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THE HERPETOLOGY OF CUBA.

BY

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WITH FIFTEEN PLATES.

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CONTENTS.

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THE HERPETOLOGY OF CUBA.

INTRODUCTION.

No previous attempt has been made to produce a complete list of the amphibians and reptiles of Cuba with descriptions of the species. It should be expressly understood that the senior author is responsible for the actual writing of this paper, for the nomenclature, and taxonomic descriptions, and the junior author has contributed many details of distribution and notes upon habits and habitats; his work has been chiefly in the Guantanamo Basin; and of this region he has the intimate knowledge which only long residence can give. The senior author besides having been privileged to collect with his associate upon Monte Libano, and elsewhere about Guantanamo, has visited various chosen localities in all of the other provinces, usually several times. Thus one or other of the writers has himself collected, with a few exceptions, every definitely known Cuban reptile or amphibian.

In 1880 Gundlach published his classic Erpetologia Cubana in Havana and in the natural course of events many changes have taken place since that time which have affected the nomenclature and status of the species treated, while new forms have been discovered.

SYNOPSIS OF THE SPECIES.

Gundlach in 1880 recognized fifty-four species of reptiles (aside from marine tortoises) and twelve species of amphibians. In 1914, only sixty-three species altogether were recognized (Barbour, Reptiles and Amphibians of the West Indies, Mem. M. C. Z., **44**), many of Gundlach's names being reduced to the synonymy, or otherwise disposed of, and but comparatively few new species described. The following comparative table shows the present status of the species mentioned in Gundlach's Erpetologia Cubana, (Habana 1880, p. 1–99).

Name in Gundlach[1]	*Name in present use.*[2]
Emys rugosa	Pseudemys palustris
Crocodilus rhombifer	Crocodylus rhombifer
americanus	acutus
Ameiva auberi	
Leiocephalus carinatus	
vittatus	Leiocephalus macleayi
macropus	
raviceps	
Cyclura carinata	Cyclura cyclura
Anolis equestris	
fernandinae	Chamaeleolis chamaeleontides
porcus	chamaeleontides
vermiculatus	Deiroptyx vermiculatus
carolinensis	Anolis porcatus
sagrae	sagrei
lucius	
argenteolus	
angusticeps	
isolepis	
ophiolepis	Norops ophiolepis
cyanopleurus	
alutaceus	
spectrum	
loysiana	
argillaceus	
Platydactylus cubanus	Tarentola cubana
Hemidactylus mabuia *introduced*	Hemidactylus mabouia
Sphaeriodactylus sputator	Sphaerodactylus torrei
cinereus	cinereus
argus	cinereus
notatus	notatus
fantasticus	scaber
Gymnodactylus albogularis	Gonatodes fuscus
Cricosaura typica	Cricolepis typica
Diplogossus sagrae	Celestus de la sagrae
Amphisbaena punctata	Cadea blanoides
cubana	
Typhlops lumbricalis	
Ungalia melanura	Trophidophis melanurus
maculata	maculatus
semicincta	semicinctus
Epicrates angulifer	
Urotheca dumerilii *undoubtedly not Cuban*	
Cryptodacus vittatus	Arrhyton vittatum
Arrhyton taeniatum	
fulvum	Arrhyton taeniatum

[1] Listed in Gundlach's sequence.
[2] An omission indicates no change from Gundlach's name.

Colorhagia redimita	Arrhyton redimitum
Dromicus angulifer	Alsophis angulifer
adspersus	angulifer
fugitivus	Leimadophis andreae
temporalis *undoubtedly not Cuban*	Urotheca lateristriga
Tretanorhinus variabilis	
Tropidonotus cubanus	Natrix compressicauda
anoscopus	?Natrix rhombifer, or perhaps an African species.
Peltaphryne peltacephalus	Bufo peltacephalus
empusa	empusus
Phyllobates bicolor *probably Mexican*	
limbatus	
Trachycephalus marmoratus	Hyla septentrionalis
insulsus	septentrionalis
wrightii	septentrionalis
Hylodes dimidiatus	Eleutherodactylus dimidiatus
auriculatus	auriculatus
ricordii	ricordii
varians	varians
cuneatus	cuneatus

SPECIES ERRONEOUSLY RECORDED.

Many species either through a misplaced label, in the museum or in the field, have been recorded from localities which know them not. Errors arise also from mistaking a species which has been accidentally or purposely introduced for a native form. *Cf.* Gundlach's account of *Hemidactylus mabouia* (Erp. Cub., 1880, p. 55).

1. Cayman sclerops (Schneider).

While this alligator is really South American, it has been recorded from Cuba by Gray (Ann. mag. nat. hist., 1840, **5**, p. 115).

2. Testudo denticulata Linné.

This species, usually known by the name of *Testudo tabulata* Walbaum, has been often carried about alive and hence has been recorded from many of the Antilles, from Cuba and Porto Rico among others. It is confined to the South American mainland.

3. Testudo polyphemus Daudin.

Really confined to Florida, but recorded by Gray from Cuba (Ann. mag. nat. hist. 1840, **5**, p. 115).

4. Cinosternon bauri Garman.

A Floridian tortoise; one of the types was said to have been sent to the M. C. Z. by Filipe Poey, from Cuba. Either Professor Poey obtained the specimen from Florida and neglected to mention the fact, or an incorrect label was substituted for the original after it was received at the Museum. There is an example of Gerrhonotus in the U. S. N. M. which has suffered exactly the same vicissitudes, bearing now a Poey label.

5. Natrix anoscopa (Cope).

This was probably based on a specimen from the southern United States, although Stejneger thinks Cope may have had an African form. The evidence that Gundlach ever found a Natrix in Cuba is extremely unconvincing, since none has been found there by any other collector. It is quite probable that his *Tropidonotus cubanus* (Erp. Cubana, 1880, p. 81) was really based on an anomalous example of the "catibo" (*Tretanorhinus variabilis*). There is no specimen of Natrix (Tropidonotus *auct.*) in the Museo Gundlach of the Instituto de Segunda Ensenanza in Havana. (See Postscript, p. 212).

6. Leimadophis parvifrons (Cope).

Under the name of (*Liophis*) *parvifrons* Meerwarth records (Mitth. Natur. mus. Hamb., 1901, **18**, p. 15), a specimen of this Haitian species from Cuba. The specimen apparently entirely lacks definite data. That this record should not be queried by Meerwarth will hardly surprise one who consults this paper, for on page 9 it is stated that the Hamburg museum possesses *Constrictor* (called *Boa*) *imperator* from St. Thomas!

