. 9708) presents considerable differences in the head shields. The frontonasal is divided by a transverse suture into an anterior pentagonal and a smaller posterior rectangular part. The interparietal is shorter than the parietals, the posterior pair meeting behind it. Nasals more elongate, the nostril at their center. The supraoculars are three on each side (i. e., posterior ocular transversely divided).

Measurements and Scale Characters

PHILA. ACAD. NO.	9708	9709
Length	444	638 mm.
Body	85	138 mm.
Tail	359	500 mm.
Leg	5	7 mm.
Head Length	13	17 mm.
Head Breadth	6	8 mm.
Length of Snout	5.5	7.5 mm.
Scales about Body	22	22
Scales from above Anus to Occiput	40	39
Labials	$\frac{5\text{–}5}{6\text{–}6}$	$\frac{5\text{–}5}{5\text{–}6}$
Anals	9	9
Femoral Pores	3–3	1–1

EXPLANATION OF PLATES VII–XXXII

Plate VII

The Border of a Clearing in the Ituri Forest toward Nala. A swampy depression in the foreground with typical plants of the secondary growth in the space cleared for the road: at the right of the bridge, elephant grass (*Pennisetum benthami*) and a young musanga (*Musanga smithi*); the slender tree in the left center is a *Uapaca*, and the broad-leaved bush in front of it a *Vernonia conferta*. Primary Rain Forest in the background, the majority of the trees being *Cynometra alexandri*, often reaching 150 feet. A few oil palms are visible toward the road.

Plate VIII

Interior of the Rain Forest on the Watershed between the Ituri and Uele Rivers, between Nala and Rungu. Tree ferns (*Cyathea*, probably *C. laurentiorum*), some of which reach 20 feet, in the swampy depression at the center. The heavily buttressed tree at the left is a muhindi (*Cynometra alexandri*) and that with a columnar trunk on the right is a mambao (*Macrolobium dewevrei*). The left front corner shows typical ground cover of the Rain Forest with large-leaved *Phrynium* and the broad-bladed forest grass (*Leptaspis conchifera*). Note also the huge creepers (*Landolphia*, *Lonchocarpus*, and others), hanging down from the crowns of the trees. The Rain Forest represents one of the primary divisions of the Ethiopian Region, both in its flora and fauna.

Plate IX

Typical Aspect of Open Country in the Northeastern Uele, along the Road from Niangara to Faradje. The flat or slightly rolling country is covered with moderately high grass (*Imperata cylindrica* and various species of *Andropogon*); scattered, medium-sized trees from 20 to 30 feet high (*Dombeya*, *Kigelia*, etc.); and irregular scrubby bushes (*Bauhinia*, *Combretum* and others). A thorny element is represented by a few species of *Acacia* and the widely distributed *Zizyphus jujuba*.

Plate X

The Savannah North of Garamba, on the Watershed between the Nile and Congo Basins. The vegetation is typical of the transition zone between the mixed Uele flora and that of the Sudanese Subprovince (cf. Map 2). The grass is shorter and is chiefly composed of smaller *Andropogons*. Larger trees (such as *Lophira alata*) are very rare. The smaller woody plants include a great variety of species: *Protea*, *Sarcocephalus*, *Bauhinia*, *Dombeya*, *Uapaca*, *Grewia*, *Gardenia thunbergia* and others. In the depressions of the rocks, where moisture and humus accumulate, grow various grasses and a dwarf species of *Aloe*. Plates IX and X may be taken as representing an aspect of the second faunal and floral division of the Ethiopian Region, the Savannah Province; they also represent the first of the faunal subdivisions, the Sudanese Subprovince, which extends somewhat further toward the forest border than does the botanical division.

Plate XI

Figure 1. *Kinixys erosa* (Schweigger). The average size of the adult is probably 200–230 mm.

Figure 2. *Kinixys belliana* Gray. A. M. N. H. No. 10042; length 230 mm.

Figure 3. *Pelusios nigricans* (Donndorff). A. M. N. H. No. 10063; ♂; length 290 mm.

Plate XII

Figure 1. *Crocodylus cataphractus* Cuvier. A. M. N. H. No. 10072; juvenile.

Figure 2. *Crocodylus niloticus* Laurenti, the common African crocodile. Photograph used by courtesy of the New York Zoölogical Society.

Plate XIII

Figure 1. *Osteoblepharon osborni,* new species. Total length 130 cm.

Figure 2. *Osteolæmus tetraspis* Cope. Total length 142 cm. Photograph by courtesy of the New York Zoölogical Society.

Plate XIV

Figure 1. *Hemidactylus brookii* Gray. A. M. N. H. No. 10254; ♀; length 122 mm.

Figure 2. *Lygodactylus picturatus gutturalis* Bocage. Dorsal view. A. M. N. H. No. 10325; ♂; length 78 mm.

