

**Article III.—THE REPTILES OF HAINAN<sup>1</sup>**BY KARL PATTERSON SCHMIDT<sup>2</sup>

With Abstracts from the Field Notes of Clifford H. Pope

PLATE XXVII, TEXT FIGURES 1 TO 17

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## INTRODUCTION

The Island of Hainan occupies a position of especial interest for the student of the Chinese fauna. Lying almost wholly south of latitude 20° N., it is the southernmost extension of the Chinese Empire. In the same latitude as northern Indo-China and northern Luzon, its faunal relations are primarily Oriental and its fauna is more purely tropical in character than that of any other corner of China. In spite of its rather narrow separation from the mainland, its herpetological fauna contains a considerable number of endemic forms, though their number may be reduced in the future by discoveries in southern China and Indo-China. A number of forms first described from Hainan have since been recorded from the mainland, and the present studies, on the whole, serve to reduce the proportion of forms confined to the island.

The collection of amphibians and reptiles made by Mr. Clifford H. Pope for the Third Asiatic Expedition of The American Museum of Natural History, during his stay in Hainan from December 1922 to July 1923, is by far the most extensive in number of both specimens and species that has yet come from this island. Of no less importance is the excellence of the preservation of his specimens. Mr. Pope has given an interesting account of his work in Hainan in 'Natural History' (Pope, 1924).

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The present paper concerns only the reptiles<sup>1</sup> of Mr. Pope's collection, of which there are fifteen hundred and eighty specimens, representing forty-nine species. Listed according to the families represented, these specimens and species are distributed as follows:

	NUMBER OF GENERA	NUMBER OF SPECIES	NUMBER OF SPECIMENS
<b>TURTLES</b>			
Platysternidæ	1	1	17
Testudinidæ	4	5	77
Trionychidæ	2	3	7
<b>LIZARDS</b>			
Gekkonidæ	2	2	154
Agamidæ	4	4	398
Varanidæ	1	1	5
Lacertidæ	1	1	214
Scincidæ	5	5	101
<b>SNAKES</b>			
Typhlopidae	1	1	37
Pythonidæ	1	1	7
Colubridæ ( <i>sens. lat.</i> )	16	24	528
Crotalidæ	1	1	41

Five species, two lizards and three snakes, appear to be new:<sup>2</sup>

*Sphenomorphus leveretti*  
*Lygosaurus salisburyi*  
*Sibynophis hainanensis*  
*Natrix popei*  
*Natrix andrewsi*

Eleven more, five turtles, one lizard and five snakes, are additions to the fauna of Hainan:

Turtles  
*Platysternon megacephalum*  
*Clemmys bealii*  
*Cyclemys trifasciata*  
*Pyxidea mouhotii*  
*Pelochelys cantorii*  
Lizards  
*Eumeces quadrilineatus*  
Snakes  
*Elaphe taniura vaillanti*

<sup>1</sup>A paper on the Amphibians of Hainan is in course of preparation by Dr. G. K. Noble and Clifford H. Pope.

<sup>2</sup>Advance diagnoses of the new forms were published in American Museum Novitates, No. 157, pp. 1-5, February 13, 1925. If Werner, 1924, antedates this, it will be necessary to place *Natrix andrewsi* in the synonymy of *Natrix ornaticeps* (Werner). This paper, however, was not received in the United States until about April, 1925, and Werner (1926) merely states that his paper has priority (which is, of course, probable), without mention of the date of publication.

*Elaphe porphyracea*  
*Ahaetulla boiga*  
*Bungarus multicinctus*<sup>1</sup>  
*Calliophis macclellandii*

While the entire collection was made with Nodda as a base, the actual localities of collection lie within a considerable radius of Nodda, most of the specimens having been brought in by native boys or hunters. Specimens collected in the mountainous area south of Nodda have been so distinguished in the following account of the species.

In the course of studies for the present report, I have been indebted for advice especially to Dr. Leonhard Stejneger, whose contributions to Oriental herpetology make him the chief authority in this field. Many points have been discussed with Mr. Pope, whose first-hand knowledge has thus supplemented my laboratory acquaintance with the specimens. For access to the collections in their care and for friendly aid while studying those collections, I am indebted to Dr. Stejneger and Miss Doris Cochran at the United States National Museum, to Dr. G. K. Noble and Mr. Pope at The American Museum of Natural History, and to Dr. Thomas Barbour and Mr. Arthur Loveridge at the Museum of Comparative Zoölogy at Harvard University.

For the opportunity to report on the results of the work of the Third Asiatic Expedition, I am indebted to Mr. Roy Chapman Andrews, and the arrangement has been made possible by a cordial coöperative agreement between The American Museum of Natural History and the Field Museum of Natural History.

#### SUMMARY OF PREVIOUS CONTRIBUTIONS TO THE HERPETOLOGY OF HAINAN

Our knowledge of the reptiles of Hainan begins with the list published by Swinhoe in 1870, in which he enumerates nine species, identified by Günther, with some observations of his own upon them. These are:

*Varanus dracaena*  
*Mabouia chinensis*  
*Peripia peronii*  
*Draco* species

*Calotes versicolor*  
*Liolepis guttatus*  
*Simotes* species  
*Tropidonotus stolatus*

*Python molurus*

Six of these species reappear in Boulenger's catalogues of specimens in the British Museum. *Mabouia chinensis* is apparently referred to *M. siamensis*; *Peripia peronii* to *Hemidactylus frenatus*; *Simotes* sp. to

<sup>1</sup>Recorded by Boulenger from the Neumann collection.

*Simotes violaceus*; and *Tropidonotus stolatus* appears without change. The *Draco* sp. reappeared in the Whitehead collection as *Draco whiteheadi* Boulenger. Singularly enough, the *Varanus* was omitted from all subsequent lists, to reappear in the present collection, together with *Peropus mutilatus* (= *Peripia peronii*).

Boettger in 1888 records a collection made in Hainan by Otto Herz. He lists the following sixteen species, of which thirteen are additions to the known reptile fauna:

<i>Calotes versicolor</i>	<i>Hypsirhina bennetti</i>
<i>Liolepis bellii</i>	<i>Hypsirhina chinensis</i>
<i>Eumeces chinensis</i>	<i>Hypsirhina plumbea</i>
<i>Typhlops braminus</i>	<i>Naja tripudians</i>
<i>Ptyas korros</i>	<i>Hydrophis cyanocinctus</i>
<i>Ptyas mucosus</i>	<i>Hydrophis gracilis</i>
<i>Tropidonotus quincunciatus</i>	<i>Hydrophis viperinus</i>
<i>Tropidonotus stolatus</i>	<i>Trimeresurus erythrurus</i>

In 1894 Boettger makes three additions to this list from the collection of Bernhard Schmacker. These are:

*Clemmys schmackeri*, new species  
*Mabuia multifasciata*  
*Simotes hainanensis*, new species

In the 'Catalogue of Snakes' Boulenger records a collection of snakes received from J. Neumann, supposedly made at Hoi-How, Hainan. The species represented are:

<i>Python molurus</i>	* <i>Simotes chinensis</i>
* <i>Tropidonotus tigrinus</i>	<i>Hypsirhina plumbea</i>
* <i>Dinodon rufodorsatum</i>	<i>Hypsirhina chinensis</i>
<i>Zamenis korros</i>	* <i>Bungarus candidus</i>
* <i>Zamenis spinalis</i>	<i>Naja tripudians</i>
* <i>Coluber rufodorsatus</i>	* <i>Ancistrodon blomhoffii</i>
* <i>Coluber dione</i>	

Eight of these thirteen species (marked \* above) are new to the Hainan list; and, of these, six are North Chinese forms, which were scarcely to be expected in Hainan. Stejneger (1907, p. 318) suggests that these records require confirmation. Mell (1922, p. 104) states that Neumann also collected in northern China and he omits these species from his faunal list for Kwangtung and Hainan, as of erroneous record. Finally, not one of these six species occurs in the present extensive collection and, in view of this fact, I prefer to disregard the entire list. This deletes in addition to the northern species, only *Holarchus chinensis* from the Hainan list, *Bungarus multicinctus* reappearing in the present collection.

Cope recorded a small collection of seven species from Hainan in 1895. His additions to the fauna are the singular water-snake, *Trimerydytes balteatus*, and *Amblycephalus moellendorffi*. His *Holarchus dolleyanus* appears to be a synonym of *H. violaceus*.

The next important contribution to the fauna is Boulenger's report on the collection made by Mr. John Whitehead in the interior of Hainan, on the expedition which cost him his life. The reptiles recorded are:

\**Draco whiteheadi*

*Calotes versicolor*

\**Acanthosaura hainanensis*

*Tropidonotus chrysargus*

Two of these (marked \*) are new species, and *Tropidonotus chrysargus* is a further addition to the fauna.

In 1906 Siebenrock described *Amyda steindachneri*, from Hainan and Indo-China, and added records of *Ocadia sinensis* and *Amyda sinensis* to the Hainan list. A single species of turtle (*Clemmys schmackeri*) was previously known from Hainan.

Barbour, in 1908 and 1909, records a number of specimens secured from the Owston collection, of which four are new to Hainan and three are new species. His additions are:

*Goniurosaurus hainanensis*

*Holarchus nesiotis*

*Natrix æquifasciata*

*Boiga multimaculata*

Following the nomenclature of Stejneger's important 'Herpetology of Japan' (which contains some valuable remarks on the Hainan fauna), Barbour's paper introduces some of the Hainan species under the names now in use. In 1912 Barbour added *Psammodynastes pulverulentus* to the Hainan list, and discussed several of the Hainan species.

Vogt, in 1913, records a collection of fourteen species from Hainan, collected by Herr Schoede and presented to the Berlin Museum. Vogt concludes his paper with a list of the reptiles known from Hainan, enumerating four turtles, nine lizards, and twenty-five snakes. This list omits, *Peropus mutilatus*, *Varanus salvator*, *Natrix chrysarga*, *Boiga multimaculata*, and *Disteira gracilis* and *viperina*. With these omissions, the omission of the entire Neumann list, and the additions above noted, the total species of reptiles known from Hainan in 1913 would be four turtles, eleven lizards, and twenty-one snakes, a total of thirty-six species.

Stanley (1914) records a few specimens from Hainan in the Shanghai Museum.

Mell and Vogt in 1922 gave a nominal list of the forms recorded from Hainan, and their notes on the Kwangtung fauna are of especial importance to the study of that of Hainan.

Dr. Malcolm A. Smith's 'Journey to the Interior of Hainan' (Smith, 1923), undertaken in 1923 during Mr. Pope's stay at Nodoa, resulted in the collection of thirty species of reptiles, the most extensive collection from Hainan thus far recorded. It is reported upon in two highly interesting papers, a narrative of the trip, and a report on the collection (Smith, 1923a). Four species of reptiles, two lizards and two snakes, are described as new, and seven more are additions to the known fauna.<sup>1</sup> These eleven<sup>2</sup> forms are the following:

<i>Takydromus sexlineatus</i>	<i>Leiolopisma laterale</i>
* <i>Gekko similignum</i>	<i>Natrix percarinata</i>
<i>Hemidactylus garnoti</i>	<i>Pseudoxenodon melli</i>
* <i>Tropidophorus hainanus</i>	<i>Lycodon subcinctus</i>
<i>Sphenomorphus indicus</i>	* <i>Achalinus meridianus</i>
* <i>Amblycephalus carinatus hainanus</i>	

The new species are marked with an asterisk.

Clifford H. Pope (1924, p. 218) records having seen the skin of a very large cobra, presumably a king cobra, at Nodoa. While this form is certainly to be expected in Hainan, I have omitted it from the final list pending the examination of a specimen.

#### ANNOTATED LIST OF THE SPECIES COLLECTED

##### TESTUDINATA

##### Platysternidæ

##### *Platysternon megacephalum* Gray

##### Figure 1

*Platysternon megacephalum* GRAY, 1831, Proc. Zool. Soc. London, p. 107.

*Platysternum megacephalum* BOULENGER, 1889, 'Cat. Chelon, Brit. Mus.,' p. 46, figs. 13-14. SIEBENROCK, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1742, fig. 2; 1909, Zool. Jahrb., Suppl., X, p. 450.

Seventeen specimens, A. M. N. H. Nos. 30108-30124, were collected by Mr. Pope in Hainan, all, apparently, being from the mountains some distance to the south. They form the first record of this species from Hainan.

The specimens form a series from a carapace length of 88 mm., with a sharply defined ventral marking, to one of 184 mm., without a trace of the ventral pattern, and with effaced growth-rings. The smallest specimen has only one growth-ring on its horny shields. I do not find any sex

<sup>1</sup>Dr. Smith's changes in the nomenclature of the sea-snakes, in his fine monograph of this group (1926), are incorporated in the list at the end of this paper.

<sup>2</sup>*Boiga multimaculata* and *Amblycephalus moellendorffi* are included in the list of additions by Smith.

differences in measurements in this series, beyond the usual concavity of the plastron in males.

The measurements<sup>1</sup> of the shells of ten specimens are shown below, with the average for sixteen.

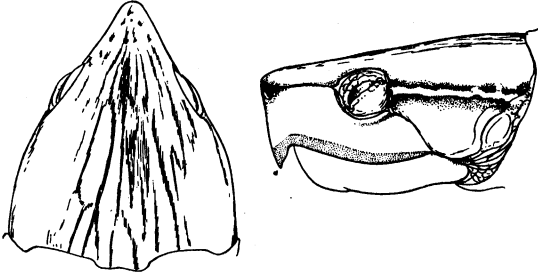


Fig. 1. *Platysternon megacephalum*, A. M. N. H. No. 30109.  
Head from above and from side, life size.

A. M. N. H. No.	LENGTH CARAPACE	BREADTH CARAPACE	GREATEST DEPTH	LENGTH PLASTRON	LENGTH TAIL
30108	85 mm.	71 mm.	26 mm.	64 mm.	90 mm.
30109	98	81	31	76	104
30112	110	85	37	85	121
30113	115	90	36	93	123
30115	134	105	45	101	153
30117	148	100	43	118	158
30118	153	114	49	125	183
30122	166	114	50	125	182
30123	176	125	56	140	198
30124	184	129	62	139	..
Average of 16 specimens	136	101	43	107	146

"All of the specimens of this species were brought out of the mountains by a Loi.

"These turtles walk with their bodies slightly raised from the ground, with their tails dragging. Two specimens were timed and made respectively 25 and 27 feet per minute on level ground covered with short grass. When at rest, they usually draw the tail up close to one side. They bite when teased, but tend to hold on rather than to snap. When tapped on one side of the shell they raise the opposite side, apparently leaning toward the annoying object, like a toad (or like a snapping turtle)." (C.H.P.)

<sup>1</sup>In this, as in subsequent species, the length of carapace and plastron is on the median line; the breadth is the greatest breadth, and the depth the greatest vertical depth of the shell, all measurements being taken with calipers. The length of the tail is from the middle of the posterior border of the plastron

## Testudinidæ

*Ocadia sinensis* (Gray)

## Figure 2

*Emys sinensis* GRAY, 1834, Proc. Zool. Soc. London, p. 53.

*Ocadia sinensis* GRAY, 1870, 'Suppl. Cat. Shield Rept. Brit. Mus.,' I, p. 35.  
BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 85. SIEBENROCK, 1903, Sitzber, Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 334; 1906, Zool. Anz., XXX, p. 578. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58; p. 489, Pl. XXVIII, text figs. 377-381. SIEBENROCK, 1909, Zool. Jahrb., Suppl., X, p. 470. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 197.

Twenty-four specimens of this species, A. M. N. H. Nos. 30173-30196, are in the collection. This series offers no discrepancies from the excellent descriptions of Stejneger and Siebenrock.

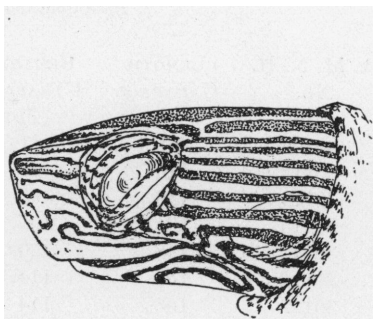
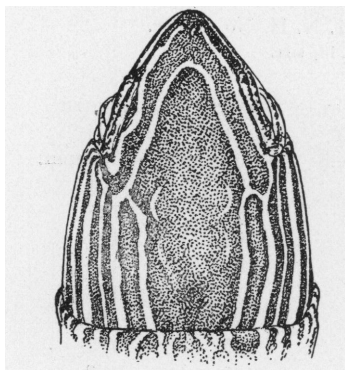


Fig. 2. *Ocadia sinensis*, A. M. N. H. No. 30184.

Head from above and from side, life size.