7. Dromicus temporalis Cope.

This species and a so-called *Scoliophis fumiceps* were described from specimens said to have been in the M. C. Z. The type of the latter cannot be found

but it is evidently a Tantilla. The type of *D. temporalis* is referable to *Urotheca lateristriga*. Both examples doubtless came from Central America and not Cuba as Cope records.

8. Urotheca dumerilii Bibron.

Only known from Cuba through the collections sent to Paris by Ramon de la Sagra. Never since that time has the species been found in Cuba. The other species of the genus are all from the mainland. Prof. de la Torre tells us that a number of species of molluscs from the Central American mainland were reported as coming from Cuba by d'Orbigny, also from the collections of de la Sagra. Evidently de la Sagra shipped material from the mainland to Paris with his Cuban collections and as these bear no definite localities in the published accounts it is quite likely that no label was sent with any of the specimens and that it was simply assumed that all came from Cuba.

We suspect that possibly the reverse occurred with the collections of Morelet, who gathered material first in Cuba, then went to Central America, whence probably all was sent to Europe. Thus the Cuban species *Crocodylus rhombifer* and *Tropidophis semicincta* may have been carried to Central America and possibly these appear now as *Crocodylus moreleti* and *Tropidophis moreleti* from Central America, where they do not seem to be found by recent collectors. Regarding the latter possibility *cf.* Stejneger (Proc. U. S. N. M., 1917, **53**, p. 281).

9. Phyllobates bicolor Bibron.

This species so beautifully figured by Bibron in the Histoire of de la Sagra has never been discovered in any collection made in Cuba since de la Sagra's time and it certainly appears as if the history of this species is the same as that of *Urotheca dumerilii*.

10. Bufo marinis (Linné).

Meerwarth records a specimen from Cuba and tersely remarks that it is *typisch*. No great surprise if he really had *marinis* which is not found in Cuba (Mitth. Natur. mus. Hamb., 1901, **18**, p. 40).

11. Hemidactylus mabouia (Moreau).

This species has a somewhat different history from those preceding. It is one which has been carried far and wide through tropical America from Africa,

probably during the slave-trade. Gundlach evidently did not know that it was not a native Cuban species. (*Cf.* Erp. Cub. 1880, p. 55). A detailed description of this species is given in its systematic position on p. 117.

GEOGRAPHIC NOTE.

Cuba, the largest and richest of all the West Indies, has an area all told, including the outlying cayos, of about 123,000 square kilometers. The Island is about 1,200 kilometers long and varies greatly in breadth, from 40 to 200 kilometers. It is distant 210 kilometers east of Yucatan, about 180 kilometers south of Florida, and 77 west of Haiti. Generally speaking the rainfall increases as one passes eastward through the island. The central provinces of Havana, Matanzas, Santa Clara, and Camaguey are in great part level, devoted to the cultivation of sugar-cane or the raising of cattle and horses. Even in these provinces there are ranges of rounded hills composed of metamorphosed igneous rocks as well as scattered remnants of limestone either in the form of isolated hillocks or *mogotes* as they are called locally, or more extensive chains called *sierras* in contradistinction to *lomas*, the term sometimes used for hills other than those of limestone. In Pinar del Rio and far more so in Oriente the limestone ranges are well developed and reach considerable heights. Pico Turquino has an estimated altitude of 2,400 meters and is the highest summit in Cuba. Spanish language and custom combine to endow any land colonized by Spain with a marvellously complete equipment of place-names and every brook, spring, hillock, or dale whether inhabited or not, if it has ever been visited at all, has some often wonderfully trite name. No one unfamiliar with the local idiom would believe that so great a series of beautifully differentiating names were available for every physiographic feature. This state of affairs makes it very simple to designate accurately the locality where one has collected. The only difficulty is that names often change. The student interested in the distribution of Cuban species will do well to consult the excellent map (in two large sheets) published by the U. S. War Department and the Geografia de la Isla de Cuba by Aguayo and de la Torre (Habana La Moderna Poesia, 1907). The latter which is the regular text-book of geography used in the Cuban schools is wholly excellent.

FAUNAL RELATIONSHIPS.

There can be no reasonable doubt but that in the past Cuba has been subjected to a number of fundamental changes of level. Ammonites of Jurassic age are found in Pinar del Rio (Puerto de Ancon, Viñales, San Diego de los Baños) while in the central provinces Barettia, hippuritids and similar fossils bear evidence of depression there. Thus we may imagine Cuba as having been an archipelago by the evidence of these marine deposits and by the fact as well that so many of the *sierras* have their own very distinct faunulae of terrestrial molluscs. These often point to curious possible connections in the past. The axis of the Sierra Maestra, if prolonged, would reach out to the Cayman Islands and to Swan Island and the relationships of the land shells suggest some such condition in the past. So also the molluscs of the *sierras* of the Island of Pines and those of Camaguey point to a relationship far more intimate than exists at present. The amphibians and reptiles, because of their ability to spread with comparative ease in a region where no great natural barriers exist, are rather homogeneously distributed throughout the Island. Nevertheless there are conspicuous exceptions such as the two remarkable toads *Bufo longinasus* and *B. ramsdeni*.

The connection at some time in the past of Cuba with both Yucatan and Haiti is very strongly indicated by the fauna, not only among the reptiles and amphibians but in very many other groups.[1]

Since Cuba is by far the largest of the Antilles in area it is by no means surprising to find that it supports the largest number of species of reptiles and amphibians of any of the islands, there being no less than seventy species at present recorded. Two of these appear to have been introduced, while no less than fifty-two are peculiar to Cuba. The Cuban fauna differs in some important respects from that of either Jamaica, Haiti, or Porto Rico. The presence of Phyllobates, Tretanorhinus, Arrhyton, Norops, and Cricosaura bespeaks a close relationship to the neighboring continent, in which the other islands have not shared. So, also, the presence of no less than four species of Bufo, only one of which, *B. empusus*, has close allies in *B. gutturosus* of Haiti, *B. lemur* of Porto Rico, and *B. turpis* of Virgin Gorda. While of the others *B. peltacephalus* is not so very unlike some of the continental forms, but *B. longinasus* and *B.*

[1] For a discussion of the Antillean land bridges see Bull. M. C. Z., 1910, **52**, p. 275–285; Mem. M. C. Z., 1914, **44**, p. 214–237; Ann. N. Y. acad. sci., 1916, **27**, p. 1–15.

ramsdeni, while they are related to each other, have no close affinity with any Bufo anywhere. The single Hyla is decidedly similar to *H. dominicensis* of Haiti or *H. brunnea* of Jamaica. Upon Jamaica, however, another very peculiar Hyla, *H. lichenata*, is found with a possible ally, *H. vasta*, in Haiti; and there, still a third species, *H. pulchrilineata*, occurs with affinities to *H. eximia* of Mexico, *H. andersonii* of the white cedar swamps of the eastern United States and so to *H. arborea* of Europe. The beautiful little Phyllobates is the only species of its genus which is not found upon the mainland, except for *P. trinitatis* which is probably not congeneric. The Eleutherodactyli, six in number, embrace four which are peculiar to the island. These four might be said perhaps to be rather more like mainland than Antillean types; *E. ricordii*, however, is found in the Bahamas and Florida, having appeared there recently, and *E. auriculatus* is more common in Haiti and Porto Rico than it is in Cuba, its type-locality.