Figure 3. *Lygodactylus picturatus gutturalis* Bocage. A. M. N. H. No. 10325. Ventral view with characteristic throat marking.

Plate XV

Figure 1. *Hemidactylus fasciatus* Gray. A. M. N. H. No. 10265; ♀; length 168 mm.

Figure 2. *Hemidactylus ituriensis,* new species. A. M. N. H. No. 10270; ♀; length 162 mm.

Plate XVI

Hemidactylus ituriensis, new species, showing a variant coloration. A. M. N. H. No. 10273; ♀; length 137 mm.

Plate XVII

Figure 1. *Hemidactylus richardsoni* Gray. A rare forest gecko, protectively colored. A. M. N. H. No. 10279; ♀; length 130 mm.

Figure 2. *Lygodactylus depressus,* new species. A. M. N. H. No. 10342; ♀; length 72 mm.

Plate XVIII

Figure 1. *Agama atricollis* Smith. A. M. N. H. No. 10489; ♂; length 330 mm.

Figure 2. *Agama colonorum* Daudin. A. M. N. H. No. 10408; ♂; length 303 mm.

Plate XIX

Varanus exanthematicus exanthematicus (Bosc). A. M. N. H. No. 10494; length 650 mm.

Plate XX

Figure 1. *Varanus exanthematicus exanthematicus* (Bosc). A. M. N. H. No. 10494. Characteristic attitude when annoyed.

Figure 2. *Gerrhosaurus zechi* Tornier. A. M. N. H. No. 10722; ♀; length 302 mm.

Plate XXI

Lacerta langi, new species. A. M. N. H. No. 10525, type; ♀; length 275 mm.

Plate XXII

Bedriagaia tropidopholis Boulenger. A. M. N. H. No. 10528; ♂; length 398 mm.

Plate XXIII

Figure 1. *Algiroides africanus* Boulenger. A. M. N. H. No. 10534; ♂; length 163 mm.

Figure 2. *Holaspis guentheri* Gray. A. M. N. H. No. 10709; ♂; length 118 mm.

Plate XXIV

Figure 1. *Mabuya polytropis* Boulenger. A. M. N. H. No. 10895; ♀; length 321 mm.

Figure 2. *Feylinia currori* Gray. A. M. N. H. No. 11294; length 340 mm.

Plate XXV

Mabuya sudanensis, new species. A. M. N. H. No. 10934, type; ♀; length 264 mm.

Plate XXVI

Mabuya perrotetii (Duméril and Bibron). A. M. N. H. No. 10955; ♂; length 248 mm.

Plate XXVII

Figure 1. *Mabuya quinquetæniata* (Lichtenstein). A. M. N. H. No. 11025; ♂; length 233 mm.

Figure 2. *Mabuya quinquetæniata* (Lichtenstein). A. M. N. H. No. 11022; ♀; length 220 mm.

Plate XXVIII

Figure 1. *Lygosoma reichenowii* Peters. A. M. N. H. No. 11196; ♀; length 123 mm.

Figure 2. *Lygosoma breviceps* (Peters). A. M. N. H. No. 11197; ♂; length 160 mm.

Plate XXIX

Lygosoma sundevallii (Smith). A. M. N. H. No. 11225; ♂; length 179 mm.

Plate XXX

Figure 1. *Chamæleon gracilis* Hallowell. A. M. N. H. No. 11335; ♀; length 239 mm.

Figure 2. *Chamæleon senegalensis lævigatus* Gray. A. M. N. H. No. 11394; ♀; length 177 mm.

Figure 3. *Rhampholeon boulengeri* Steindachner. A. M. N. H. No. 11576; ♀; length 66 mm. Matching the light gray stump upon which it rests. Compare the color phases shown on Plate XXXII, Figures 7 and 8. The two oblique marks on the back have been compared with the ribs of a dead leaf.

Plate XXXI

Figure 1. *Chamæleon owenii* Gray. A. M. N. H. No. 11425; ♂; length 303 mm.

Figure 2. *Chamæleon ituriensis*, new species. A. M. N. H. No. 11494; ♀; length 213 mm.

Plate XXXII

Figures 1–5. Successively darker color phases in *Chamæleon ituriensis*, new species. A. M. N. H. Nos. 11521–22; length 196 and 234 mm.

Figure 6. *Chamæleon owenii* Gray. A. M. N. H. No. 11439; ♂; length 250 mm. The color usually assumed in bright sunlight.

Figures 7–8. Two color phases of *Rhampholeon boulengeri* Steindachner. A. M. N. H. No. 11607; ♀; length 65 mm.

INDEX

New names of species and subspecies are printed in **heavy-faced type**, also the main references in a series of references; synonyms are printed in *italics*.