The measurements of ten specimens of this species are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON	TAIL LENGTH
30173	juv.	58 mm.	50 mm.	25 mm.	49 mm.	33 mm.
30176	juv.	80	64	37	67	40
30177	juv.	89	70	37	75	43
30179	♀	101	79	45	87	43
30184	♂	110	82	43	94	52
30189	♀	122	92	53	106	53
30191	♀	133	94	52	110	54
30194	♀	149	107	61	127	52
30195	♀	196	140	79	174	65
30196	♀	217	161	86	192	72
Average of 24 specimens		117	87	48	100	48



The uppermost narrow line in the head-pattern may be absent in large specimens of this species.

***Clemmys bealii* (Gray)**

Figure 3

*Cistuda bealii* GRAY, 1831, 'Syn. Rept.,' p. 71.

*Clemmys bealii* STRAUCH, 1862, 'Chelon. Stud.,' p. 32. BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 107. SIEBENROCK, 1909, Zool. Jahrb., Suppl., X, p. 482. MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A., Heft 10, p. 109. VOGT, 1922, idem, p. 135.

*Clemmys bealii* var. *quadriocellata* SIEBENROCK, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 336, Pl. I, figs. 1-2; 1909, Zool. Jahrb., Suppl., X, p. 482.

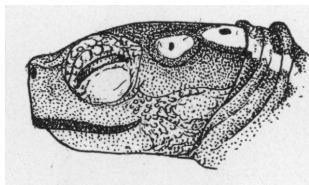
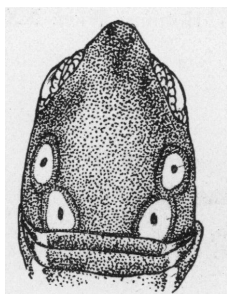


Fig. 3. *Clemmys bealii*, A. M. N. H. No. 28337.

Head from above and from side,  $\times 2$ .

Five specimens of this strikingly handsome species, A. M. N. H. Nos. 28337-28341, are in the collection, all brought from the mountains south of Nodoa. This form has not previously been recorded from Hainan.

In the largest specimen the temporal ocellæ are faded to a uniform gray, though still perfectly distinct. These are bright yellow rings surrounding a black spot in the four remaining specimens, and in all five there are two ocellæ on each side.

The measurements of this series are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON	LENGTH TAIL
28337	♂	58 mm.	59 mm.	25 mm.	45 mm.	28 mm.
28338	♂	78	67	31	62	30
28341	♂	121	58	41	100	47
28340	♀	121	89	42	102	41
28339	♀	129	91	46	108	39

The tail is somewhat longer in male than in female specimens, proportionately much longer in the juvenile specimen than in the larger ones. The smallest specimen is also proportionately wider and deeper.

These specimens evidently confirm the surmise of Vogt that *quadriocellata* and *bealii* are identical. The types, redescribed by Boulenger, consisted of a shell and a stuffed specimen, and it is evident that in a dried skin one of the pairs of ocellæ might have become obscure.

***Clemmys mutica* (Cantor)**

Figure 4

*Emys mutica* CANTOR, 1842, Ann. Mag. Nat. Hist., (1) IX, p. 482.

*Damonina mutica* BOULENGER, 1889, 'Cat. Chelon, Brit. Mus.,' p. 96.

*Clemmys mutica*, SIEBENROCK, 1910, Ann. Naturh. Hofmus. Wien, XXIII, p. 312, Pl. XII-XIII.

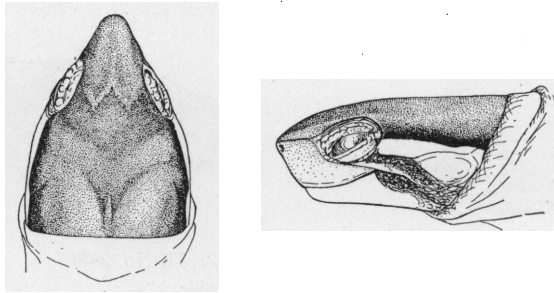


Fig. 4. *Clemmys mutica*, A. M. N. H. No. 30170.

Head from above and from side, life size.

*Clemmys schmackeri* BÖTTGER, 1894, Ber. Senck. Ges., p. 129, Pl. III, fig. 1. SIEBENROCK, 1906, Zool. Anz., XXX, p. 378; 1909, Zool. Jahrb., Suppl., X, p. 482. MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 109.

Nineteen specimens of this species, A. M. N. H. Nos. 30154-30172, are in the collection.

This is a well-marked species, with an invariable head pattern. Siebenrock's reference of *Clemmys schmackeri* to this species seems amply justified, as his excellent figures of a Formosan specimen leave little room for doubt of the identity of the form from Hainan with those described by him.

The measurements of ten specimens are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON	LENGTH TAIL
30154	juv.	65 mm.	54 mm.	32 mm.	56 mm.	21 mm.
30157	juv.	75	61	35	64	27
30158	juv.	93	71	40	79	33
30159	juv.	100	74	43	86	36
30160	juv.	110	83	45	91	45
30164	♀	118	87	48	96	37
30166	♀	132	97	51	109	48
30168	♂	145	106	54	122	47
30171	♀	149	108	58	129	41
30172	♀	154	110	61	127	50
Average of 19 specimens		114	85	46	96	40

The fifth vertebral shield, usually nearly equal in size to the fourth, is only half as large in No. 30165. An additional, irregular, fourth vertebral is present in No. 30155. The lateral yellow stripe of the head exhibits minor variations in form. It is usually continuous on the neck, with a straight upper border. A median nuchal stripe, which may be continuous with one at the base of the neck, may be present or absent. There is great variation in the amount of black color on the plastron in this series. No. 30154 (juv.) is uniform black beneath except for the edge of the marginals, the lower angle of the bridge, and a median line, which are yellow. In No. 30162 the plastral shields are black with a broad yellow border on their anterior and median sides. In No. 30168 the yellow color considerably exceeds the black, and black spots are absent from the gular shields.

Deposits of a red pigment (presumably from the water in which the turtles live) frequently obscure the yellow areas of the plastron.

### *Cyclemys trifasciata* (Bell)

#### Figure 5

*Sternotherus trifasciata* BELL, 1825, Zool. Journ. II, p. 305, Pl. XIII.

*Cyclemys trifasciata* BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.', p. 133. SIEBENROCK, 1907, Sitzber. Akad. Wiss. Wien (math-natur.), CXVI, Abt. 1, p. 1763; 1909, Zool. Jahrb., Suppl., X, p. 502. MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 108.

Twenty-eight specimens of this species, A. M. N. H. Nos. 30126-30153, form the first records of this species from Hainan.

The measurements of a series of ten specimens are as follows:

A. M. N. H. No.	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH ANT. LOBE	PLASTRON POST. LOBE
30127	58 mm.	49 mm.	25 mm.	23 mm.	29 mm.
30131	65	56	24	25	31
30132	76	65	26	29	36
30135	87	67	34	36	45
30137	99	73	40	42	53
30140	117	85	43	47	59
30149	136	97	49	55	66
30150	155	119	59	65	88
30152	173	122	65	70	94
30153	200	154	87	86	114
Average of 28 specimens	110	87	42	45	58

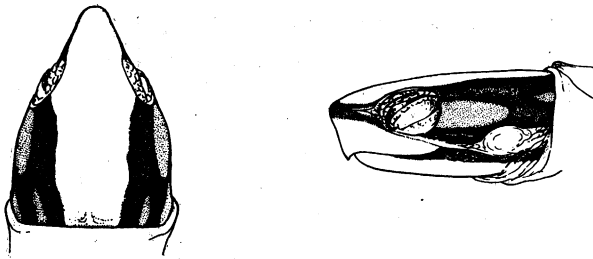


Fig. 5. *Cyclemys trifasciata*, A. M. N. H. No. 30144.  
Head from above and from side, life size.

As in other turtles with a hinged shell, the hinge is not developed in the younger specimens. In the present series it is not recognizable in specimens up to about 90 mm. in length, while those over 100 mm. have a well-developed and functional hinge.

The dorsolateral black lines of this species are absent in juvenile specimens and first appear in specimens about 100 mm. long. In the largest specimen there are supplementary black markings which extend from the lateral lines to the marginals, one on each costal shield. The whole plastron, with the exception of a narrow yellow outer border, is black in the young. By the growth of the shields, the central part of the plastron becomes yellow in adults, with rays of black from the latero-posterior black areas on each shield. This change of pattern conditioned by growth is evidently the same as in *Clemmys mutica*. Deposits of extraneous red pigment are frequent.

"This species, like *Clemmys mutica* and *Ocadia sinensis*, is common near Nodda. Two eggs, apparently ready to be laid, were taken from one of these turtles on May 17th. They were oval, 27 mm. by 50 mm., with a hard white shell." (C. H. P.)

***Pyxidea mouhotii* (Gray)**

Figure 6

*Cyclernys mouhotii* GRAY, 1862, Ann. Mag. Nat. Hist., (3) X, p. 157. BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 132.

*Pyxidea mouhotii* GRAY, 1863, Proc. Zool. Soc. London, p. 175. SIEBENROCK, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 345, Pl. I, figs. 3-4; 1909, Zool. Jahrb., Suppl., X, p. 505.

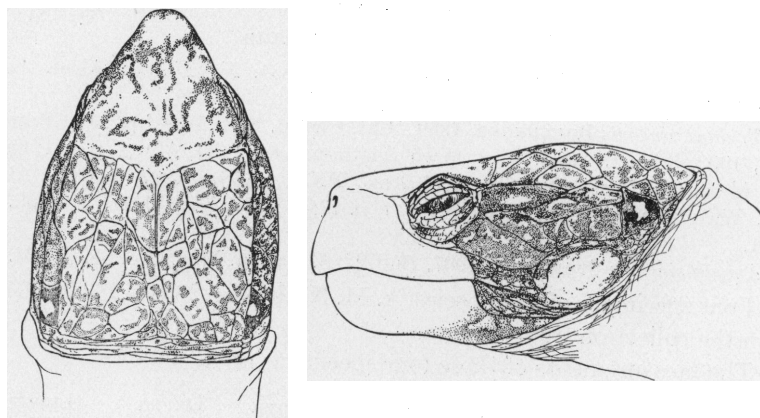


Fig. 6. *Pyxidea mouhotii*, A. M. N. H. No. 28336.  
Head from above and from side, life size.

A single specimen of this species is in the collection, A. M. N. H. No. 28336, ♀. It was secured at Nam Fong.

The length of the carapace is 163 mm., its breadth 119 mm. The greatest depth is 67 mm. The length of the anterior lobe of the plastron is 70 mm.; of the posterior lobe 87 mm.; its width at the hinge 92 mm.; the width of the bridge 52 mm. The length of the tail is 35 mm. The lengths of the sutures between the shields of the plastron are as follows: gulars, 25 mm.; humerals, 17 mm.; pectorals, 28 mm.; abdominals, 36 mm.; femorals, 20 mm.; anals 30 mm.

The color of the carapace is a uniform light brown, each costal with a diffuse black marking at its upper posterior corner, below the lateral keel. The plastron is grayish brown, with scattered small black spots. The outer borders of the gulars, humerals, femorals, and anals are black, and there

is a lateral black spot on each pectoral and on one of the abdominals. The head is brown with black spotting or vermiculation, with a yellow spot, outlined with black, behind and above the tympanum.

The specimen agrees well with Günther's figure (1864, Rept. Brit. India, Pl. IV, fig. *D*), and with Boulenger's description. The retention of the separate genus, *Pyxidea* Gray, for it seems justified, if only by the striking difference in habitus between it and the more aquatic *Cyclemys*.

It was previously known from Siam and Indo-China, and it has not been recorded from Kwangtung, even in the extensive collections of Mell.

### Trionychidæ

#### *Amyda sinensis* (Wiegmann)

*Trionyx* (*Aspidonectes*) *sinensis* WIEGMANN, 1834, Nova Acta Akad. Leop. Carol, XVII, p. 189.

*Trionyx sinensis* BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 256. SIEBENROCK, 1902, Sitzber. Akad. Wiss. Wien (math.-natur.), CXI, Abt. 1, p. 821, fig. 4; 1903, idem, CXII, p. 349; 1906, Zool. Anz., XXX, p. 581; 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1741; 1909, Zool. Jahrb., Suppl., X, p. 601.

*Amyda sinensis* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 524.

Four specimens of this species, A. M. N. H. Nos. 28344-28346, 30125, are in the collection from Hainan.

The measurements of these four specimens are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON
30125	juv.	47 mm.	43 mm.	17 mm.	36 mm.
28346	♀	103	86	29	77
28344	♀	177	154	50	134
28345	♀	236	194	74	183

The ventral pattern of this species is very distinct in the two smaller specimens, distinguishable in the next, and reduced to two diffuse lateral spots in the largest. It is invariable in general arrangement and appears to differ regularly from the pattern of *Amyda japonica* figured by Stejneger (1907, Pl. xxxv). I shall return to the interesting topic of variation in this species and its near relatives in connection with studies on the mainland specimens of *Amyda* collected by the Third Asiatic Expedition. There can be no question, however, of the applicability of the name *sinensis* (type locality near Macao) to the Hainan specimens at hand.

***Amyda steindachneri* (Siebenrock)**

*Trionyx steindachneri* SIEBENROCK, 1906, Zool. Anz., XXX, p. 579, Fig.; 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1766, Pl.; 1909, Zool. Jahrb., Suppl., X, p. 600. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 110. VOGT, 1922, idem, p. 136.

A single female specimen, A. M. N. H. No. 28343, represents this well-characterized species in the present collection.

The nasal septum is provided with papillæ. The whole anterior border of the carapace is tuberculate. The carapace is set with spinose tubercles, not confluent into rows, heaviest posteriorly. The venter is diffusely mottled with gray, with no trace of large black spots. The pattern of the side of the neck, shown in Siebenrock's figure, is faint but distinguishable.

The length of the carapace is 161 mm.; its greatest breadth 135 mm.; greatest depth 50 mm.; length of plastron 127 mm.

***Pelochelys cantorii* Gray**

Figures 7 and 8

*Pelochelys cantorii* GRAY, 1864, Proc. Zool. Soc. London, p. 90, Figs.

*Pelochelys cantoris* BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 263, Fig. 69. SIEBENROCK, 1902, Sitzber. Akad. Wiss. Wien (math. natur.), CXI, Abt. 1, p. 832, Fig. 12; 1903, idem, CXII, Abt. 1, p. 350; 1909, Zool. Jahrb., Suppl., X, p. 607.

Two specimens of this form were brought to Nodda. A. M. N. H. No. 28342 consists of head and front legs, with the skull prepared, and No. 23541, Feb. 1923, is a complete skeleton.

The figure of the skull given by Gray is defective, and I have accordingly presented drawings of the skull and hyoid of the present specimen. The body of the hyoid is remarkable for the presence of four pairs of ossifications, a generic character which distinguishes *Chitra* and *Pelochelys* sharply from other Trionychidæ.

The species has not before been known from Hainan, but is known from Kwangtung.

**SAURIA****Gekkonidæ*****Hemidactylus frenatus* Duméril and Bibron**

Figure 9

*Hemidactylus frenatus* DUMÉRIL AND BIBRON, 1836, 'Erpet. Gen.,' III, p. 366. BOULENGER, 1885, 'Cat. Lizards Brit. Mus.,' I, p. 120. BÉTTGER, 1894, Ber. Senck. Ges., p. 131. STEJNEGER, 1907, Bull. U. S. Nation. Mus. No. 58, p. 172, figs. 167-168. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. SMITH, 1923, Journ. Nat. His. Soc. Siam, VI, p. 197.

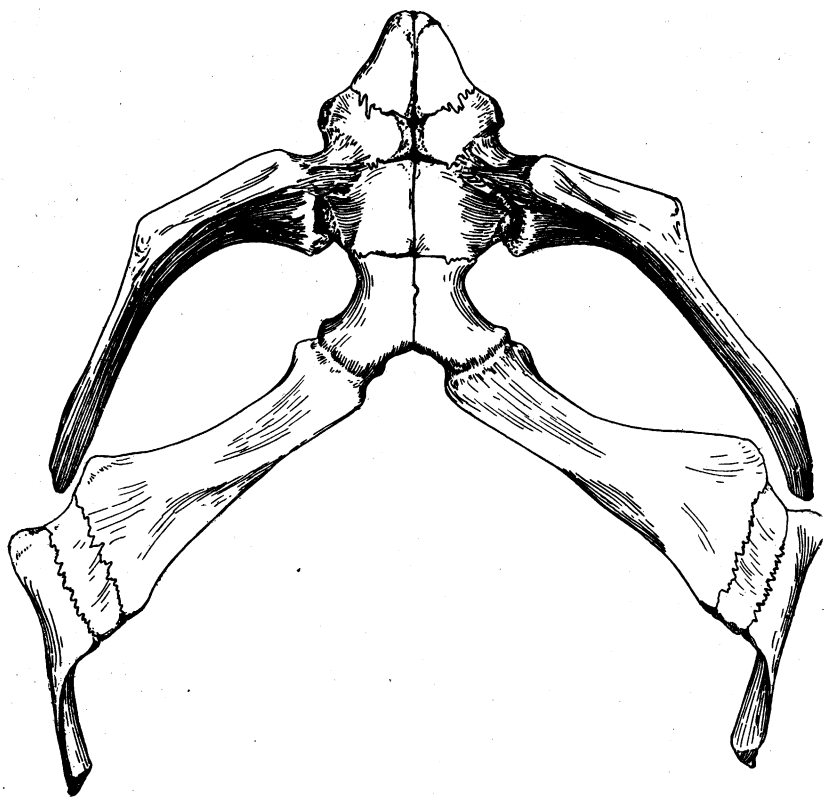


Fig. 7. Ventral view of hyoid of *Pelochelys cantorii*, A. M. N. H. No. 28342.  
(Terminal series of ossifications wanting), life size.