Among the reptiles Deiroptyx and Chamaeleolis are modifications of an Anolis-like stock, probably Anolis itself. Monotypic and confined to Cuba, they suggest that they have evolved rather recently, in spite of their great divergence from Anolis; for they have never spread elsewhere. Cricolepis, also monotypic, tells a different tale, for, although it too is peculiar to Cuba, it belongs to an archaic group which persists with but few species, almost all of which are rare and confined to extremely restricted habitats. The Norops is very like the continental species, and no other of the genus is found among the Antilles. The Celestus, the Cyclura, the four Leiocephali, and many of the species of Anolis are truly West Indian; that is, they belong to groups which appear to have evolved themselves upon the greater Antillean land area of which the West Indies are now the disrupted remnants. To this category belong several of the Sphaerodactyli, *S. notatus*, *picturatus*, *elegans*, *cinereus*, *nigropunctatus*, which are allied to *corticolus* of the Bahamas, leaving only *S. torrei* of the Cuban species without close relations outside of Cuba or occurring elsewhere among the islands. As a matter of fact, *S. torrei* is very possibly derived from some *elegans*-like ancestor, perhaps from *elegans* itself, and since *elegans* does not appear in eastern Cuba, although it is found in Haiti, it is possible that it really represents *elegans* thus modified in Oriente; for *torrei* seems to be found in Oriente only, the one province of Cuba from which *elegans* is wanting. It is perhaps more probably related to *decoratus* of the Bahamas. The Tarentola is an enigma; supposedly entirely confined to Cuba, it has been found recently in the Bahamas, upon Exuma, and being retiring and hard to find it

may occur elsewhere in the region. Its relationships are, of course, Mediterranean.

Of the snakes Arrhyton with three species is confined to Cuba and probably represents some Leptocalamus-like ancestor, modified through isolation. The Alsophis and Leimadophis are really West Indian, while the Boas, one Epicrates, and no less than four Tropidophes are typically Greater Antillean. The Typhlops is insignificant, being very wide-ranging and a type likely to be transported fortuitously. The fresh-water tortoise is found upon the four greater islands; *Crocodylus acutus*, although wanting in Porto Rico occurs on the other three. *Crocodylus rhombifer* is peculiar to Cuba and has but one near ally in *C. moreletii* of Central America; if this species ever proves to be anything more than *rhombifer* with a wrong locality label.

The question of whether Cuba is a true continental island and whether or not it with the other West Indies has ever been joined together to form a far greater land mass than they do now, has been discussed elsewhere at length (see footnote p. 79). The discovery of fossil mammals, edentates, rodents, and an insectivore, unearthed in Cuba through Carlos de la Torre, Barnum Brown and the exploring parties from the M. C. Z., and the still more surprising collections made in Porto Rico by Franz Boas and Anthony and recently reported upon by J. A. Allen and Anthony, make it increasingly evident that this interpretation of the evidence of the amphibians and reptiles is the correct one. The significance of these fossil troves cannot be exaggerated and how much exploration remains to be done! A few years ago from densely populated and widely cultivated Porto Rico not a fossil mammal was known and some of the most learned palaeontologists did not postulate their presence there. Now several genera of rodents, an insectivore, and a sloth have been found and beyond doubt the end is not yet. Haiti is palaeontologically absolutely a *terra incognita*, or as perhaps we might better say in a paper upon Cuba, *una tierra desconocida*. If suitable deposits are found, and if fortune favors, there is no great doubt but that a considerable mammalian fauna will be uncovered in the future.

Perhaps the most interesting point which a study of the reptiles and amphibians brings out is that, although Cuba supports mainland types not found upon other islands, it has nevertheless in spite of the swift currents which sweep its shores and its proximity to Yucatan and Florida a typically West Indian fauna; those very forms being present in their reasonable proportion or representation, as so very many of them occur upon every island from Cuba to Grenada. It is

this homogeneity of the fauna and the character of its components, their habits, and their life histories which are significant in answering those who believe that the West Indies were populated by "flotsam and jetsam" means. The eggs of Ameiva, in Jamaica at any rate, have been found by Dr. Grabham of Kingston to be laid three feet underground; probably for this reason Ameiva eggs have not been found elsewhere. Yet several writers have seriously suggested the importance of tropical hurricanes and ocean currents in carrying the eggs of those forms, whose adults even they admit could probably not be transported by any conceivable means. Every added observation to those now upon record makes it appear less probable that the eggs are more capable of fortuitous transportal than the adults.

The writers have to thank many who have helped in the preparation of this paper. First and foremost Dr. Leonhard Stejneger whose wise council has ever been generously given and who has allowed the use of a number of cuts. Then to Dr. Carlos de la Torre we are greatly indebted, for he has helped us beyond measure. Nor can the senior author fail to acknowledge the constant assistance received from Mr. W. S. Brooks, who has been his frequent and welcome companion during many voyages. Mr. Brooks though chiefly interested in ornithology and conchology has added very many amphibians and reptiles to our collections and his name should be associated with much of the material collected by the senior author since 1915. To our host of hospitable friends, Cuban and American alike, who have aided us in many ways it is impossible to express adequately our gratitude. It is useless to even attempt to number them since they were so many. We shall always remember, however, specially Señor don Francisco Morales and Señor Victor J. Rodriguez.

42. Anolis porcatus Gray.

Gray, Ann. mag. nat. hist., 1840, **5**, p. 112; Barbour, loc. cit., p. 293.

A very common species, usually found in parks and gardens, especially abundant upon Cacti, agaves, and other yuccaceous plants.