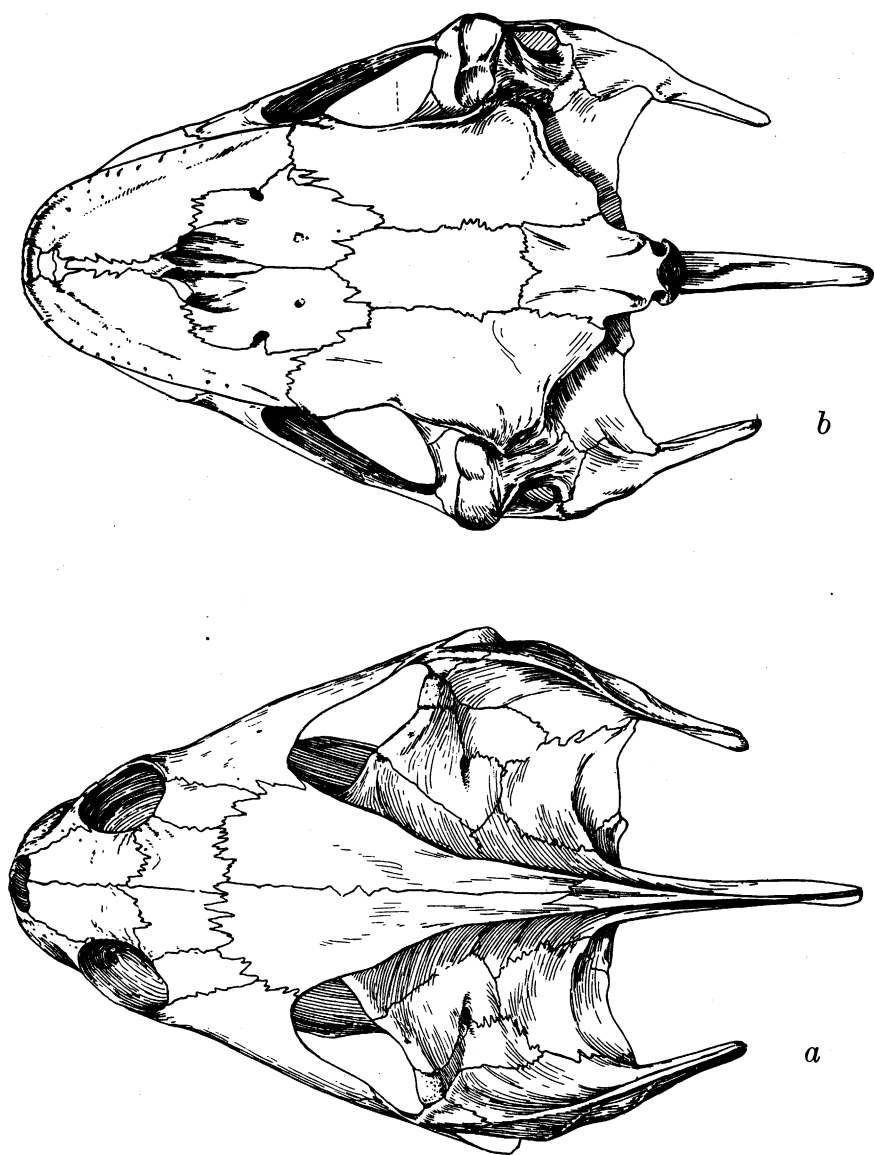


Fig. 8. Dorsal (a) and ventral (b) views of the skull of *Pelochelys cantorii*, A. M. N. H. No. 28342, life size.

One hundred and fifteen specimens of this species, A. M. N. H. Nos. 30298-30412, were collected at Nodoa.

These specimens agree in their principal characters with published accounts of this species. They exhibit a surprising variability in the arrangement of their chin shields, contrasting with the constancy of this character in *Peropus mutilatus*.

In the present series, seventy-five specimens have two pairs of chin shields, seventeen have an extra one on one side, and twenty-three have three pairs of enlarged chin shields, of which the last may be either in

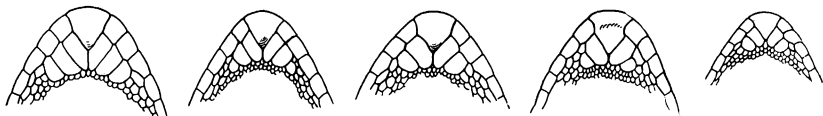


Fig. 9. Variation in the postmentals of *Hemidactylus frenatus*.

In A. M. N. H. Nos. 30320 and 30326 there are three pairs of chin shields, all in contact with the labials in the first, only two pairs in the second. In Nos. 30359 and 30325 there are two pairs of chin shields, both in contact with the labials in the former, only the anterior pair in the latter (an approach to the arrangement of *H. garnotii*). In No. 30303, the chin shields are separated by a small median postmental. All  $\times 3$ .

contact with the adjacent labials or separated from them. The length of the suture between the first pair is very variable. In two specimens they are separated by small granules. The second pair of these shields is separated from the labials in a single specimen, thus producing an arrangement very similar to the normal one in *Hemidactylus garnotii*. This variation is shown in the accompanying figures.

*Hemidactylus garnotii* is recorded from Hainan by Smith, but it is certainly not represented in the present collection. *Hemidactylus bowringii* may also be expected to occur in Hainan.

#### ***Peropus mutilatus* (Wiegmann)**

*Hemidactylus mutilatus* WIEGMANN, 1834, 'Herpet. Mex.,' I, p. 54.

*Peropus mutilatus* GIRARD, 1858, 'Herpetol. U. S. Expl. Exp.,' p. 277. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 180, Figs. 171-173.

? *Peripia peronii* SWINHAE, 1870, Proc. Zool. Soc. London, p. 239.

Thirty-nine specimens, A. M. N. H. Nos. 30413-30451, of this widely distributed species were collected in Hainan by Mr. Clifford H. Pope.

This form was recorded in Swinhoe's paper on Hainan reptiles in 1870, but the record is not confirmed by Boulenger, who lists *Hemidactylus frenatus* from Hainan, collected by Swinhoe, in the 'Catalogue of Lizards.' The fact that the species now reappears, and that it is evidently abundant in Hainan, seems to make it probable that Swinhoe

really did have some specimens of this species in his collections, though his record has been ignored in subsequent lists of Hainan reptiles.

The present series agrees excellently with the descriptions of Stejneger and Boulenger, and I find no important differences between the Hainan specimens and the large Polynesian series in the American Museum, collected by the Whitney South Sea Expedition.

"Among the live geckos we kept in a glass jar I noticed two distinct kinds, one with only four well-developed toes and spines on the tail, and one with five digits and a smooth, broad tail. The first of these (*Hemidactylus frenatus*) was a comparatively poor climber, and could not climb the vertical glass sides of the jar, while the other (*Peropus mutilatus*) could easily do so.

"I saw a *Peropus* deliberately lick the bottom of his digits. He held his front foot to his mouth and, by projecting his tongue, licked the under surfaces of his fingers with the under side of his tongue.

"About July 13th I saw the first very small gecko seen here, and others on July 18th, 24th, and 28th, evidently just hatched." (C. H. P.)

### Agamidæ

#### *Draco whiteheadi* Boulenger

*Draco* sp., SWINHOE, 1870, Proc. Zoöl. Soc. London, p. 240.

*Draco whiteheadi* BOULENGER, 1899, Proc. Zoöl. Soc. London, p. 956, Pl. LXVI, fig. 1. BARBOUR, 1909, Proc. New England Zoöl. Club, IV, p. 63. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 199.

Sixty-nine specimens, A. M. N. H. Nos. 30890-30958, of this species were secured near Nodoa, sixty of which were collected on December 12th and 16th, 1922.

Without a series of the mainland *Draco maculatus*, I am unable to form an opinion as to the degree of difference between these species. The coloration of the wings appears to be different. The color-pattern of the gular appendage in the male is variable; the colors are no longer discernible.

This species, like *Calotes versicolor*, apparently does not reproduce its tail.

This is another form not seen wild by Mr. Pope. It is evidently found only at a distance from Nodoa. The series mentioned was said to have come from six miles southwest of Nodoa, across the river.

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## Summary of Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Length of Body	♂	51	39- 80 mm.	....
	♀	18	37- 72	....
Total Length	♂	45	108-218	....
	♀	17	102-197	....
Length of Tail	♂	45	69-143	....
	♀	17	65-125	....
Ratio of Tail to Total Length	♂	45	.62-.66	.64
	♀	17	.63-.66	.64

"In my December field notes I have the following entry: Yesterday nineteen of the so-called 'flying-snakes' were brought in. They are lizards, of course. I tied a thread to the foot of one of them and tried letting him fall from various heights. The 'wings' were invariably spread as soon as the lizard was allowed to fall or move downward rapidly. When dropped from a fifteen-foot elevation it landed lightly on the grass below, although it fell nearly vertically; it did not attempt to glide. The 'wings' seem to be simply an aid to its jumps.

"Their protective coloration is almost as remarkable as the wings. When put in a basket over night, in which were a number of small branches, the lizards so arranged themselves as to be for the most part invisible. When I raised the lid in the morning, I thought that several must have escaped. Scrutiny revealed them stretched and flattened and fitted along the branches, legs clinging about the twig, and 'wings' pressed downward, not extended, so that the lizard's form was blended with and molded into that of the branch. Even the long thin tail was extended along the branch and not allowed to hang down. Their color blends perfectly with that of the bark. When annoyed, they are slow to move, as if realizing that their 'low visibility' is their best protection." (C. H. P.)

*Acanthosaura hainanensis* Boulenger

*Acanthosaura hainanensis* BOULENGER, 1899, Proc. Zool. Soc. London, p. 957, Pl. LXVI, fig. 2.

Fifteen specimens, A. M. N. H. Nos. 30875-30889, were collected in the mountains south of Nodda and brought to Mr. Pope in July, 1923.

These agree with Boulenger's figure and description. *Acanthosaura crucigera*, with which Boulenger compared this species in the original description, is not available to me, but the Hainan series shows an astonishing agreement in color pattern with *A. lamnidentata*. From

the latter species they differ in the flat, smooth, dorsal and lateral scales, the intermixed larger ones being flat and keeled, while both large and small scales in *lamnidentata* are tubercular. In *hainanensis* the upper head scales are flat with a single keel, while in *lamnidentata* they are many-keeled or rugose.

The upper labials range from eleven to thirteen, the canthals and supraciliaries from ten to twelve.

The measurements of ten male specimens are as follows:

	EXTREMES	AVERAGE
Total Length	197-252 mm.	225 mm.
Body	71- 88	80
Tail	129-164	145
Arm	44- 52	47
Leg	67- 79	73

"About the first of July I hired Li Ah-Sen and sent him into the Loi Country, into the high mountains to the south. He returned on the 5th with two specimens of *Acanthosaura hainanensis*. These lizards were brilliant green in life with a jet-black head. It is evidently a mountain form, as we have not bought a single specimen." (C. H. P.)

### ***Calotes versicolor* (Daudin)**

*Agama versicolor* DAUDIN, 1803, 'Hist. Nat. Rep.,' III, p. 395, Pl. XLIV.

*Calotes versicolor* FITZINGER, 1826, 'Neue Class. Rept.,' p. 49. SWINHOE, 1870, Proc. Zool. Soc. London, p. 240. BOULENGER, 1885, 'Cat. Lizards Brit. Mus.,' I, p. 331. BÖTTGER, 1888, Ber. Offenbacher. Ver. Naturk., XXVI-XXVIII, p. 61; 1894, Ber. Senck. Ges., p. 131. COPE, 1895, Proc. Acad. Nat. Sci. Phila., (1894), p. 428. BOULENGER, 1899, Proc. Zool. Soc. London, p. 957. BARBOUR, 1909, Proc. New England Zool. Club., IV, p. 62. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. SMITH, 1923, Journ. Nat. Hist. Soc., Siam, VI, p. 199.

One hundred and five specimens, A. M. N. H. Nos. 30960-31064, of this species were collected at Nodoa.

### Summary of Measurements and of Scales Around the Body

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Total Length	♂	41	162-435 mm.	323 mm.
	♀	53	153-405	274
Tail Length/Total Length	♂	41	.75-.78	.765
	♀	53	.75-.78	.764
Length of Hind Leg/Body Length	♂	44	.74-.90	.82
	♀	61	.74-.90	.82
Scales Around Mid-body	♂	44	40- 46	43
	♀	61	40- 47	44

Comparison material for the study of geographic variation in this species is not at hand. It seems likely that it may prove to be divisible into geographic races in the area from Afghanistan to Ceylon and Hainan, which constitutes its range.

"This is the commonest of lizards, their numbers undiminished in the mission compound in spite of all that were collected for us. They are essentially bush or tree inhabitants, usually seen descending a palm or on the garden wall, never seen on the ground except when apparently en route to some support. They employ the common trick of arboreal animals of keeping the trunk of the tree between themselves and an approaching person.

"During the winter I saw no brightly colored *Calotes*, and had replied in the negative to Mr. Leverett's question as to whether we had secured a red-headed tree-lizard. On March seventeenth I came upon a *Calotes* with head, throat, and shoulders crimson, with a black spot on each cheek. Recalling Mr. Leverett's query, I eagerly grabbed this specimen. Before I recovered my balance, a glance showed me that I was holding a brown-shouldered and brown-headed lizard, with no black spots, and only a little pale crimson on the throat. I have never seen a more sudden or complete color change." (C. H. P.)

#### ***Leiolepis belli* (Gray)**

*Uromastix belli* GRAY, 1827, *Zoöl. Journ.*, III, p. 216.

*Lioplepis belli* CANTOR, 1847, 'Cat. Malay Rept.', p. 41. BOULENGER, 1885, 'Cat. Lizards Brit. Mus.', I, p. 403. BÖTTGER, 1893, 'Kat. Rept. Mus. Senck.', I, p. 55.

*Lioplepis guttatus* SWINHOE, 1870, *Proc. Zoöl. Soc. London*, p. 240.

*Lioplepis reevesii* STANLEY, 1914, *Journ. N. China Branch Roy. Asiatic Soc.*, XLV, p. 25.

Two hundred and ten specimens of this species, A. M. N. H. Nos. 30666-30874, 30959, were secured in the neighborhood of Nodda.

The males of this species are characterized by their larger size and brilliant coloration. Juvenile specimens have three longitudinal, dorsal, light lines, which become broken up by the reticulate pattern between them with the growth of the individual.

Three to five of the subdigital lamellæ at the base of the third toe are strongly modified, suggesting the "comb" of *Cyclura* and the allied iguanid genera. So well defined a structure would be expected to have some definite function, the discovery of which must wait observations on this species in life.

The well-defined lateral fold at the base of the abdomen, whose edge is stiffened by prolongations of the posterior ribs, is a distinctive char-

acteristic which also awaits investigation from a student of the living animal. It seems possible that it may be an adaptation for burying the body in sand, like the broadening of the bodies of numerous desert-inhabiting lizards, and the adult pattern strongly suggests that of other sand-loving lizards. I quote the curious account of Swinhoe as to the function of this lateral expansion, as, although it seems a rather fanciful one, it may help to focus the attention of some observer on this point. Swinhoe's observations, at the least, require verification. Part of his account follows:

They lay basking in the sun, and when disturbed would run with great speed to the mouths of their holes, where they would stop short and turn their heads about. If not satisfied with what they saw, they popped at once into their holes. If surprised far from their holes, they spring into the air while running, and, expanding the loose red skin of their sides, skim along the surface of the sand for a considerable distance (say, often twenty yards at a time) and thus reach their retreats at greater speed. Their flight is not continued by flaps, but seems to be merely a long sustained leap, the body being made buoyant by the expanded side skin, and is analogous to the flight of the Flying-fish.

Variation in the labial scales, which appears to be independent of age and sex, is as follows:

NUMBER OF UPPER LABIALS	NUMBER OF COUNTS
6	2
7	25
8	183
9	183
10	27

Variation in the number of femoral pores also seems to be unexpectedly independent of age and sex:

NUMBER OF FEMORAL PORES	NUMBER OF COUNTS		
	♂	♀	juv.
12	3	3	2
13	52	16	24
14	82	29	54
15	61	29	31
16	12	12	5
17	2	1	2

## Summary of Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Total Length	♂	87	236-438 mm.	340 mm.
	♀	40	197-320	263
	Juv.	58	155-234	193
Ratio of Tail	♂	87	.64-.70	.666
Length to	♀	40	.64-.70	.680
Total Length	Juv.	58	.67-.70	.686
Ratio of Leg	♂	106	.61-.72	.661
Length to	♀	45	.62-.74	.678
Body Length	Juv.	59	.65-.77	.718

"These lizards, whose local name is 'Pore-lung,' were uncommon until the first of March, when they began to appear in numbers. They are exceedingly abundant in the open rolling country, with sparse vegetation, about Nodoa.

"The Pore-lung is a swift runner, but takes refuge in his hole sooner or later, if pursued. A healthy rat-terrier gave chase to one and the lizard kept well in the lead for about 100 feet. Then he stopped short, and the terrier, after running past, came back and caught him.

"Their holes may be at the very edge of a well-frequented path. In general, the holes are inconspicuous and are concealed in the short grass. There is no mound at the opening, which is variable in shape, about an inch by an inch and a half. The holes extend for about two feet and at such an angle as to reach a depth of about one foot. They enlarge slightly below the ground. None were straight. Each hole was inhabited by a single lizard." (C. H. P.)

**Varanidæ*****Varanus salvator* (Laurenti)**

*Stellio salvator* LAURENTI, 1768, 'Syn. Rept.,' p. 56.

*Varanus salvator* CANTOR, 1847, 'Cat. Malay Rept.,' p. 29.

*Varanus dracæna* SWINHÖE, 1870, Proc. Zool. Soc. London, p. 239

Five *Varanus*, A. M. N. H. Nos. 31513-31517, were collected at Nodoa by Mr. Clifford H. Pope.

These agree excellently with Boulenger's description of *Varanus salvator* in every important character. Hainan and southern China represent the northeastern extreme of the range of this species.

In this series, the enlarged supraoculars are usually seven, eight occurring twice. The number of dorsal scales in a length equal to that of the occipital from the tip of the snout ranges from twenty-six to thirty,



nuchals in an equal length, counting from the posterior border of the skull, from twenty-four to twenty-eight. The scales between the occipital and the 'rostral' range from twenty-five to thirty. The transverse rows of ventrals, counted from the groin to the gular fold, number from eighty to ninety-three; the ventrals in a transverse row range from sixty-five to seventy-five. There is a distinct median groove on the snout.

"My hunter talks of monitors twelve feet long, but produces no evidence. The specimens secured came from Nam Fong, so it probably comes from the mountains south of that market.

"The first monitors brought in were very docile, and at most made half-hearted attempts to bite and to lash with their tails, with an occasional hiss. A female monitor, after egg-laying, became much more lively. When approached she raised herself on all fours, blew out her throat, hissed, and lashed with her tail. Her tail was a very effective whip, and was used like one; the little fox-terrier in the compound promptly learned to give her a wide berth. She was both deliberate and accurate with her blows.

"The ten eggs laid by this specimen were perfectly white, with a leathery shell. Their measurements range from  $39 \times 75$  mm. to  $41 \times 80$  mm. The egg-laying began on July 8th and was not completed until July 13th." (C. H. P.)

### Lacertidæ

#### *Takydromus sexlineatus meridionalis* (Günther)

*Tachydromus meridionalis* GÜNTHER, 1864, 'Rep. Brit. India,' p. 70, Pl. VIII, fig. D.

*Takydromus sexlineatus* SMITH, 1923, Journ. Nat. Hist. Soc. Siam., VI, p. 200.

Two hundred and fourteen specimens of this form, A. M. N. H. Nos. 30452-30665, are in the Hainan collection.

This subspecies differs from *T. sexlineatus sexlineatus* in having twelve or more longitudinal rows of ventrals and never more than one femoral pore on each side.

The number of longitudinal rows of ventrals varies as follows:

	♂	♀
12 Rows	73 specimens	77 specimens
14 Rows	25 specimens	36 specimens
16 Rows	.....	1 specimen

Six specimens have more than the normal four rows of enlarged dorsals, two having five and four six. The frontonasal and rostral are in

contact in sixty-three specimens, separated in one hundred and fifty. One specimen has a small median scale between the supranasals. One specimen has gulars 3-2 and one 4-3, otherwise there are uniformly three on each side.

These lizards are very badly infested with mites, which usually attach themselves beneath the ventral scales. Sixty-five is the maximum number found on a single specimen.

#### Summary of Measurements and Scale Characters

	SEX	NO OF SPECIMENS	EXTREMES	AVERAGE
Ventrals from Anal				
Plate to Collar	♂	98	20- 26	23
	♀	114	23- 28	25
Lamellæ beneath				
4th Toe	♂	97	17- 24	..
	♀	114	17- 25	..
Length Hind Leg/ Body Length	♂	98	.44-.52	.49
	♀	114	.38-.49	.44
Total Length	♂	27	180-240 mm.	212 mm.
	♀	16	166-224 mm.	205 mm.
Tail Length/Total Length	♂	27	.76-.81	.79
	♀	16	.76-.80	.79

"I have not seen a single specimen outside! A remarkable illustration of the possibility of missing an extremely common form entirely.<sup>1</sup> The natives began to bring them in in numbers about mid-April.

"One of these lizards laid five eggs in the laboratory on April 21st. The eggs are oval, nine to ten mm. in length, with a leathery shell." (C. H. P.)

#### Scincidae

##### *Mabuya multifasciata* (Kuhl)

*Scincus multifasciatus* KUHL, 1820, Beiträge Zool. Vergl. Anat., p. 126.

*Mabuya multifasciata* FITZINGER, 1826, 'Neue Class. Rept.,' p. 52. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

*Mabuia multifasciata* BÖTTGER, 1894, Ber. Senck. Ges., p. 131.

Forty-eight specimens of this species, A. M. N. H. Nos. 30250-30297, were collected at Nodoa.

<sup>1</sup>It seems likely that this lizard inhabits bunch grass, and that both body form and coloration are highly 'protective,' as I have myself observed in long tailed anoles with a similar habitat (Cf. Schmidt, 1921, Bull. Amer. Mus. Nat. Hist., XLIV, p. 11).

This proves to be a species with a small range of variability. The dorsal scales are nearly always tricarinate. Adult females may be distinguished by the white spots on the sides. All but three have six supraciliaries on each side, two having six on one side and five on the other, and one five on one side and four on the other. A single specimen has six upper labials on one side, seven being normal. The subdigital lamellæ beneath the fourth toe range from seventeen to twenty-one.

Female specimens are strongly spotted on the sides, each spot a white shaft confined to a single scale. The reproduced tail has transversely enlarged dorsal and ventral scales.

The maximum body length for the present series is 118 mm., in a female specimen with reproduced tail. The measurements of the largest specimen (male; A. M. N. H. No. 30286) with a complete tail are as follows:

Total Length	310 mm.
Tail Length	204
Length of Arm	35
Length of Leg	48

#### Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Scales around Mid-body	♂	21	28- 31	30.0
	♀	20	29- 32	30.3
Dorsals in a Longitudinal Row <sup>1</sup>	♂	21	40- 45	43
	♀	20	41- 46	43
Ventrals from Anus to Mental	♂	21	48- 55	52
	♀	20	48- 56	53
Ratio of Leg Length to Body Length	♂	21	.41-.48	.45
	♀	20	.40-.47	.42
Ratio of Tail Length to Total Length	♂	4	.64-.66	.65
	♀	3	.63-.64	.64

"This skink is to be seen everywhere in open bushy or grassy country and in thickets. It seems, however, to have a decided preference for the vegetation along streams. There it may be seen in the daytime walking about under the low growth. They draw themselves over the leaves, stopping frequently to look around. As soon as alarmed, off they go like a flash. When caught, they seem half stupified, but give one a good

<sup>1</sup>Counted from a point opposite the anal cleft to the parietals.

nip now and then. I have seen them in the mission garden, but they keep within reach of shelter and do not venture on the open lawn." (C. H. P.)

***Sphenomorphus leveretti*,<sup>1</sup> new species**

Figure 10

TYPE.—A. M. N. H. No. 30201; ♂; Mountains south of Nodda, Hainan; July 1923; Clifford H. Pope.

DIAGNOSIS.—Allied to *Sphenomorphus indicus*, from which it may be distinguished by its more elongate snout; the longer and more pointed frontal; the much greater extension of the rostral shield on the upper surface of the snout; the longer dorsal and nuchal scales; twenty-two compressed lamellæ beneath the fourth toe; and a more spotted dorsal pattern, the lateral black band of *indicus* being represented only by numerous black spots, while the mid-dorsal area is heavily spotted with black, without the median black line occasionally found in *indicus*.

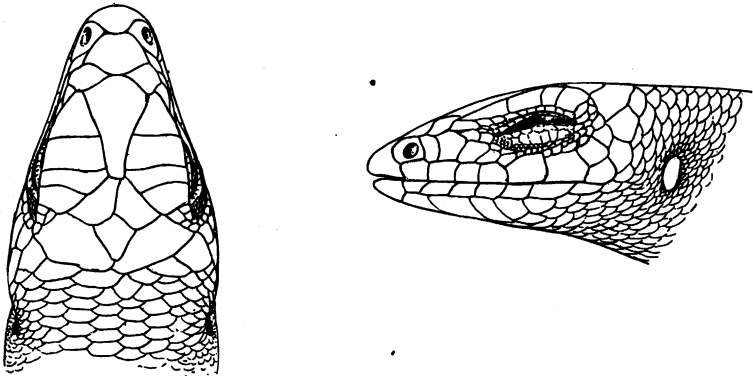


Fig. 10. *Sphenomorphus leveretti*, new species, A. M. N. H. No. 30201.

Head from above and from side,  $\times 2$ .

DESCRIPTION OF TYPE.—Rostral with a broad superior portion, about equal to two-thirds of the fronto-nasal, with which it makes a broad suture; no supranasals; nostril in a large nasal, which is bounded by the first labial, loreal, frontonasal, and rostral; anterior loreal little higher than the second, about two-thirds as long; seven upper labials, the fifth beneath the eye, fifth or sixth largest; frontonasal a little broader than long, in contact with the frontal; prefrontals moderate; frontal elongate, in contact with three supraoculars; four supraoculars; ten or eleven supraciliaries; lower eyelid with a semitransparent disc, which is composed of vertically elongate plates; fronto-parietals much larger than the interparietal; interparietal a little longer than wide; parietals in contact behind the interparietal; a row of five slightly enlarged nuchals bordering the parietals; temporals three in the first row, two in the second; ear opening oval, without lobules; a single large post-mental;

<sup>1</sup>Named for Reverend Wm. J. Leverett, of the American Presbyterian Mission, Nodda, Hainan.

dorsal scales smooth, with faint striæ; four enlarged preanals, of which the middle pair is much the largest; thirty-seven scales around the middle of the body; no enlarged subcaudals; fingers and toes with smooth subdigital lamellæ, those of the toes strongly compressed, but not truly keeled, twenty-one and twenty-three under the fourth toes; sixty-four scales in a dorsal row from a point opposite the rear face of the thighs to the parietals.

Upper parts dark brown, with a metallic green sheen, with scattered black spots; sides heavily spotted with black; venter immaculate gray; a light line extends from the loreal beneath the eye to the ear, and continues as a less distinct one to the arm; limbs with light spots, (or a dark net work) above; head shields, especially prefrontals, frontal, supraoculars and labials, with black spots.

#### Measurements of Type and Paratypes

A. M. N. H. No.	30201 TYPE ♂	30200 ♂	30202 ♀
Total Length	243 mm.	243 mm.	.....
Length of Body	86	87	97 mm.
Length of Tail	157	156	.....
Snout to Axilla	35	36	36
Axilla to Groin	47	47	58
Length of Arm	28	29	28
Length of Leg	43	45	40

The paratypes agree with the type excellently in coloration; the frontal is in contact with two supraoculars on one side and three on the other in all three; enlarged nuchals are scarcely distinguishable; the dorsal scales from base of tail to parietals range from sixty-six to sixty-eight; scales around the body range from thirty-six to thirty-eight; subdigital lamellæ beneath the fourth toe range from twenty-one to twenty-three.

#### *Leiolopisma reevesii* (Gray)

*Tiliqua reevesii* GRAY, 1838, Ann. Nat. Hist., II, p. 292.

*Hinulia reevesii* GRAY, 1845, 'Cat. Lizards,' p. 76.

*Eumeces reevesii* GÜNTHER, 1864, 'Rept. Brit. India,' p. 87, Pl. x, fig. k.

*Lygosoma nigropunctatum* BOCOURT. 1878, Ann. Sci. Nat., (6) VII, Art. 16, p. 2.

MOCQUARD, 1897, Bull. Mus. Hist. Nat. Paris, III, p. 213.

*Lygosoma laterale* (part) BOULENGER, 1887, 'Cat. Lizards Brit. Mus.,' III, p. 264.

*Lygosoma laterale* MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A., Heft 10, p. 114. VOGT, 1922, idem, p. 137.

*Leiolopisma laterale* (part) STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 218.

*Leiolopisma laterale* SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

Forty-six specimens, A. M. N. H. Nos. 30204-30249, collected at Nodda by Mr. Clifford H. Pope, are certainly referable to *Leiolopisma reevesii* Gray.

The Chinese lizards of this genus have been cited as a conspicuous instance of discontinuous distribution since their identification with *Leiolopisma laterale* of the southern United States, first suggested by Boulenger in 1887. Stejneger, in 1907, followed Boulenger in referring Riu Kiu Island specimens to *laterale*. Van Denburgh, in 1912, for the first time dealing with adequate series, found at least three recognizable forms, respectively in Formosa, Ishigakishima, and Tsushima. He, however, maintains their connection with *laterale* by writing them as subspecies, and he identifies the Tsushima form with *L. reevesii* Gray. This close association of a Chinese and a North American species is not especially improbable, in view of the striking number of reptilian genera which have a North American—East Asian distribution.

The large series of Chinese *Leiolopismas* now at hand, collected by Mr. Pope in Hainan and Hunan, and by Mr. Walter Granger in Szechwan, enable me to re-examine this question. Two conclusions seem evident: (1) that the south Chinese *Leiolopisma reevesii* is distinct from the central Chinese *L. modestum*; and (2) that neither *reevesii* nor *L. modestum* is conspecific with *L. laterale*, *L. modestum* being the more closely allied.

The Hainan specimens form a series remarkably uniform in habitus, scale characters, and coloration. These must unquestionably be referred to *L. reevesii* Gray.

Gray, in the 'Catalogue of Lizards,' mentions the color character which is most distinctive of the present series, namely the presence of white spots in the dark lateral band. Günther's (1864) figure of the head of the type shows the broad contact of the prefrontals, also a characteristic of the present series. Finally, Mell has shown that Reeves' material came from south China. It is to be regretted that no Canton specimens of *Leiolopisma* are at hand, but the extremely close agreement of the Hainan and Kwangtung faunas leaves no doubt in my mind that the Hainan series before me is authentic *Leiolopisma reevesii* Gray.

It is by no means easy to draw up an infallible distinction between this *reevesii* and the American *laterale* based exclusively on scale characters, though the higher average of scale rows around the body and the usual meeting of the prefrontals in *L. reevesii* are nearly constant. The coloration, however, seems to be notably distinctive; *reevesii* has much more yellow in its coloration, has the lateral dark bar broken with light spots or vermiculation, has scattered dark spots on the lower sides, and frequently has a dark mid-dorsal line. When the tail is complete, the lateral line extends to its tip.

The arrangement of the prefrontals in the series examined is as follows:

	BROADLY IN CONTACT	MEETING AT A POINT	SEPARATED
<i>L. reevesii</i> <sup>1</sup>	42	3	1
<i>L. modestum</i>	6	16	54
<i>L. laterale</i>	5	3	42

The scales around mid-body are thirty in seventeen specimens, thirty-one in one, thirty-two in seven, and thirty-three in one. In specimens of *L. laterale* examined by Van Denburgh and myself, this count ranges from twenty-six to thirty, the latter figure only once in twenty-eight specimens.

The number of lamellæ beneath the fourth toe in *L. reevesii* ranges from sixteen to nineteen, and this character is in close agreement in *L. laterale*.<sup>2</sup>

#### Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Scales Around Mid-body	♂	18	30- 32	30.4
	♀	9	30- 33	31.2
Dorsal Scales in a Longitudinal Row	♂	18	66- 74	70
	♀	9	69- 76	73
Lamellæ Beneath the Fourth Toe	♂	18	16- 19	17.6
	♀	9	17- 19	17.8
Length of Body	♂	18	41- 48 mm.	46 mm.
	♀	9	47- 53	50
Ratio of Leg-length to Body-length	♂	18	.31-.37	.34
	♀	9	.28-.33	.31
Total Length	♂	10	123-136 mm.	131 mm.
	♀	4	133-136	135
Ratio of Tail-length to Total Length	♂	10	.63-.67	.65
	♀	4	.62-.64	.63

The number of dorsal scales from the posterior sides of the thighs to the parietals ranges from sixty-six to seventy-six in twenty-seven *reevesii*, averaging seventy-one compared with a range of from sixty-one to seventy-two and an average of sixty-eight, in twenty-eight *L. laterale*.