43. Norops ophiolepis (Cope).

Cope, Proc. Acad. nat. sci. Phila., 1861, p. 211; Boulenger, loc. cit., p. 26; Barbour, loc. cit., p. 296.

A not uncommon species in open grassy fields and plains. It lives upon the ground, over the whole Island.

44. Cyclura macleayi Gray.

Gray, Cat. lizards Brit. mus., 1845, p. 190; Cocteau, Sagra's Hist. Cuba. Rept., 1838, p. 96, pl. 6; Barbour, loc. cit., p. 297.

Rare upon the mainland of Cuba itself, but not yet so uncommon among the cays off the coast, especially near Manzanillo.

45. Leiocephalus carinatus Gray.

Gray, Philos. mag., 1827, **2**, p. 208; Boulenger, loc. cit., p. 165; Barbour, loc. cit., p. 300.

Common about beaches and sea-cliffs. A species characteristic of the area of the sea-shore plant association.

46. Leiocephalus (cubensis) Gray.

Gray, Ann. mag. nat. hist., 1840, **5**, p. 110.
L. vittatus Boulenger, loc. cit., p. 163; Barbour, loc. cit., p. 300.

A widespread and common species. Abundant in "guarda rayas" of the cane-fields and in open plains all over the Island.

47. Leiocephalus raviceps Cope.

Cope, Proc. Acad. nat. sci. Phila., 1862, p. 183.

A species known from the original specimens only. Perhaps not Cuban.

48. Leiocephalus macropus Cope.

Cope, Proc. Acad. nat. sci. Phila., 1862, p. 184; Boulenger, loc. cit., p. 163; Barbour, loc. cit., p. 301.

Apparently confined to the Province of Oriente and to be nowhere abundant.

SYSTEMATIC ACCOUNT OF THE SPECIES.

Keys.

The following series of keys has been prepared to facilitate identifications, but they cannot be expected to prove serviceable invariably. The young of many species differ greatly from the adults, and, moreover, the adults often vary *inter se* in a surprising degree. With Anolis especially the difficulty of exact diagnosis is very great. The keys therefore should be used in connection with the detailed descriptions; or, when possible, comparatively with typical or authentically named specimens.

AMPHIBIA: SALIENTIA.

Key to the Genera.

a¹ No teeth
  b¹ Skin warty, rough, a large gland on each side of the neck . . Bufo, p. 95
  b² Skin smooth, no dermal glands evident . . . . . Phyllobates, p. 112
a² Teeth on upper jaw and roof of mouth.
  b¹ Skin of head involved in cranial ossification . . . . . Hyla, p. 93
  b² Skin of head free from bony cranium . . . . . Eleutherodactylus, p. 102

HYLIDAE.

1. HYLA SEPTENTRIONALIS Boulenger.

Plate 1, fig. 1.

Rana; Rana platanera.

Diagnosis:— A gray, light greenish or brownish tree frog which reaches a very large size. The skin of the head is completely involved in the cranial ossification and the surfaces of back, sides, and belly are covered with warts of varying size. Tips of fingers and toes with enormous sucking pads.

Description:— Adult M. C. Z. 3,713. Cuba: Pinar del Rio; Guane, March, 1915. Thomas Barbour.

Tongue broad, much broader than long, unemarginate; vomerine teeth in a single continuous series between the large choanae, the posterior border of this series being slightly behind the posterior margins of the choanae; nostrils

near Alto Cedro, also in Oriente. Much more startling, however, was the capture in 1915 of a single adult at San Antonio de los Baños not far from Havana (Barbour). These are the only records of which we are aware, where the locality is exactly known. There is a specimen in the British Museum (P. Z. S., 1890, p. 324) which Dr. Boulenger writes was purchased from the natural history institute "Linnaea" with merely Cuba for data.

As to the habits of *P. limbatus* we can contribute but little. It seems to be confined to a limestone substratum and is found by day hidden under stones or damp leaves in moist situations. It is astonishingly active and when once spied out it is by no means easy to catch. One needs forceps and must work carefully lest the tiny creature be badly injured. It is noteworthy that the smallest bird, *Calypte helenae* (Gundlach), is peculiar to Cuba, and that on the same island occurs *Sphaerodactylus elegans* Reinhardt & Lütken, the smallest reptile, and *Phyllobates limbatus* Cope, which is certainly one of the smallest if not the very smallest amphibian known. However, almost equally minute species of Arthroleptis and Nectophryne occur in the Seychelles Islands.

Phyllobates bicolor Bibron which was ascribed to Cuba in la Sagra's History (Rept. 1840, pl. 29, *bis*), and which appears also in Gundlach's Erpetologia Cubana (1880, p. 88) is beyond doubt some non-Cuban form. It probably got mixed in with the Cuban collections which were forwarded to Paris for study for publication in the la Sagra series. It is perhaps Mexican, for a number of species of shells now known to be from that country occur in d'Orbigny's volume on the Mollusques.

REPTILIA: SAURIA.

Key to the Genera.

a¹ Four limbs.
  b¹ Head covered with scales or small plates.
    c¹ Eyelids undeveloped, pupil vertical.
      d¹ Toes compressed, undilated . . . . . *Gonatodes*, p. 114
      d² Toes dilated.
        e¹ Toes dilated at the tip only . . . . . *Sphaerodactylus*, p. 119
        e² Toes dilated at the base.
          f¹ Terminal portion of each toe free, raised upward, all toes clawed . . . . . *Hemidactylus*, p. 117
          f² Only third and fourth toes clawed . . . . . *Tarentola*, p. 116
  c² Eyelids functional, pupils round.
    d¹ Toes dilated.
      e¹ A transverse gular fold . . . . . *Deiroptyx*, p. 130
      e² A longitudinal gular pouch.
        f¹ Squamation heterogeneous, body with mixed scales of greatly varying size . . . . . *Chamaeleolis*, p. 128

f² Squamation homogeneous, scales of single area similar in size . . . . . *Anolis*, p. 132
d² Toes undilated.
e¹ Two hind toes armed with "combs" . . . . . *Cyclura*, p. 166
e² Hind toes all simple.
f¹ Tail long cylindrical . . . . . *Norops*, p. 164
f² Tail long, more or less compressed and crested . . . *Liocephalus*, p. 169
b² Head covered with large plates.
c¹ Eyelids undeveloped, pupil vertical . . . . . *Cricolepis*, p. 177
c² Eyelids developed.
d¹ Occipital shield absent . . . . . *Ameiva*, p. 179
d² Occipital shield present . . . . . *Celestus*, p. 175
a² No limbs.
b¹ A lateral line present . . . . . *Amphisbaena*, p. 183
b² No lateral line . . . . . *Cadea*, p. 181

Gekkonidae.