<sup>1</sup>Smith records thirteen specimens, of which eight have the prefrontals in contact, four meeting in a point, and one separated.

<sup>2</sup>The specimen from Tsushima Island referred to *Leiolopisma laterale reevesii* by Van Denburgh appears to be amply distinguished from both *reevesii* and *modestum* by the small number of subdigital lamellæ beneath the fourth toe, twelve, compared with sixteen to nineteen in *reevesii*. For this specimen (Calif. Acad. Sci. No. 26134), I wish to propose the name *Leiolopisma vandenburghi*. It is an especial pleasure to attach the late Dr. Van Denburgh's name to this form, as he has led the way to an intelligible analysis of the oriental forms confounded with *L. laterale*.

*L. reevesii* is distinguished from *L. modestum* Günther, whose type locality is Ningpo, in part by the same characters which distinguish it from *L. laterale*. There is much more reason for a confusion of *L. modestum* with *laterale* than for the identification of *reevesii* with either. I shall return to this problem in a discussion of *L. modestum* in a subsequent paper of the present series.

"This is a very common little skink. I saw it most often in the late afternoon when it would run off the road ahead of me to rustle away in the grass. My collectors usually brought in four or five in a morning. There is a varying amount of red on the sides." (C. H. P.)

***Lygosaurus salsburyi*,<sup>1</sup> new species**

Figure 11

TYPE.—A. M. N. H. No. 30198 ; ♂; Nodoo, Hainan, China; 1923; Clifford H. Pope.

DIAGNOSIS.—Very clearly allied to *Lygosaurus sowerbyi* Stejneger, of Fukien, from which it may be distinguished by the greater number of subdigital lamellæ. In *sal.buryi* there are from nineteen to twenty-one lamellæ beneath the fourth toe, compared with fifteen or sixteen in *sowerbyi*. In the present form the part of the frontal anterior to its constriction is about equal to the posterior part, while in *sowerbyi* the anterior part of the frontal is much shorter than the posterior portion.

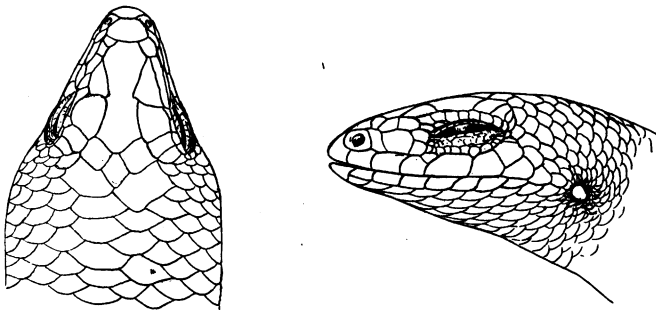


Fig. 11. *Lygosaurus salsburyi*, new species, A. M. N. H. No. 30199.

Head from above and from side,  $\times 2$ .

DESCRIPTION OF TYPE.—Habitus stout, with a moderately long conical tail, and short limbs, head not wider than the body, snout rather pointed, with sloping lores.

Rostral much broader than high; no supranasals; nostrils in rather large nasals; nasals in contact with the first labial, loreal, frontonasal, and rostral; two loreals, the first higher than broad, the second nearly square; six upper labials, fourth largest

<sup>1</sup>Named for Dr. Clarence G. Salsbury of the American Presbyterian Mission, Nodoo, Hainan.



and beneath the eye; prefrontals small, widely separated, apparently continuous with the supraciliary series; frontal very large, more than twice as long as its greatest width, with a strong lateral notch made by the angle of the first supraocular; three large supraoculars followed by a pair of smaller ones; eight or nine supraciliaries; frontoparietals larger than the interparietal, which is in contact with the frontal; parietals small, with a considerable suture behind the interparietal; no enlarged nuchals; three temporals in each row, lower anterior largest; ear opening small, round, without lobules; dorsal scales with two distinct keels, between which a median faint one is frequently present, indistinct additional lateral keels less frequent, all rather faintly striate; twenty-eight scales around the middle of the body; no enlarged preanals; forty-five scales in a dorsal row from a point opposite the posterior face of the thighs to the parietals; nineteen and twenty-one subdigital lamellæ beneath the fourth toes; no enlarged scales beneath the tail.

Dorsal ground color light brown, lighter on the sides and the venter light yellowish brown; sides heavily spotted with vertical black spots, each usually at the base of a scale, and with a more or less distinct light spot behind it; these spots unite to form a distinct black band from shoulder to ear, enclosing two or three light spots; temples, in front of the ear-openings, heavily spotted; a few sharply defined black spots at the sides of the chin and throat; mid-dorsal area posteriorly and on the tail with scattered longitudinal black shafts on the centers of scales; venter immaculate.

#### Measurements of Type and Paratype

A. M. N. H. No.	30198	30199
Total Length	171 mm.	.....
Length of Body	80	87 mm.
Length of Tail	91	.....
Snout to Axilla	30	31
Axilla to Groin	47	54
Length of Arm	16	17
Length of Leg	24	25

The single paratype agrees excellently with the type; one of its hind feet is lost and the tail is reproduced, with a short extra "nubbin" on one side. There are twenty-eight scales around the body; twenty subdigital lamellæ beneath the fourth toe; and forty-seven dorsal scales from the base of the tail to the parietals.

#### *Eumeces quadrilineatus* (Blyth)

##### Figure 12

*Plestiodon quadrilineatus* BLYTH, 1853, Journ. Asiatic Soc. Bengal, XXII, p. 652.

*Eumeces quadrilineatus* BOCOURT, 1879, 'Mission Sci. Mex.,' Rept., p. 423, Pl. XXII, D, fig. 5. BOULENGER, 1887, 'Cat. Lizards Brit. Mus.,' III, p. 381.

A single specimen of this species, A. M. N. H. No. 30197, ♂, was collected in the mountains south of Nodda, July 30th, 1923, by a Loi collector for the expedition.

This form has not hitherto been recorded from Hainan. I append a description of the present specimen (A. M. N. H. No. 30197).

Habitus slender; head slightly swollen at the temples; tail stout, incomplete.

Supranasals in contact behind the rostral; nostril large, in the center of a single nasal; a postnasal nearly or quite as long as the first loreal; frontonasal broader than long, not in contact with rostral or frontal; prefrontals nearly as large as the frontonasal, in contact; anterior loreal higher than the second, about one-third as long; seven or eight upper labials, fifth or sixth beneath the eye, last largest; mental followed by two postmentals; frontal six-sided, the lateral sides nearly parallel, its length about equal to its distance from the end of the snout, in contact with the anterior three supraoculars; four supraoculars; eight supraciliaries; frontoparietals about equal to the interparietal, somewhat larger than the prefrontals; parietals meeting behind the interparietal; three pairs of nuchals; two temporals in the first

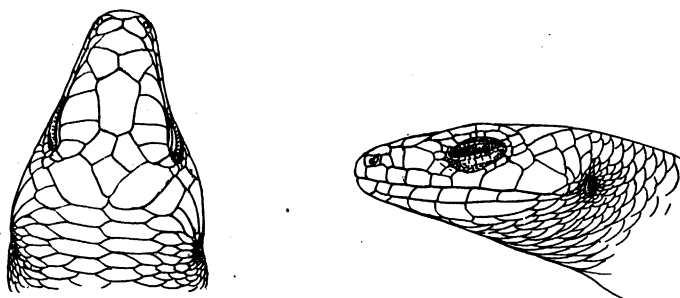


Fig. 12. *Eumeces quadrilineatus* Blyth, A. M. N. H. No. 30197.

Head from above and from side,  $\times 2$

row, lower the larger; lower temporal of the second row little larger than the upper, wedge-shaped; two or three small lobules on the anterior border of the ear; soles of the hind feet with two series of enlarged tubercles, which extend from the heel to the bases of the third and fourth toes; twenty scales around the middle of the body; eighteen lamellæ beneath the fourth toe; fifty-two dorsal scales from a point opposite the rear face of the thighs to the parietals.

Back very dark gray; head slightly brownish, venter light gray, yellowish gray beneath throat and tail; a pair of light dorsolateral lines extends from the parietals on the middle of the second scale row from the mid-dorsal line to the base of the tail, and these continue on the tail as broader lines, involving the outer part of the median two scale rows.

#### Measurements

Length of Body	72 mm.
Snout to Axilla	26
Axilla to Groin	44
Length of Arm	22
Length of Leg	28

**SERPENTES****Typhlopidae*****Typhlops braminus* (Daudin)**

*Eryx braminus* DAUDIN, 1803, 'Hist. Nat. Rept.,' VII, p. 279.

*Typhlops braminus* CUVIER, 1829, 'Regne Anim.,' 2nd Ed., II, p. 73. BÖTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 70; 1894, Ber. Senck. Ges., p. 132; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 1. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 260, figs. 232-235. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

A series of thirty-seven specimens of this species was collected at Nodoa (A. M. N. H. Nos. 28108-28144). They offer no appreciable variation from mainland specimens, or from published descriptions of this form. They range in length from 87 to 150 mm., and in diameter from 2.3 to 4 mm. The ratio of length to diameter varies from 34 to 48, the average being 41. The average length is 124 mm.

"This tiny snake is extremely abundant. An eight-year-old boy collected them for me during the spring by looking every week or so under the few dozen flower pots in the yards of the foreign houses. My Chinese servant swept one up in the yard." (C. H. P.)

**Boidæ*****Python bivittatus* Schlegel**

*Python bivittatus* SCHLEGEL, 1837, 'Phys. Serp.,' III, p. 403, Pl. xv, figs. 1-4. WERNER, 1921, Arch. Naturg., LXXXVII, Abt. A, Heft 7, p. 240.

*Python molurus* SWINHOE, 1870, Proc. Zool. Soc. London, p. 241. BOULENGER, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 418 (part). BÖTTGER, 1894, Ber. Senck. Ges., p. 132.

Seven specimens of this species were secured by Mr. Pope at Nodoa, A. M. N. H. Nos. 27804-27810.

In the uniform presence of suboculars the present series bears out Werner's distinction of *bivittatus* from *molurus*.

The specimens range in length from 2235 to 3353 mm. (skins). The tail-length ranges from .11 to .14 of the total. The dorsal scales, on the neck, at mid-body, and just before the vent, range from 54-65-40 to 62-72-44. The ventrals range in number from 255 to 262, average 258, and the subcaudals from 65 to 71, average 68. The upper labials are 12-12<sup>1</sup> in four specimens, 12-11 in two, and 11-11 in one. The lower labials vary from 18 to 20. The oculars, which encircle the eye, are 7-7 in four specimens, 6-7 in one, and 8-6 in one. The color pattern is apparently typical.

<sup>1</sup>The two figures separated by a dash refer to the left and right sides of the specimen.

Swinhoe's remarks on this species are interesting. He says:

Two large Pythons were exposed in the market for sale at Taipingsze (Central Hainan) in February. They had been taken in the neighborhood, and I was told that the country people often brought them in. They were confined merely by a straw rope twisted around the neck. The natives declare that they are not hurtful to man and are easily caught by throwing over their heads a noose of twisted grass, and may with this be led about without danger. They call them Vang, and take them for the sake of their skin, heart, and liver. The skin is used chiefly for making drums, banjos, and other musical instruments, and the heart and liver, when dried and pounded, for stimulative medicine."

"A nine-foot python proved to be easily managed and could be handled freely. Teasing caused it to try to bite once or twice, but only at very close range. This specimen climbed a banyan tree and lay out upon the small limbs at the very top, so that we had to shoot the limb off to get it down. Its movements were slow and deliberate. A smaller specimen, six and a half feet long, was more agile in climbing and bit more viciously. Beyond a very slight tightening of the coils, neither of these snakes could be induced to constrict my forearm. Pythons seemed to be fairly common near Nodoa and apparently were not confined to any special habitat. We were told by the farmers that their dogs were responsible for the discovery of pythons." (C. H. P.)

### Colubridæ

#### *Sibynophis hainanensis*, new species<sup>1</sup>

Figure 13

TYPE.—A. M. N. H. No. R27788, ♂; Nodoa, Hainan, China; December 1922–July 1923; Clifford H. Pope.

DIAGNOSIS.—Closely allied to *Sibynophis collaris*; maxillary teeth 40; rostral just visible from above; upper labials 8; parietal in contact with the lower postocular; ventral plates 167, caudals 115.

DESCRIPTION OF TYPE.—Habitus of *S. collaris*; head moderately distinct from the body, body moderately slender, nearly cylindrical; tail long.

Maxillary teeth 40.

Rostral twice as broad as high, narrowly visible from above; internasals shorter than the prefrontals, but the internasal suture nearly equal to that of the prefrontals; nasal completely divided; loreal about as long as high; frontal longer than its distance from the end of the snout, much shorter than the parietals; one preocular and two postoculars; temporals 2–2 on each side; upper labials 8, the 3rd, 4th and 5th entering the eye on the right side, only the 4th and 5th on the left, a small anterior subocular being cut off from the third labial on that side; lower labials 10.

Dorsal scales all smooth, in 17 rows the whole length of the body, without apical pits; ventral plates 167; subcaudals 115; anal divided.

<sup>1</sup>Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 2.

General color light grayish brown; a faint dark mid-dorsal line anteriorly; head and neck dark brown with three black crossbands, the first two obscure, the first on the posterior part of the supraoculars and the frontal; the second on the posterior part of the parietals; the third a broad nuchal collar, outlined posteriorly by a narrow white line; a sharply defined white line on the upper labials, outlined above by the brown head color, below by a narrow border of black; this light line extends from the nostril to the angle of the mouth, and is connected with its fellow by a line across the rostral; labial border white; venter white, each ventral plate with a pair of black dots at each end, which become confluent into continuous black lines posteriorly; chin with black dots; mental and first three lower labials each with a white spot outlined with brown.

Total length 483 mm., tail 177 mm., tail length .37 of the total.

RANGE.—Known only from Hainan.

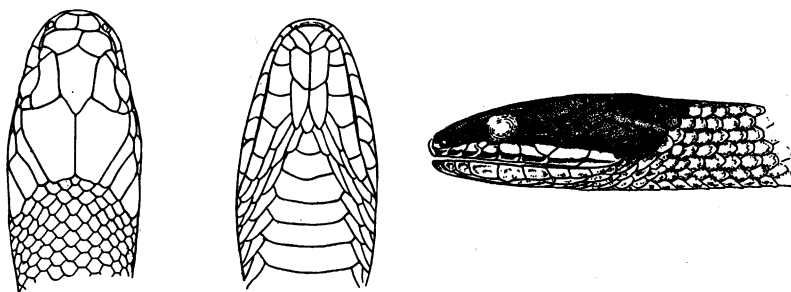


Fig. 13. *Sibynophis hainanensis*, new species, A. M. N. H. No. 27788, type.  
Dorsal, ventral, and lateral views of head,  $\times 2$ .

If compared with Boulenger's synopsis of this genus (1893, p. 181), this Hainan form seems well distinguished from its nearest ally, *Sibynophis collaris*. Boulenger has since described *S. grahami* from Yunnan, and this approaches the present form in having only eight upper labials. It differs, however, in coloration, and has a much lower number of subcaudals (83), so that it can only be associated with the present form through *collaris*. Boulenger's reference of *Sibynophis sinensis* Günther, described from Ichang, Hupeh, to *collaris* is not convincing, and I am inclined to the opinion that *collaris*, *sinensis*, *grahami*, and *hainanensis* may prove to be rather intimately related subspecies of a single wide-spread form.<sup>1</sup>

<sup>1</sup>See Werner, 1926, p. 142.

**Natrix popei**, new species<sup>1</sup>

## Figure 14

TYPE.—A. M. N. H. No. 27763, ♂; Nodoo, Hainan, China; December 1922–July 1923; Clifford H. Pope.

DIAGNOSIS.—Closely allied to *Natrix vibakari* and to *Natrix sauteri* of Formosa; maxillary teeth 20, the last gradually enlarged; anal divided; scales in nineteen rows; one or two anterior temporals; eight upper labials, fourth and fifth entering the eye; ventral plates 130–137; subcaudals 78–86; apical pits very faint, small, absent on most scales.

DESCRIPTION OF TYPE.—Size small, head moderately distinct from body, tail long.

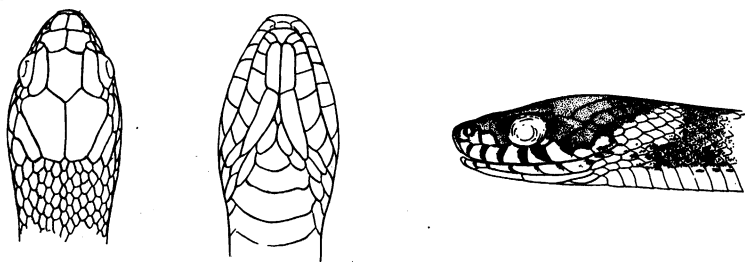


Fig. 14. *Natrix popei*, new species, A. M. N. H. No. 27763.  
Dorsal, ventral, and lateral views of head,  $\times 2$ .

Maxillary teeth 20, gradually enlarged posteriorly.

Rostral vertical, only its edge visible from above, wider than high, its suture with the internasal about equal to that with the first labial; internasal suture about two-thirds as long as that of the prefrontals; nasal divided, nostril lateral; loreal nearly quadrangular, a little longer than high; one preocular and three postoculars; temporals 2–2 on each side, the upper anterior small; upper labials 8, the fourth and fifth entering the eye; lower labials 9, four in contact with the anterior chin-shields, which are shorter than the posterior; first pair of lower labials separated by the triangular mental.

Dorsal scales distinctly keeled, the outermost row smooth, in 19–17 rows; apical pits absent on most scales, occasionally present, but small and faint; ventral plates 133, subcaudals 78; anal divided.

General dorsal color dark brownish gray, lightest in two dorsolateral bands, in which are situated, on each side, a row of white, vertical, dark-edged spots, extending to about mid-body, absent posteriorly; venter white, a row of black spots on each side, one on each ventral, larger posteriorly and confluent into black latero-ventral lines; ventrals outside of these spots clouded with the dorsal color; each side of the neck with a broad light mark, the two nearly united dorsally; top of head, and lateral scales, with fine vermiculations or punctulations of white spots; a characteristic labial pattern of the *vibakari* type (compare Stejneger, 1907, fig. 240); first six labials white with black posterior edges; seventh white at the labial border, dark above, edged

<sup>1</sup>Schmidt, 1925, Amer. Mus. Novitates. No. 157, p. 3.

with black; eighth with a flask-shaped white spot which reaches the labial border at the anterior corner; lower labials with narrow black marks on their sutures; loreal light, with dark margins.

Total length 356 mm., tail 107 mm., ratio of tail length to total, .30.

NOTES ON PARATYPES.—The paratypes (A. M. N. H. No. 27764, ♂, and 27765-68, ♀), agree excellently with the type. The first lower labials are in contact behind the mental in all; the dorsal scales are uniformly 19-17; the ventrals vary from 130 to 137, not differing in number in the sexes; subcaudals range from 78 to 86 in three specimens; labials and oculars are uniform with the type; temporals are 1-1 on both sides in three specimens, 2-1 in one, and 2-2 in one; maximum length 380 mm., tail length .29 to .32 of the total in three specimens; in three specimens the eighth labial spot is isolated, and fails to reach the labial border.

RANGE.—Known only from Hainan.

This species appears to be excellently distinguished from the Formosan *Natrix sauteri* by the higher number of ventrals, nineteen rows of dorsal scales instead of seventeen, and eight upper labials instead of seven. The coloration appears to be in close agreement, so far as can be judged from the description, and it is apparently very similar to that of juvenile *vibakari*, with which I believe both of these species to be allied. It is remarkable that the Hainan species proves to be more nearly allied to *vibakari* than the Formosan *sauteri*. The specimen of *vibakari* from Formosa referred to by Boulenger (1893, p. 222) is doubtless a *Natrix sauteri*. Mell (1922, p. 115) records *vibakari* from Kwangtung, without giving the characters of his specimens. These may prove to belong to the Hainan species.

### ***Natrix piscator* (Schneider)**

*Hydrus piscator* SCHNEIDER, 1799, 'Hist. Amphib.,' I, p. 247.

*Natrix piscator* MERREM, 1820, 'Syst. Amphib.,' p. 122. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 288, Figs. 250-252. BARBOUR, 1912, Mem. Mus. Com. Zoöl., XLIV, p. 109. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 201.

*Tropidonotus quincunciatus* BETTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 76.

*Tropidonotus piscator* BETTGER, 1894, Ber. Senck. Ges., p. 132; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 22. WALL, 1903, Proc. Zoöl. Soc. London, p. 86.

One hundred and ten specimens of this widespread species attest its abundance in Hainan (A. M. N. H. Nos. 28145-28254).

This species is, upon the whole, very uniform and fixed in its characters. The present series of specimens agrees in coloration with Boulenger's series B (1893, p. 232). The supralabials in the whole series vary from 9 in only four specimens, one of which has 8 on both sides, and the other three 8 on one side and 9 on the other. The lower labials are more variable, usually 10, but the formula 9-10 occurs in seventeen

specimens, 9-9 four times, 8-9 once, 10-8 once, and 10-11 twice. The preocular is single except in one specimen, in which it is divided on one side. The postoculars are 2-2 in one specimen, 2-3 in one, 3-3 in seventy-eight, 3-4 in seventeen, 4 in eleven, 3-5 in one, and 4-5 in one. The first row of temporals is 1-1 in one specimen, 1-2 in two, 2-3 in one, and 2-2 in the remaining. In the second row there are 2-3 in seven, 3-3 in one, and 2-2 in the rest. The dorsal scales are normally 19-17, 19-17-15 occurring in ten specimens, 19-17-16 in six, 18-19-16 in one, and 17-18-15 in one.

The maximum length in the sixty-seven males is 668 mm., in the forty-three females 975 mm.

#### Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	67	122-133	126.5
	♀	43	134-145	138.2
Subcaudals	♂	51	73- 88	81.5
	♀	34	64- 77	71.5
Tail-Length	♂	51	.29-.33	.31
	♀	34	.23-.28	.24

Twelve stomachs contained remains of frogs, one the remains of a fish.

"This is perhaps the most abundant snake about Nodoa. It is found in all sorts of situations, but occurs in greatest numbers in wet, grassy places. It is especially abundant along the tiny streams just to the north of Nodoa.

"I frequently saw one that lived near a small pool in the corner of a rice field. It dashed into a hole in the clay bank whenever I appeared. One was taken in the mission compound.

"Some individuals have a row of red spots along either side, and these are apparently much less numerous than those without such spots." (C. H. P.)

#### *Natrix stolata* (Linnæus)

*Coluber stolatus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 219.

*Natrix stolatus* MERREM, 1820, 'Syst. Amphib.,' p. 123. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 280, Figs. 244-246. BARBOUR, 1909, Proc. New England Zool. Club, IV, p. 67; 1912, Mem. Mus. Comp. Zool., XLIV, p. 110. SMITH, 1923, Journ. Nat. Hist. Soc. Siam., VI, p. 201.

*Tropidonotus stolatus* SWINHOE, 1870, Proc. Zool. Soc. London, 1870, p. 214. BETTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 79. BOULENGER, 1893, 'Cat. Snakes. Brit. Mus.,' I, p. 253. BETTGER, 1894, Ber. Senck. Ges., p. 132. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225.



One hundred and seven specimens of *Natrix stolata*, A. M. N. H. Nos. 30001-30107, were collected in the vicinity of Nodoa, where it is evidently the most abundant terrestrial snake.

Like *Natrix piscator*, this species has a low range of variation in scale characters, and its color pattern is equally constant. The development of a lineate dorsal pattern in a terrestrial *Natrix* appears to be correlated with the Savannah habitat, paralleling the pattern-type of the North American *Thamnophis*.

The normal number of supralabials is eight, and this is departed from in only three specimens, in each of which the number is reduced to seven on one side. The lower labials are usually ten, eight occurring five times, nine seventeen times, and eleven six times, against ten in one hundred eighty-six counts. Two specimens have two preoculars on both sides, three have one on one side and two on the other, and the remaining series has the normal single preocular. The postoculars range from two to four, but are three on both sides in ninety-one specimens. The temporals are 1-1 on both sides in eleven specimens, 1-2 in fifty-eight, and 2-2 in five. The dorsal scale rows are 19-17 in all except one specimen which has the irregular formula 19-18-16.

The maximum length in thirty-eight males is 634 mm., in twenty-eight females it is 687 mm.

#### Summary of Ventrals, Subcaudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	55	143-156	149
	♀	52	148-158	152
Subcaudals	♂	38	69- 87	80
	♀	28	70- 86	77
Tail-Length	♂	38	.24-.28	.26
	♀	28	.23-.27	.25

Five stomachs contained remains of *Microhyla* sp., and five remains of *Rana limnocharis*.

"This snake rivals *Natrix piscator* in abundance. Several were taken in the mission compound. It does not seem to be a water-snake. The bright yellow throat is a conspicuous recognition character.

"It is a very harmless and mild-tempered snake, and free handling would not cause it to bite. When attempting to escape, it glides away under even very short grass.

"Eggs apparently ready to be deposited measured 11 mm. by 15 mm." (C. H. P.)

***Natrix subminiata* (Schlegel)**

*Tropidonotus subminiatus* SCHLEGEL, 1837, 'Phys. Serp.,' II, p. 313. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. STANLEY, 1914, Journ. N. China Branch Roy. Asiatic Soc., XLV, p. 28.

*Natrix subminiata* BARBOUR, 1912, Mem. Mus. Comp. Zool., XLIV, p. 111.

Four specimens, A. M. N. H. Nos. 27759-27762, agreeing with the *subminiata* of southeastern Asia, were collected at Nododa.

The dorsal scale count in the single male specimen is 17-19-17, ventrals 149, and the tail is incomplete. In the three female specimens the dorsal scales are 19-17, 19-17-19-17, and 18-19-16, ventrals 155, 155 and 150, subcaudals 69, 73 and 71, respectively. Upper labials uniformly eight, the third, fourth and fifth entering the eye. The lower labials are ten, nine on one side in one specimen. There is a single preocular on both sides in one specimen, while the remaining three each have one on one side and two on the other. The postoculars are uniformly three. The temporals are invariably 2 in the first row, 2-3 in the second row in one specimen, 3-3 in one and 3-4 in one.

The largest specimen measures 810 mm., and the tail-length in the three female specimens is .22 or .23 of the total.

Barbour, (1912, p. 111), calls attention to the rather notable variation in the number of ventrals in this species and to its correlation with distinct geographic areas. In Upper Burma and Yunnan it appears to be represented by a form (whose scale counts do not overlap those of the lowland species) which I have distinguished as *Natrix helleri*.<sup>1</sup> A number of puzzling problems remain to be solved before the relations of the Javan and mainland forms can be expressed satisfactorily by means of subspecific classification.

***Natrix andrewsi*,<sup>2</sup> new species<sup>3</sup>**

## Figure 15

TYPE.—A. M. N. H. No. 28255, ♂; mountains south of Nododa, Hainan, China; July 30, 1923; Clifford H. Pope.

DIAGNOSIS.—Subgenus *Macropophis*<sup>4</sup> Boulenger. Maxillary teeth 37, uniform anteriorly, the last gradually enlarged; body very slender; eye large; all the scales strongly keeled, in nineteen rows; ventral plates 164, subcaudals 118; anal divided.

DESCRIPTION OF TYPE.—Body and neck slender, tail long, head distinct, the eye very large, its diameter equalling its distance from the rostral.

<sup>1</sup>Amer. Mus. Novitates, No. 157, p. 3.

<sup>2</sup>Named for Mr. Roy Chapman Andrews, leader of the Third Asiatic Expedition.

<sup>3</sup>Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 2.

<sup>4</sup>The highly interesting assemblage of species now grouped under *Natrix* offers such interesting problems for a general revision that I have retained the present form in *Natrix*, although convinced that *Macropophis* merits recognition.

Rostral more than twice as broad as high, its suture with the first labial much less than that with the internasal; internasals and prefrontals quadrangular, the internasal suture about three-fourths as long as that of the prefrontals; nasal divided, nostril lateral; loreal nearly square on one side, trapezoidal on the other; one preocular and four postoculars on each side; temporals 2-3 on each side; nine upper labials, the fourth, fifth and sixth entering the eye; lower labials 9, five in contact with the first pair of chin-shields; both pairs of chin-shields very long, the second longest, in contact with the fifth and sixth labials and with the first ventral plate.

Dorsal scales in 19-17 rows, all strongly keeled, with faint apical pits some distance from the tip of the scale, which is notched; ventral plates 164; subcaudals 118; anal divided.

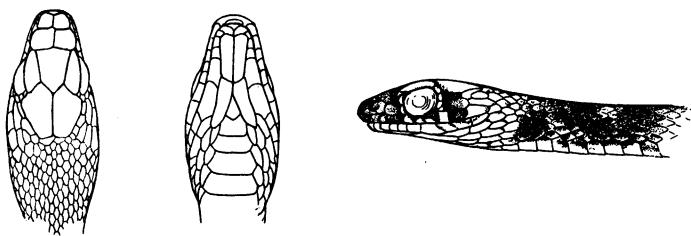


Fig. 15. *Natrix andrewsi*, new species, A. M. N. H. No. 28255, type.

Dorsal, ventral, and lateral views of head,  $\times 2$ .

The color description is somewhat incomplete on account of the very deciduous scales, the specimen being otherwise well-preserved. Middle of back dark, the sides brownish, some of the lateral scales outlined with black; venter white, except ends of ventrals, which are punctate with black and black-tipped next to the first scale row; neck with a series of square light markings on each side, alternate, occupying the fourth to sixth scale rows; the first pair joins the diffuse, broad light nuchal band; top of head brown; a sharply defined vertical white bar on each side of the eye, the anterior one extending from the supra-ocular across the preocular and the fourth labial, the posterior on the postoculars, lower corner of the first lower temporal, and the middle of the seventh labial; both of these light bars are margined with black; the fifth and sixth labials each have a semicircular white spot; anterior labials brown; eighth labial brown, the ninth involved in the lighter nuchal band.

Total length 800 mm., tail-length 303 mm., ratio of tail to the total length, .34.

RANGE.—Known only from Hainan.

This species is evidently allied to *Natrix dendrophiops* Günther in dentition and habitus. It is apparently a very distinct form, otherwise unrelated to the Chinese or even Oriental water-snakes, unless it be *Natrix maculatus* Edeling, which has a very different dentition.<sup>1</sup>

<sup>1</sup>Evidently identical with *Natrix ornaticeps* (Werner). While it is probable that Werner's paper (dated 1924) is the prior one, I reserve the necessary synonymic changes pending conclusive evidence on this point.

**Trimerodytes balteatus** Cope

*Trimerodytes balteatus* COPE, 1895, Proc. Acad. Nat. Sci. Phila., 1894, p. 426, Pl. x, fig. 2.

*Tropidonotus balteatus* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 607.

*Liparophis bedoti* PERACCA, 1904, Rev. Suisse Zool., XII, p. 663. STEINDACHNER, 1906, Sitzber. Akad. Wiss. Wien (math.-natur.), CXV, Abt. 1, p. 905, Pl. MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 118. VOGT, 1922, idem, p. 139.

Examination of two specimens of *Trimerodytes balteatus*, A. M. N. H. Nos. 27751-27752, from Nodola leaves no possible doubt as to the identity of *Liparophis bedoti* with this species. The confusion is the evident result of Boulenger's rather offhand reference of *Trimerodytes* to *Tropidonotus*. This was the less justifiable as he described *Tapinophis* only a few years later, which, in turn, is doubtfully distinct from *Trimerodytes*, the differences in any case being not of generic value in Boulenger's own practice.

## Scale Characters and Measurements

MUSEUM NUMBER	A. N. S. P. (Type)	A. M. N. H. 27751	A. M. N. H. 27752	GENEVA Type of <i>L. bedoti</i>
Sex		♂	♂	
Dorsal Scales	19	19-17	19-17	19
Ventrals	202	202	205	196
Caudals	84	38	85	55
Upper Labials	9	8-9	9-8	9
Lower Labials	9	9-8	8-9	.....
Pre + Postoculars	1+2-3	1+2	1+2	1+2-3
First + Second Row of Temporals	1 2	1 2	1 $\frac{2}{3}$	1 2
Total-Length	377 mm.	536 mm.	597 mm.	717 mm.
Tail-Length	.21	.12	.21	.14

The only noteworthy difference to be explained in *L. bedoti* is the low number of subcaudals and the short tail, and this is amply accounted for by the short-tailed specimen at hand, which evidently has a broken tail but which has healed so perfectly that without the second specimen for comparison it might have passed as a complete one.

As there are three excellent descriptions of this species extant, it seems unnecessary to add to them. The specimens described and figured by Steindachner had complete tails, ranging from .20 to .23 of the total length. There is some anomaly in the specimen described by Mell and Vogt, as with 72 caudals its tail-length is only .14 of the total.

The color pattern of dorsal rings split by a narrow light band is very striking. It is evidently derivable from that of *Natrix percarinata*,

to which *Natrix æquifasciata* Barbour is closely allied. The number of black rings in the present specimens is fifty and fifty-five, slightly higher than the number reported by Steindachner.

This species is now recorded from Indo-China ("Cambodia and Tonkin") by Steindachner, and from Wutsung, Kwangtung, by Mell.<sup>1</sup>

"This species is quick and alert in its movements. It glides along in short grass with the body nearly straight. I could not persuade it to bite or even to assume a defensive position. When handled it does not hold itself rigid but hangs with muscles relaxed. It has the rather unusual habit of backing up over an obstruction, or backing into a hole or into a sack." (C. H. P.)