13. Gonatodes fuscus (Hallowell).

Plate 1, fig. 5.

Salamanquita.

Diagnosis: — A heavy bodied, thick tailed nocturnal lizard which differs from the other Cuban geckonids by having round pupils, the eyelid distinct all around the eye and no dilatation of the digits.

Description: — Adult ♂ M. C. Z. 1,922. Cuba: Havana, University grounds, 1913. V. J. Rodriguez.

Head short and rather high; snout obtusely rounded, rather short, as long as distance of eye to ear opening; ear opening broadly oval; forehead slightly concave; limbs and body rather short and stout; digits slender, compressed at the base, the scales under the basal joint enlarged; upper parts all covered with minute even granules, those on the snout somewhat enlarged; rostral roughly a pentagon, almost twice as broad as high, with a long median crest above; nostril between the rostral and three or four small surrounding scales; labials posteriorly ill defined, about five or six upper labials distinctly enlarged and four or five lower; mental large, followed by two or three slightly enlarged chin-shields, followed by other scales which pass almost immediately into the granules of the throat; scales of abdomen, rather large, flat, rounded, and strongly imbricating; tail cylindrical, tapering, covered above with small, round, imbricating scales, those below larger with a median series distinctly expanded.

Colour (in life): — Adult male. Iris neutral gray; head ochraceous yellow, turning to orange-red below; neck same colour as head, with a narrow dark

strictly terrestrial and feeds principally on ants although it will rarely climb even into the lowest bush or upon the stalks of grass to secure its prey; on one occasion the junior author saw one climb about eighteen inches into a small malvaceous bush at Guantanamo. The structure of its feet with the sharp projecting lateral scales marks a transition stage toward the condition seen in such genera as Uma, among iguanids or the South African Ptenopus among geckonids.

44. Cyclura macleayi Gray.

Plate 11, fig. 2, 3.

Iguana.

Diagnosis: — The largest Cuban land reptile, an enormous lizard with prominent gular pouch, a nuchal and dorsal crest of spines and a powerful muscular tail armed with prominent whorls of heavily keeled scales.

Description: — Adult ♂ M. C. Z. 11,050. Cuba: Pinar del Rio; Valley of Luis Lazo, April, 1915. Carlos de la Torre and Thomas Barbour.

Rostral as wide as the mental, broadly in contact with nasals; nasal large, somewhat pentagonal, perforated by a large ovoid nostril; each nasal in contact with a large, elongate supranasal and a squarish postnasal; nasals and supranasals broadly in contact on the middle of the snout; the pair of supranasals immediately followed by two pair of large prefrontals, the posterior pair several times as large as the anterior pair; both pairs of prefrontals broadly in contact in the middle line of the snout; a few granules on the crossing point of the two prefrontal sutures; all these scutes covering the upper surface of the snout slightly swollen and convex; between prefrontals and the scarcely indicated supraocular semicircular two irregular rows of scales, the anterior row formed of scales several times as large as those in the posterior one; immediately following the posterior row a large rounded median scale; supraorbital semicircle differentiated from the supraocular disc but the scales on the outer and anterior portion of the supraocular region smaller than the others; semicircles separated by two, partly by three rows of large scales; occipital located with its posterior end on a line with the posterior end of the semicircle; scales of the occipital region enlarged and swollen, the outer ones largest; about two rows of scales between the occipital and the semicircles; two or three rows of superciliary shields not clearly differentiated, canthus rostralis consisting of three large scales, the first elongate and in contact with two supraciliary scales that are also elongate; all of these scales on the top of the head swollen, slightly keeled, and,

with the exception of the small supraocular scales, uniformly enlarged; a well-developed series of strongly keeled suboculars continued backward as a supratympanic series; six supralabials to the middle of the eye; a series of three or four rows of small scales separating the supralabials from the suboculars; above the angle of the snout and in front of the lower edge of the eye a large tubercular shield; above it about the middle of the front edge of the ear two large shields, preceeded by a third, all three tubercular; below the angle of the mouth a few tubercular scales, irregularly arranged; five infralabials to the middle of the eye; a single row of very large, keeled malar scales, and two anterior ones in contact with the infralabials, the rest separated from the infralabials by one or two rows of small scales; dorsal and ventral scales small, about eleven contained in the vertical diameter of the tympanum; from the nuchal fold along the median line of the neck and back a row of low, blunt spines, the largest slightly over a centimeter high; this crest interrupted on the shoulders and rump, thirty-seven spines between these two points; upper surface of the limbs with slightly imbricated, keeled, posteriorly pointed scales considerably larger than the body-scales; scales covering the upper surface of the radius and tibia much larger than those covering the humerus and femur; on the upper arm about eight, on the lower about five of these scales to the vertical diameter of the tympanum; a single series of twenty-two femoral pores; inner side of second toe with one comb, of third toe with two combs, each consisting of three lobes; tail compressed, covered with obliquely keeled scales in vertical rows, forming faintly indicated verticils; tail surmounted by a serrated crest similar to the body-crest but formed of slightly larger spines.

Colour (in life): — Ground tone of dorsal surface brownish gray; whole dorsal surface sprinkled with pale, yellowish green, the spots very abundant and partly confluent posteriorly; flanks marked by four broad, vertical stripes of pale bluish gray; each stripe edged dark slaty gray, sides and upper surface of the head broadly blotched with pale bluish yellow; sides of the tail with a series of irregular vertical stripes of bluish gray becoming regular and evenly spaced posteriorly, ventral surface somewhat lighter than the upper surface.

Dimensions: —	Total length	910 mm.
	Tip of snout to vent	347 mm.
	Vent to tip of tail	563 mm.
	Tip of snout to ear	73 mm.
	Width of head	52 mm.
	Fore leg	156 mm.
	Hind leg	254 mm.

A very young specimen, a female measuring only 115 millimeters from snout to vent, collected at Belig, Cabo Cruz, Cuba, by O. Tollin and now in the collection of the junior author, varies greatly in colour from the adult, but the lepidosis of the specimen is very similar to that of the typical adult. In this example the ground tone of the dorsal surface is grayish blue tinged with greenish; along the middle line of the back there is a series of broad white cross-bars edged broadly before and behind with black; these black and white cross-bars are continued on the sides as a series of wavy stripes, each stripe pointing obliquely backward; the ventral surface is paler than the dorsal, and is covered by broken continuations of the lateral stripes.

This species was once a common inhabitant of all parts of the Island. By 1880, however, when Gundlach wrote it had begun to be rare, although he said that it still lived in various cays and about some of the coasts of both Cuba and the Island of Pines. At the present time we have specimens or know definitely that it occurs in the following regions: — near Baracoa (de la Torre), about Guantanamo (the authors) and near Santiago (Wirt Robinson). There is a beautiful young specimen from near Belig, Cabo Cruz, in the collection of the junior author. It is known to occur commonly on the cays of the coast near Manzanillo, Santa Cruz del Sur, as well as those in the Gulf of Batabanó. It is also found on some of the cays of the north coast near Cárdenas and Remedios. On the mainland of Cuba it also occurs on the Pan de Guajaibón, in the mountains about the Valley of Luis Lazo and El Sumidero, in the coastal plain about Santa Cruz del Norte, all in Pinar del Rio Province, and probably in some other localities as well. In the Island of Pines, the Iguana is more common than in Cuba. Its tracks and burrows may often be seen in the sand about the coasts and they occur in the Sierras as well. In general it prefers the neighborhood of rocky hills and precipices where there are crevices for hiding and ledges on which it may bask in the sunshine. Iguanas are more often seen than captured, for they are decidedly shy. They may only be secured by shooting or by setting nooses at the entrances to their lairs or hiding places. Gundlach spoke of how they were, in his day, hunted for food; he considered them excellent. Throughout tropical America Cyclura and its allies are eagerly sought and are esteemed highly. At present, however, in Cuba they are generally held in great disgust and often even regarded as poisonous. The country folk often declare that when an Iguana is hung up a drivel or slobber supposed to be poisonous falls from its mouth called the bába or burujo. Possibly this notion is derived from its similarity to the burujo or black vomit which comes

from the blood-filled stomachs of persons during the last stage of fatal cases of yellow fever. The fact that the Iguanas are growing rare and difficult to obtain coupled with their repulsive appearance may have also contributed to this change of custom. It is strange, however, that so great a change can have taken place in popular opinion in hardly more than a generation.

Key to the Species of Leiocephalus.

a¹ Caudal crest higher than dorsal . . . . . *carinatus*, p. 169
a² Caudal crest not higher than dorsal.
  b¹ An area of minute granules behind ear opening . . . . . *macropus*, p. 173
  b² No area of minute granules behind ear opening.
    c¹ Side of neck entirely covered with pointed, imbricate, keeled scales. about 12 dorsal scales equal length of head . . . . . *cubensis*, p. 171
    c² About 20 dorsal scales equal length of head posterior praefrontals greatly enlarged . . . . . *raviceps*, p. 172

45. Leiocephalus carinatus Gray.

Plate 14, fig. 11.

Perico, Caguayo; Iguana de los Fosos; Iguana, Iguana rabienroscada; Bayoya de rabo enroscado.

Diagnosis: — A large spiny lizard carrying its tail curled over its back, always when moving and often while at rest. It may be distinguished at once from the other Cuban species by its barred gray and brown colouration and by having the caudal crest better developed than the dorsal.

Description: — Adult M. C. Z. 7,940. Cuba: Morro Castle, Havana, February, 1910. Thomas Barbour.

Upper head-scales, rather large, smooth: nasal in contact with the rostral; supraorbitals extensively in contact; six narrow strap-like supraoculars, separated from the supraorbitals by a single series of rather small scales; two pairs of parietals, the outer pair more than twice as broad as the inner; sides of neck each with two sharply defined, converging folds; scales of sides of neck, pointed, imbricate and sharply keeled; dorsal crest evident but feebly developed; dorsal scales, large, broader than long, slightly mucronate, serrate on their free edges, very strongly keeled, the keels forming continuous and slightly oblique lines; lateral scales slightly smaller than dorsals, imbricate, keeled, the keels much more sharply oblique; ventrals very slightly smaller than dorsals, smooth, rounded, distinctly broader than long; the adpressed hind limb reaches to the

PLATE **11**.

Fig. 1. Cricolepis typica (Gundlach and Peters). 10 × nat. size.
M. C. Z. 8,512. Cabo Cruz, Oriente, Cuba. Thomas Barbour.
Top of head.

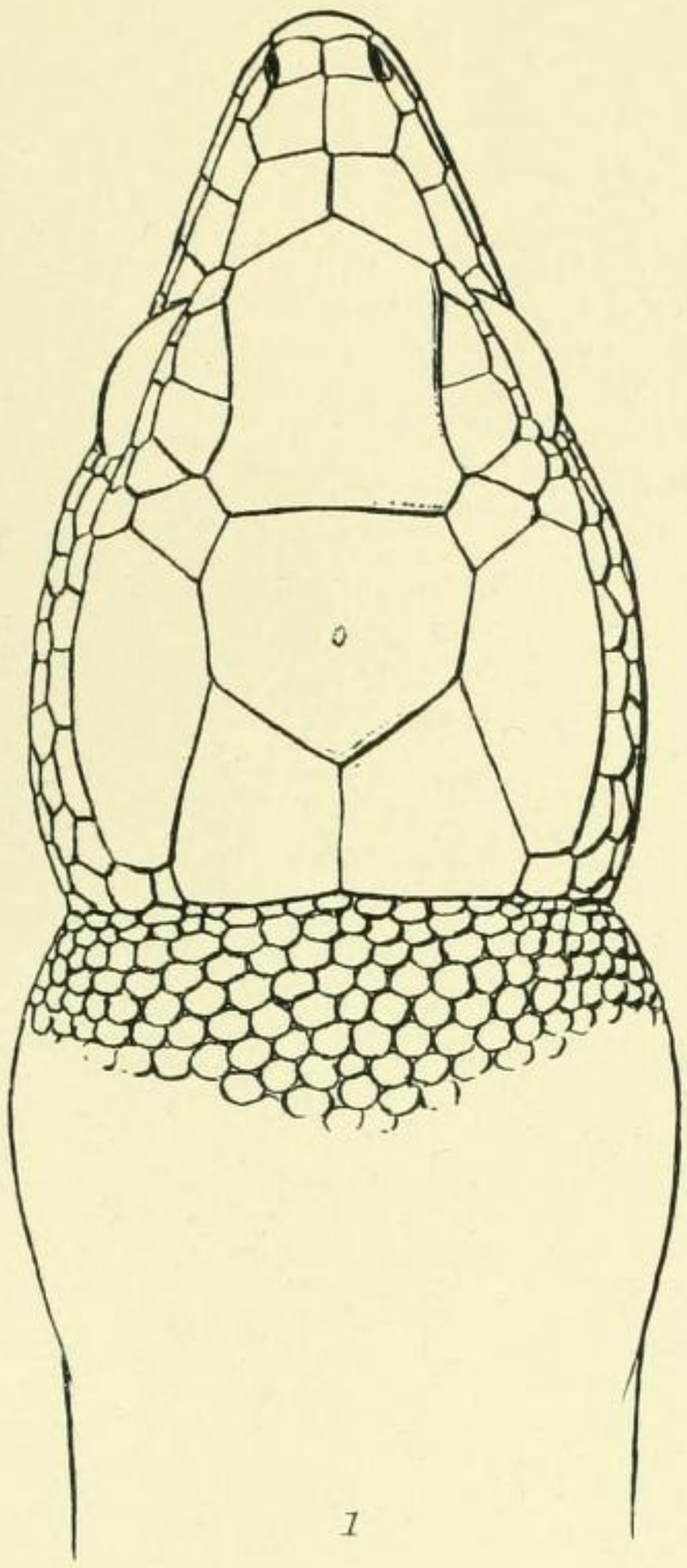
Fig. 2. Cyclura macleayi Gray.
(Barbour and Noble, Bull. M. C. Z., 1916, **60**, plate **2**.)
M. C. Z. 11,050. Valley of Luis Lazo, western Cuba. Carlos de la Torre and Thomas Barbour.
Side of head.