### ***Pseudoxenodon melli* Vogt**

Figure 16

*Pseudoxenodon melli* Vogt, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 139. MELL, 1922, idem, p. 118, Pl. iv, fig. 3. SMITH, 1923, Journ. Nat. Hist. Soc Siam, VI, p. 202.

A single specimen, A. M. N. H. No. 27753, from the mountains south of Nodoa, Hainan, is referable to this recently described species, which has been recorded from Hainan by Smith.

In its larger and more distinct head and its bold color pattern, this form contrasts strongly with other species of *Pseudoxenodon*. The present specimen presents some differences from Vogt's description, but it agrees in most characters, and its coloration and habitus are excellently shown in Mell's figure.

The differences in scale characters, together with those of *P. bambusicola* Vogt, are shown in the following tabulation:

	A. M. N. H. 27753	MALCOLM A. SMITH COLL.	TYPE OF <i>P. melli</i>	TYPE OF <i>P. bambusicola</i>
Sex	♂	♀	?	?
Dorsal Scales	19-17-15	.....	19-17-15	19-17-15
Ventrals	140	141	136	132
Subcaudals	52	47	38	56
Upper Labials	8	.....	8	8
Pre+Postoculars	1+3	.....	1+3	1+2
First and Second Rows of Temporals	2-2	.....	2-2	2-3
Total-Length	618 mm.	500 mm.	330 mm.	....
Tail-Length	102	80	45	....
Ratio, Tail to Total	.16	.16	.13	

<sup>1</sup>Werner's reference of this species to *Liparophis* Peracca (Werner, 1926, p. 141) is of course untenable. Nor is it possible to maintain Peracca's species on the basis of a difference in coloration.

It will be seen that the Hainan specimen agrees in number of subcaudals with *bambusicola*. Vogt fails to mention the sex of his specimens, and the difference in tail-length between *bambusicola* and *melli* might well be a sexual one. Mell's field notes, however, indicate that he found the two forms in distinct habitats and geographic areas, and *bambusicola* may therefore be retained in spite of the fact that the present specimen bridges the gap between the two species.<sup>1</sup> The close agreement of the female specimen described by Smith from Nam-kaio, Hainan, with the present specimen, indicates that Vogt's type may have had an unusually

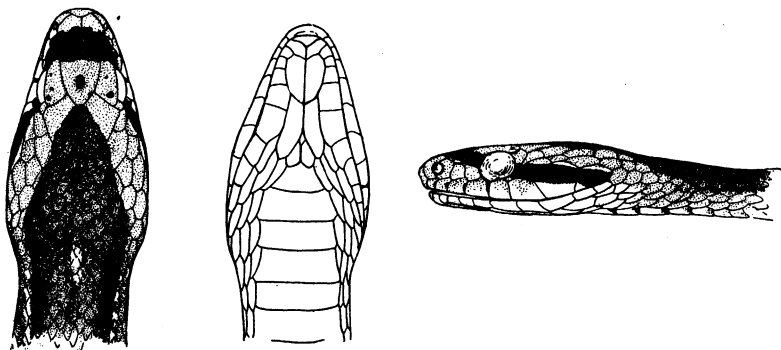


Fig. 16. *Pseudoxenodon melli* Vogt, A. M. N. H. No. 27753.  
Dorsal, ventral, and lateral views of head, life size.

low number of subcaudals, or possibly an incomplete tail. Both of the two known Hainan specimens have the second pair of chin shields equal to the first, and five lower labials in contact with the first pair.

In Boulenger's description of the genus (1893, p. 270), apical pits are said to be wanting. I find them evident in this form, and they may be distinguished, by attentive examination, in *P. sinensis*.

#### ***Lycodon subcinctus* Boie**

*Lycodon subcinctus* BOIE, 1827, Isis, p. 551. BOULENGER, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 359. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

The single specimen collected by Mr. Pope at Nodoo, A. M. N. H. No. 27755, is the second record of this species from Hainan, and it is as yet unknown from the Chinese mainland. It seems to be indistinguishable from the East Indian representatives of the species.

<sup>1</sup>Werner (1926, p. 144) determines the type of *bambusicola* as the ♂ of *melli*; *P. bambusicola* has page priority over *melli* and is preferred by Werner, who may be regarded as first revisor. It should be employed in future for the form here described.

The dorsal scales are in 17-17-15 rows; ventral plates 197, subcaudals 77; upper labials 8 on each side; oculars 0-2; temporals 1-2. The total length is 564 mm., tail 112 mm., ratio of tail to length, .20.

Maxillary teeth 5+6, the anterior group strongly enlarged posteriorly, the posterior group subequal. The angular bend of the maxilla at the toothless interspace is much less marked than in *Lycodon aulicus*.

"The first specimen of this species was brought August 1st by the mission carpenter from the mission compound.

"While resembling the Krait in general appearance, the behavior of this species is radically different. It moves quickly through, or over, the short grass, with its head slightly raised. It could not be made to assume a defensive position, but would strike while in motion. When held down with a stick, it would strike with speed and vigor. The tail was repeatedly vibrated." (C. H. P.)

#### ***Ptyas mucosus* (Linnæus)**

*Coluber mucosus* LINNÆUS, 1758, 'Syst. Nat.,' Ed. 10, I, p. 226.

*Ptyas mucosus* COPE, 1860, Proc. Acad. Nat. Sci. Phila., p. 563. BÖTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 75. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 345, Figs. 298-300. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

*Zamenis mucosus*, BÖTTGER, 1894, Ber. Senck. Ges., p. 133; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 41.

Eleven specimens, A. M. N. H. Nos. 27820-27830, of this widespread species were obtained.

There is no important variation to record. The upper labials are 8-9 in one specimen, 8-8 in the remaining; the lower labials are 9-10 in one, 10-10 in the rest; preoculars and postoculars invariably two; two anterior temporals, and one, two, or three in the second row, one appearing once, two fourteen times, and three seven times. The loreals vary from three to five, six specimens having three on each side, while four have four on each side and one has five on one side, four on the other.

The dorsal scale rows are 21 or 19 on the neck, invariably 17 at mid-body, and invariably 14 near the tail. The median row is lost opposite the 102d to 120th ventral, and the third row of each side is dropped a short distance farther back. The full scale formula for this form is therefore 21-19-17-16-14. The keels of the median four to six dorsal scale rows begin about mid-body, the anterior dorsals being perfectly smooth.

The largest male specimen measures 2118 mm., the largest female 1518 mm.

## Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	7	194-200	197
	♀	7	193-200	196
Caudals	♂	7	112-118	116
	♀	7	111-118	114
Tail-Length	♂	2	.24-.26	.25
	♀	4	.25-.27	.26

"This snake is the most abundant large snake of the region. I saw one myself as it crossed the road in front of me half-way between Nodoa and Nam Fong.

"Its temperament is surprisingly inoffensive. When handled, it often wraps a loop around one's arm, tucking in the tail and exerting considerable pressure. When teased, its only reaction is an attempt to escape. When cornered, it inflates the neck and hisses." (C. H. P.)

**Ptyas korros** (Schlegel)

*Coluber korros* SCHLEGEL, 1837, 'Phys. Serp.,' II, p. 139.

*Ptyas korros* COPE, 1860, Proc. Acad. Nat. Sci. Phila., p. 563. BOETTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 75. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 348. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

*Zamenis korros* BOULENGER, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 384. BOETTGER, 1894, Ber. Senck. Ges., p. 75; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 41. STANLEY, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 27.

Nine male specimens, A. M. N. H. Nos. 27811-27819, represent this form in the present collection.

The upper labials are uniformly 8; the lower labials 10 in seven specimens, 9-10 in one, 8-9 in one; three preoculars on one side of one specimen, otherwise regularly two; two postoculars; temporals 2-2 on each side except in one specimen, which has 2-3 on one side; loreals 2 on both sides in four, 3 in three, and 2-3 in two specimens.

The dorsal scales are in seventeen rows anteriorly in two specimens, fifteen in the remaining seven, uniformly fifteen at mid-body and eleven posteriorly.

No. 27811, measuring 405 mm. in length, shows the juvenile pattern of narrow white transverse lines across the anterior part of the body.

## Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	9	165-175	168
Caudals	♂	7	128-141	134
Tail/Total Length	♂	7	34-36	.35



"This species is fairly abundant. It is quick in its movements. When held by the neck, it makes the usual violent effort to escape of a whip-snake, thrashing the body and twisting upon itself. It did not have a special defensive attitude, but when teased would follow the annoying object with its head and occasionally bite rather ineffectually. On being teased, one specimen would bite itself viciously several times." C. H. P.

***Elaphe porphyracea* (Cantor)**

*Coluber porphyracea* CANTOR, 1839, Proc. Zool. Soc. London, p. 51. BOULENGER, 1894, 'Cat. Snakes Brit. Mus.,' II, p. 34.

*Elaphe porphyracea* BARBOUR, 1912, Mem. Mus. Comp. Zool., XLIV, p. 195.

Two specimens of this extremely distinct species are at hand from Hainan, A. M. N. H. Nos. 27757-27758, the first record of this form from the island.

The coloration agrees in general with that of mainland specimens. There are eleven black cross-bands on the body of the smaller specimen, with two on the tail. The posterior cross-bands are fainter in both specimens, and only nine can be distinguished in the larger. The dorsolateral black lines are less complete in the smaller specimen. The characteristic head-pattern is present.

Scale Characters and Measurements

A. M. N. H. No.	27757	27758
Sex	♂	♂
Dorsal Scales	19-17	19-17
Ventrals	198	202
Caudals	75	79
Upper Labials	8	8
Lower Labials	10	10
Preoculars	1	1
Postoculars	2	2
Temporals	1-2	1-2
Total Length	736 mm.	817 mm.
Tail-Length	140	156
Tail/Total Length	.19	.19

***Elaphe tæniura vaillanti* (Mocquard)**

*Coluber vaillanti* MOCQUARD, 1905, Bull. Mus. Hist. Nat. Paris, XI, p. 76; Bull. Soc. Philom. Paris, (9) VII, p. 319, Fig. 2.

A single *Elaphe* of the *tæniura* group, A. M. N. H. No. 27756, was bought by Mr. Pope at Nam Fong.

This specimen agrees excellently with the figure given by Mocquard, and differs in both pattern and scale characters from typical *tæniura*.

Top of head uniform grayish brown; chin and supra-labials yellowish; a black stripe on the side of the head, faint from the nasal to the eye, distinct from the eye to the angle of the jaw; neck, for a distance equal to about four head lengths, uniform grayish brown; behind this are bold black longitudinal markings, in four rows, on the 2d-5th and 8th-10th scale rows; those of the lower row alternate with those of the upper, the upper with a slight tendency to be connected across the back to form an H-shaped mark; about mid-body these markings become faint; posterior to this, the black markings of each side unite to form a solid broad longitudinal band, leaving a sharply defined light line on the mid-dorsal and adjacent half scale rows; a well-marked light lateral stripe on the lower half of the first scale row and the ends of the ventrals borders the dark bands below; ventrals yellowish, mottled with gray at their ends; posteriorly this gray mottling unites to outline the lateral light lines, leaving a fourth light, mid-ventral, line; all four light lines continued to the tip of the tail; no vertical white bars on the dark lateral longitudinal bands.

#### Scale Characters and Measurements

	A. M. N. H. No.	TYPE OF
	27756	<i>vixillanti</i>
Dorsal Scales	25-23-19	23
Ventrals	259	256
Caudals	120	106
Upper Labials	9	9
Lower Labials	11	..
Preoculars	2	2
Postoculars	2	2
Temporals	2-3	3-
Total-Length <sup>1</sup>	1960 mm.	
Tail-Length	465	
Tail/Total Length	.24	

Stejneger (1907, p. 319) has given an excellent account of the typical form of this species. He states that *Elaphe schmackeri*, to which the present specimen is most closely allied in scale characters, has the coloration of typical mainland *tæniura*. This is not the case in the Hainan and Tonkinese specimens, whose pattern is strikingly different in detail from central Chinese specimens, though agreeing in general plan.

The high number of subcaudals in the Hainan specimen is equalled only in *schmackeri*, and, were the latter not also an insular form, it would certainly have to be united with *tæniura* as a subspecies. It seems prefer-

<sup>1</sup>A skin, with head attached, measurements therefore unreliable.

able to retain *vaillanti* for the southeastern form of *tæniura*, its chief distinguishing character being the absence of the numerous dark anterior dorsal crossbars of northern *tæniura* and of *schmackeri*.

***Ahaetulla boiga* (Lacépède)<sup>1</sup>**

*Coluber boiga* LACÉPÈDE, 1789, 'Hist. Nat. Serp.,' II, pp. 102 (Tabl. Method.) and 223 (text).

*Dendrophis pictus* BOULENGER, 1894, 'Cat. Snakes Brit. Mus.,' II, p. 78.

A single specimen in the Nodda collection adds this species to the Hainan fauna, A. M. N. H. No. 27754, collected July 28, 1923.

Scale Characters and Measurements

A. M. N. H. No.	27754
Sex	♀
Dorsal Scales	15-13-11
Ventrals	191
Caudals	155
Upper Labials	9
Lower Labials	10
Preoculars	1
Postoculars	2
Temporals	2-2
Length	944 mm.
Tail-Length	322
Tail/Total Length	.34

This specimen differs from the descriptions of Oriental representatives of the species in lacking the lateral stripe on the lowermost scale row.

***Holarchus violaceus* (Cantor)**

*Coronella violacea* CANTOR, 1839, Proc. Zool. Soc. London, p. 50.

*Simotes* sp., SWINHOE, 1870, Proc. Zool. Soc. London, p. 240.

*Simotes violaceus* BOULENGER, 1894, 'Cat. Snakes Brit. Mus.,' II, p. 222; 1896, idem, III, p. 640. STANLEY, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 27.

*Holarchus dolleyanus* COPE, 1895, Proc. Acad. Nat. Sci. Phila., 1894, p. 423, Pl. x, fig. 1.

*Holarchus violaceus* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 354. SMITH, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

Forty-three specimens of this species are in the collection, A. M. N. H. Nos. 27867-27909.

The upper labials, in this series, range from five to eight, eight being the most frequent number. The lower labials vary from six to eight,

<sup>1</sup>The use of this name for *Dendrophis pictus* auct. was suggested to me, in conversation, by Dr. Leonhard Stejneger, and it is here employed for the sake of uniformity with Dr. Stejneger's future publications on Chinese herpetology.

seven and eight being nearly equally frequent. The preocular is single forty times, two forty-six times. The postoculars are regularly two in number, but are single on both sides in six specimens. The anterior temporal is normally single, but two occur ten times, and in one specimen the parietals meet the upper labials on both sides. The second row of temporals contains two scales in fifty-nine cases, one in twenty-four, and three in three. Undivided subcaudals appear in three specimens, from one to four in number.

The fourth dorsal scale row drops out between the eightieth and ninetieth ventrals, at about mid-body. The number of rows varies from 17-15 to 15-13, as follows:

DORSAL ROWS	NO. OF SPECIMENS
17-17-15	35
15-17-15	1
17-15-13	4
15-15-15	2
15-15-13	1

The largest male measures 562 mm., the largest female 480 mm.

#### Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	23	157-168	164
	♀	20	161-173	167
Caudals	♂	23	35- 45	38
	♀	20	30- 39	34
Tail/Total Length	♂	23	.13-.15	.14
	♀	20	.11-.14	.12

The coloration of this series agrees with that of Boulenger's series B, for which the name *swinhonis* Günther, type locality Amoy, is available, should it prove desirable to separate the Chinese from the Indian form. The type locality of *violaceus* is Rungpore (= Rangpur), N. E. India.

"This species seems to be one of the commonest snakes in the open grassy country around Nodda. I met with several myself in the late afternoon.

"When handled, one of these snakes rarely attempts to bite but coils around one's hand and presses against it vigorously with the sharp tip of its tail. One did bite my Chinese assistant's thumb, with no bad effect.

"When annoyed, the tip of the tail is sometimes curled into a complete circle.

"One of these snakes became suddenly very active and vicious when attacked by a baby mongoose, striking at the mongoose and repeatedly driving it away. Thereupon it struck at any object brought near and vibrated its tail.

"These snakes are much feared by the Chinese." (C. H. P.)

***Holarchus formosanus hainanensis* (Bøttger)**

*Simotes hainanensis* BÖTTGER, 1894, Ber. Senck. Ges., 1894, p. 133, Pl. III, fig. 2.

*Simotes formosanus* BÖTTGER, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 73.

*Holarchus formosanus* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 354 (in part).

*Holarchus formosanus hainanensis* BARBOUR, 1909, Proc. New England Zool. Club, IV, p. 70.

Eight specimens of this *Holarchus* were collected, A. M. N. H. Nos. 27796-27803.

One specimen has seven upper labials on each side, the 3d and 4th entering the eye, the rest have eight, with the 4th and 5th entering the eye. The lower labials are 8-9 in two specimens, 9-9 in six. There are invariably two preoculars and two postoculars. Two anterior temporals occur twice, one is normal; one temporal in the second row occurs once, two fifteen times, and three twice.