Fig. 3. The same.
Top of head.

Fig. 4. Typhlops lumbricalis (Linné). 14 × nat. size.
M. C. Z. 7,929. Soledad, near Cienfuegos, Cuba. Rosamond and Thomas Barbour.
Top of head.

Fig. 5. The same.
Side of head.

Fig. 1, 4, 5. E. N. Fischer, del.
Fig. 2, 3. George Nelson, photo.



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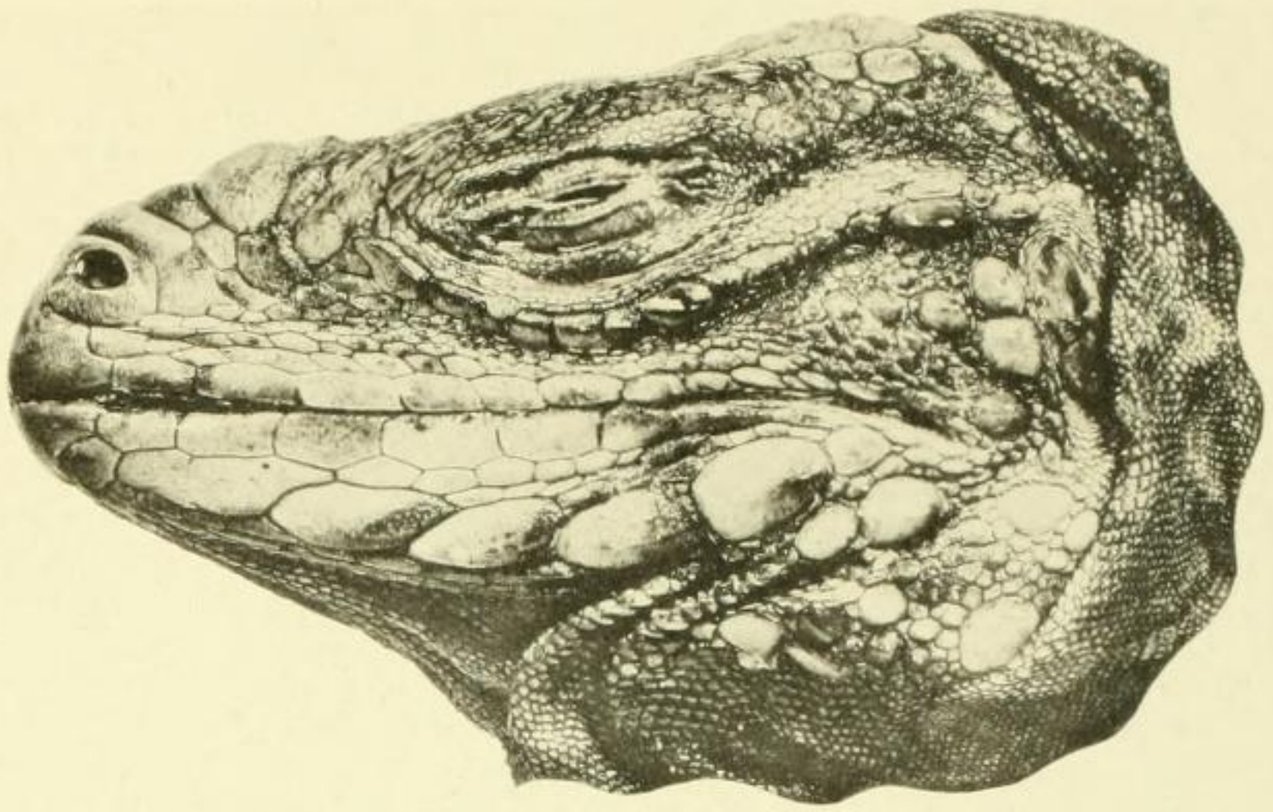

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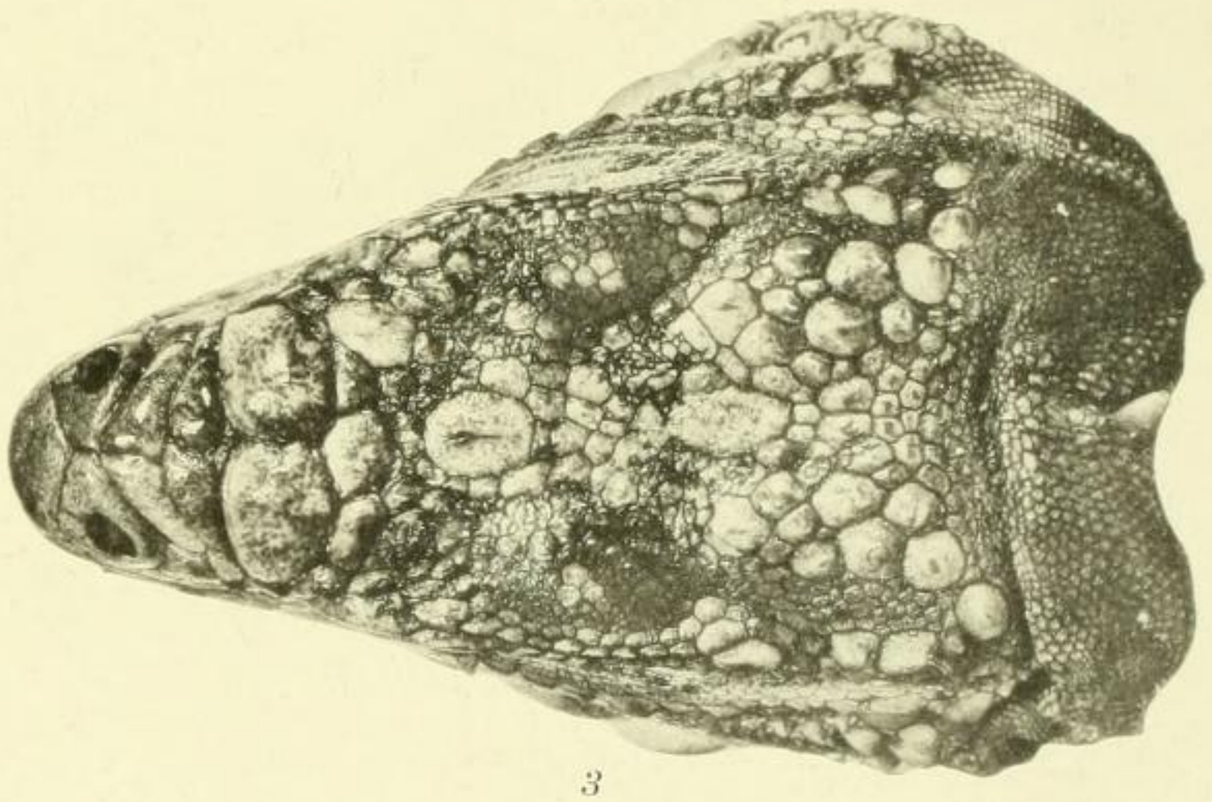

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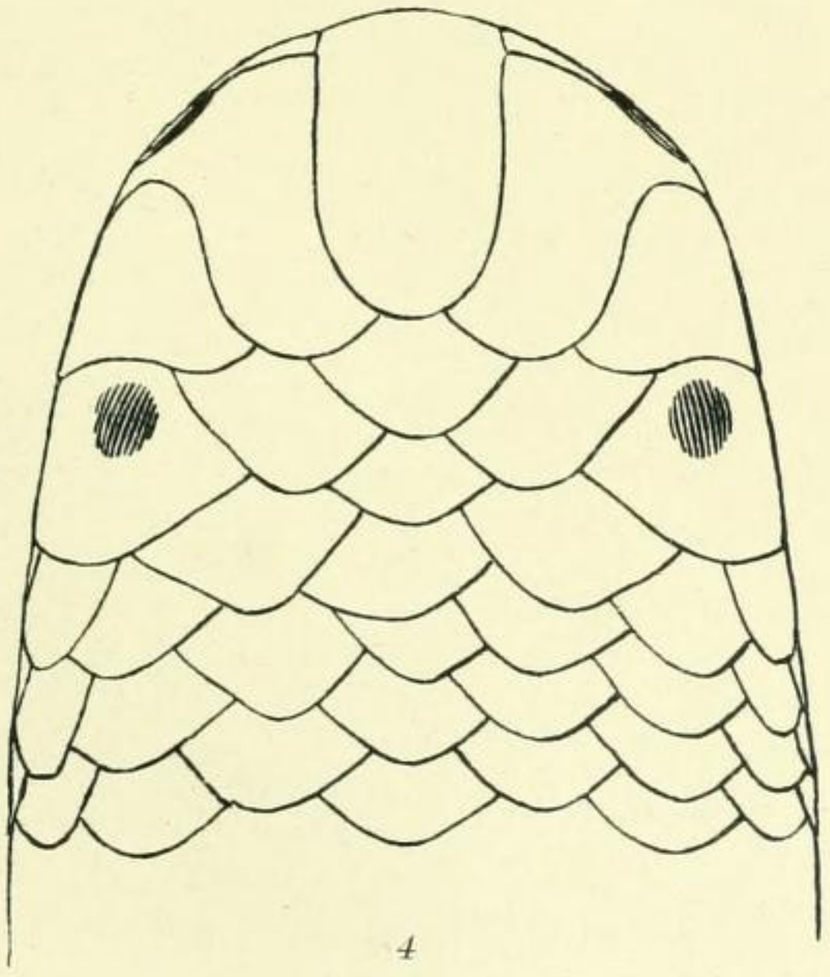

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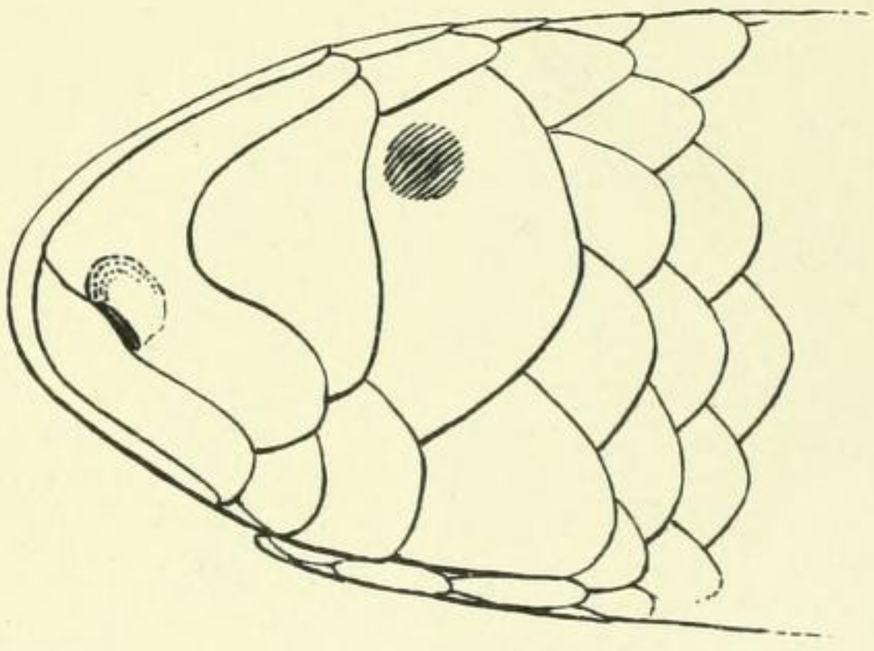

5

HELIOTYPE CO. BOSTON