The dorsal scale count is slightly different in the two sexes; in the three female specimens it is 19-17, in one male 19-17, in four 19-17-15.

The largest male specimen measures 723 mm., the largest female 481 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	5	165-171	168
	♀	3	175-178	177
Caudals	♂	5	54- 59	56
	♀	3	50- 51	50
Tail/Total Length	♂	5	.18-.19	.19
	♀	3	.16-.17	.16

Small specimens have a much more sharply defined pattern.

Barbour, 1909, p. 70, retains the name *hainanensis* as a subspecies of *formosanus*, chiefly on the basis of color differences between Formosan and Hainan specimens. There seems to be a considerable difference in the

average number of ventrals in specimens from the two islands, the average for eight specimens from Formosa (of both sexes) being 164.4, and of the twelve specimens now known from Hainan, 170.3, the respective extremes being 161–172 and 165–178. The contact of the parietal with the lower postocular, which Stejneger records as the usual condition in *formosanus*, does not occur in the specimens examined by me, nor is the exceptional upper anterior temporal to be thought of as cut off from the parietal.

The specimen recorded by Boulenger from Swatow, with 173 ventrals, suggests that it is the Hainan form rather than the Formosan which is found on the mainland.

### ***Enhydris plumbea* (Boie)**

*Homalopsis plumbea* BOIE, 1827, Isis, p. 550.

*Hypsirhina plumbea* BÖTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 83; 1894, Ber. Senck. Ges., p. 134. BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 5. BÖTTGER, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 87.

*Enhydris plumbea* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 300, Figs. 260–262. BARBOUR, 1909, Proc. New England Zool. Club, IV, p. 68. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

One hundred and twelve specimens of this common form, A. M. N. H. Nos. 27997–28107, 28045*a*, were collected.

The upper labials are eight in one hundred and ten specimens, 7–8 in one, and 8–9 in one. The lower labials range from nine to eleven, but one hundred and five specimens have ten on both sides. The preocular is usually single, two preoculars occurring twenty-seven times. The postoculars are even more constantly two in number; a single postocular occurring only seven times. A single anterior temporal is invariable, and in the second row, two are present in all but five counts, in each case on only one side of a specimen.

The dorsal scale rows vary from 20–16 to 19–15, the counts distributed as follows:

COUNT	NO. OF SPECIMENS	
	♂	♀
20–19–17–16	1	
19–17	39	50
19–17–16	4	2
19–17–15	13	3

## Summary of Ventrals, Caudals, and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	57	125-136	129
	♀	55	123-132	128
Caudals	♂	53	36- 42	39
	♀	54	31- 36	34
Tail/Total Length	♂	53	.13-.15	.14
	♀	54	.11-.14	.12

Three stomachs contained the remains of a *Rana* sp., and two remains of *Microhyla*, the great majority of stomachs being empty.

A number of females contained undeveloped eggs, the number of enlarged ones ranging from four to eleven. One specimen contained four eggs (about  $10 \times 12$  mm.), each with a small embryo.

"The common, gray water-snake bites viciously when caught with a noose, biting the stick and finally biting itself. When released in grass, it crawls slowly close to the ground, where it is well hidden."

***Enhydris chinensis* (Gray)**

*Hypsirhina chinensis* GRAY, 1842, 'Zool. Misc.', p. 73. BÖTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 82; 1894, Ber. Senck. Ges., p. 134. BOULENGER, 1896, 'Cat. Snakes Brit. Mus.', III, p. 8, Pl. I, fig. 2. BÖTTGER, 1898, 'Kat. Rept. Mus. Senck.', II, p. 88.

*Enhydris chinensis* SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

Forty-six specimens of this species, A. M. N. H. Nos. 27951-27996, were collected at Nodoa.

Like *Enhydris plumbea*, this species is a stable one in all of its characters. Eight is the normal number of upper labials, 8-9 occurring twice and 9-9 once. Ten is the usual number of lower labials, 9-10 occurring in four specimens, and 10-11 in one. The only variation from a single preocular occurs on one side of the one specimen, which has two, and two postoculars are equally constant, a single one on one side of one specimen being the only exception. The temporals are invariably 1-2 on each side. A single specimen has two internasals. The dorsal scale count varies from 25-21 to 23-17, seventeen specimens having a dorsal scale formula of 25-23-21-19, and seventeen 23-21-19. There is a very slight tendency to higher numbers of dorsal scale rows in the females.

The range in ventral scales is somewhat lower than that given by Boulenger (see below), which is accounted for in part by his having only one female specimen, although Böttger's account (1888, p. 82) of fifteen specimens from Canton also shows a higher ventral and subcaudal count.

The largest male specimen measures 516 mm.; the largest female, 567 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	26	135-147	143.5
	♀	20	134-141	137.6
Caudals	♂	26	40- 52	48.
	♀	19	35- 43	39.5
Tail/Total Length	♂	26	.15- .18	.16
	♀	19	.12- .14	.13

The stomachs of two specimens contained remains of fish, and one of these stomachs also contained a large mass of parasitic worms.

"When picked up suddenly with a pair of forceps, this snake makes wild efforts to bite, waving its open jaws about and sometimes biting itself. When teased in a box, it would actually spring about, jumping clear of the bottom and advancing as much as a foot at each jump. After a few wild efforts it would subside and assume a defensive posture striking viciously at any object brought near. At such times the body is flattened. On a smooth floor it progresses rapidly with a series of crawling "leaps," the body being apparently raised clear of the floor with every spasmodic motion.

"A large female was kept in a water-jar and the frequency of respirations observed. If given half a chance these snakes make for water, and they lie contentedly at the bottom, nearly motionless, if placed in a water jar. Seven intervals between respirations varied from ten to fifteen minutes, averaging between thirteen and fourteen minutes. Respiration occupied from one to five minutes, only the tip of the snout being exposed.

"A large female, taken July 30th, contained six fully developed young, of which the largest measured 157 mm. in length." (C. H. P.)

**Boiga multimaculata** (Boie)

*Dipsas multimaculata* BOIE, 1827, Isis, p. 549.

*Dipsadomorphus multimaculatus* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 63.

*Boiga multomaculata* BARBOUR, 1909. Proc. New England Zool. Club, IV, p. 72.

*Boiga multimaculata* SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

This species is represented by twenty-three specimens, A, M. N. H. Nos. 27844-27866.

The upper labials are regularly eight, seven appearing once and nine four times. The lower labials are regularly eleven, ten occurring twice



and twelve three times. The preoculars are two in two specimens, one in the rest, the postoculars normally two, with three appearing twice. The number of temporals in the first row is one to three, one occurring nine times, two thirty-two times, and three once; the second row varies from two to four, two in fifteen counts, three in twenty-seven, and four in two.

The dorsal scales differ slightly in the sexes, as follows:

19-17-15	♂, 3	♀, 8
19-17-15-13	♂, 9	♀, 3

The largest male measures 836 mm., the largest female 834 mm.

#### Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	12	200-213	209
	♀	11	207-221	215
Caudals	♂	12	82- 98	92
	♀	10	80- 97	89
Tail/Total Length	♂	12	.20-.22	.21
	♀	10	.19-.22	.20

Three specimens had bird remains in their stomachs (one a *Motacilla* sp.), and one a lizard, *Calotes versicolor*.

This species was recorded from Hainan by Barbour, but omitted by both Vogt and Mell from their Hainan lists.

"The numbers of this snake brought in show that it is fairly abundant about Nodda. Two specimens were taken in the mission compound. I believe its habitat to be thick bushes and brush. The Chinese say that it is fond of bird's eggs and birds. Two specimens brought in disgorged bird remains.

"When annoyed, the 'Blotched Snake' assumes a defensive posture with the anterior part of the body thrown into several symmetrical S-shaped loops, with the neck strongly compressed and the head expanded at the rear. The tip of the tail may be strongly vibrated, producing a distinct noise among dry leaves. It strikes viciously and in a very business-like manner. The range of the stroke in a twenty-eight inch specimen was about twelve inches.

"One of these snakes was bitten several times by a three and one-half foot krait, without visible effect." (C. H. P.)

***Psammodynastes pulverulentus* (Boie)**

*Psammophis pulverulenta* BOIE, 1827, Isis, p. 547.

*Psammodynastes pulverulentus* GÜNTHER, 1858, 'Cat. Colubrine Snakes Brit. Mus.,' p. 140. BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 172. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 383, Figs. 317-319. BARBOUR, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 127.

*Psammodynastes pulverulentis* STANLEY, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 29.

Seven specimens of this form are in the present collection from Hainan, A. M. N. H. Nos. 27781-27787.

In this series the dorsal scales are uniformly 17-15. The ventrals, in six male specimens, range from 157-167, average 162, and are 171 in the single female. The caudals, in the males, range from 61 to 70, average 64.5, 59 in the female. The upper labials are invariably eight, the lower labials eight except for the occurrence of seven on one side in one specimen. The preoculars are two eleven times, one three times. The postoculars are invariably two. The first temporals are uniformly two, the second two with an exceptional three. The tail-length varies from .21 to .24 of the total in males, .18 in the female specimen.

The largest male measures 506 mm., the single female 380 mm.

One specimen represents the dark brown phase of this species, the rest belong to the more common gray form.

Barbour's record of this species from Hainan was missed by both Vogt and Mell in their lists of species recorded from Hainan. Hainan specimens are also mentioned by Stanley. Stejneger's prediction that this species might be expected on the Chinese mainland has been abundantly justified by the records from Fukien (Stanley) and Kwangtung (Mell).

"Under this head I seem to have either two species or two varieties, a dark and a light. The dark form is extremely rare, while the light is not common.

"This viper-like snake was brought in about the first of June by a little boy. The snake was tied along a stick but it was undaunted and at the slightest annoyance it opened its mouth and showed its little fang sheaths, biting viciously anything put in its jaw. It proved to be very active. When I put it out on the porch it started away, progressing by means of a series of peculiar half leaps. The body was drawn up and then extended vigorously in such a way that the snake appeared to be jumping. It moved rapidly across the smooth boards, an unusual feat for a snake. I have never seen a snake come nearer to actual jumping than this little specimen. While controlling the snake's direction with the point of

an umbrella, I noticed that the snake tried to crawl up the umbrella. It climbed with facility, and has thoroughly mastered the art of climbing a smooth vertical stick by holding itself in place with one tight coil while freely working the rest of its body. When put in a small tree it immediately climbed up and showed itself most expert in sliding along small branches. Its ability to project its head, unsupported, upward, and reach for a distant twig, is notable. When put on the tip of a drooping limb it went straight up, when it might easily have dropped to the soft grass only a foot below. After being released, its viciousness did not appear so pronounced. It became more interested in escaping than in fighting. However, I did not dare test its good nature with anything but a stick, and so expert a climber could not be expected to be afraid of a stick. Its color is protective only in that it matches branches or dead leaves.

"A light-colored specimen, brought in later, apparently did not want to climb. This may have been only an individual difference." (C. H. P.)

***Naja naja atra* (Cantor)**

*Naja atra* CANTOR, 1842, Ann. Nat. Hist., IX, p. 482.

*Naja tripudians* BÖTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 85; 1894, Ber. Senck. Ges., p. 134.

*Naja tripudians* var. *fasciata* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 383.

*Naja tripudians* var. *fasciata* BÖTTGER, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 121.

*Naja naja atra* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 394. BARBOUR, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 136.

*Naja naja atra* BARBOUR, 1909, Proc. New England Zoöl. Soc., IV, p. 72.

The common cobra of southern China is represented by thirteen specimens, A. M. N. H. Nos. 27831-27843.

This series corroborates Stejneger's view of the characters of this subspecies. The upper labials are normally seven, with eight on one side in a single specimen. The lower labials are nine with a single exceptional eight. There is invariably a single preocular, and three postoculars in all except one case, which has two. The anterior temporals are always two, the second row varying from two to four, usually three.

The scales at mid-body are in twenty-one rows in twelve specimens, nineteen in the remaining one. On the neck the scale rows are twenty-five in three specimens, twenty-seven in six, and twenty-nine in four.

The largest male measures 1488 mm., the largest female 1473 mm.

## Summary of Ventrals, Caudals and Proportionate Tail-Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	8	164-172	168
	♀	5	169-177	173
Caudals	♂	7	41- 51	47.
	♀	5	39- 47	45
Ventrals+Caudals	♂ + ♀	12	208-223	216
Tail/Total Length	♂	4	.14-.17	.16
	♀	3	.14	.14

The coloration of these series is variable upon a rather distinct and striking fundamental plan. The venter is dark, light on the chin and throat, and the subcaudals light with dark outlines. There is a broad black crossband on the throat just posterior to the position of the hood-mark, which covers five or six ventrals and meets the dark dorsal color. Just anterior to the hood-mark, on the throat, is a second transverse black band, which may be poorly defined, or absent. In the latter case, however, its ends, which do not reach the dark dorsal color, remain as a pair of black latero-ventral spots. The general dorsal color is black, with six to eight light crossbands on the posterior half, each consisting of a pair of narrow light lines, with several more irregular transverse markings on the tail. The hood is marked with a round, heart-shaped, or diamond-shaped light area, which may be joined to the light color beneath the neck, and which encloses a large central black spot, with a smaller one on each side of it.

The pairs of light lines may unite laterally; they may alternate with single transverse light lines; and there may be single transverse lines on the anterior half of the body. No. 27837 exhibits this pattern in its extreme development, with five distinct, single, transverse light lines on the anterior half of the body, and eight pairs of lines on the posterior half, with irregular transverse markings on the tail. This is not at all a juvenile pattern, as it is least marked on a small specimen, No. 27834, which has only a few single, short, light transverse markings on the posterior part of the back. The figure of a Sumatran cobra given by Ditmars (1910, 'Reptiles of the World,' Pl. LXVII), shows the transverse light markings in pairs anteriorly, with a hood marking like that of the Hainan series.

"The cobra is common, as is shown by the number of specimens collected. Many more could have been secured if we had taken dead specimens. The Chinese are much afraid of these deadly snakes. It has been a surprise to me that they can be so easily managed. I do not

consider the cobra to be aggressive. None of our specimens showed any inclination to attack a man. Instead of showing fight when teased, they constantly attempt to escape, and only adopt a defensive attitude as the last resort.

"I have not seen a cobra outside. One was caught in a rat-trap, and one was found in the Mission compound.

"Small cobras are especially swift and agile, and older ones are alert and active. When they bite, they chew away until certain that their fangs have reached their mark. They quickly learn that it is useless to bite wood. When enraged, they will sometimes bite themselves.

"The behavior of cobra and mongoose was tested twice, once with a five-foot snake and a small mongoose and once with a three-foot cobra and a large mongoose. Both cobra and mongoose gave every evidence of regarding their opponents as dangerous enemies and, when placed together in a room each concentrated its attention on the other. Contrary to popular ideas of the mongoose's mode of attack, each of these specimens attacked the cobra at the moment when the latter struck, biting at the snake's open mouth so that snake and mongoose jaws became repeatedly interlocked. The snake's stroke was avoided, usually with a single motion of the head, except when it was caught in the open mouth of the mongoose. It is difficult to understand these tactics, for the snakes could scarcely fail to inoculate their enemy with poison. The small mongoose failed to kill its cobra, and died itself on the second day after the fight, but with no evident effects from the poison (it was apparently weak when brought to us). The larger mongoose killed its enemy and showed no ill effects from the encounter. Neither mongoose made the slightest attempt to attack the cobra from behind. The larger mongoose repeatedly approached the cobra and lay down on its side, just beyond reach of the cobra's stroke, keeping its eyes fixed on snake, and raising its head to keep it in view—a most peculiar and inexplicable performance." (C.H. P.)

### ***Bungarus multicinctus* Blyth**

*Bungarus multicinctus* BLYTH, 1861, Journ. Asiatic Soc. Bengal, XXIX, p. 98. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 397, Figs. 325-327.

*Bungarus candidus* var. *multicinctus* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 369.

A. M. N. H. Nos. 27789-27795, seven specimens, represent this species in the present collection.

Both upper and lower labials are uniformly seven. The preocular is single and there are two postoculars in all. The anterior temporal is

invariably single, and those of the second row are usually two, exceptionally one or three. The dorsal scales are uniformly fifteen throughout the length except in one specimen, which has seventeen rows on the neck. The ventrals in the single male are 211, the subcaudals 48. In the six females, ventrals and subcaudals average 212 and 50, respectively, ranging from 207 to 214 and from 47 to 53. The tail-length is .12 of the total in the male, and ranges from .12 to .14 of the total in the six females.

The male specimen measures 1333 mm., the largest female 1354 mm.

The number of light crossbands on the back varies from 32 to 40, and those on the tail range from 9 to 15. The scales in the light bands are dotted with brown in the larger specimens.

"I found a specimen of the krait while hunting tree frogs at night, in the small banana grove just back of Mr. Leverett's house. It made no effort to escape when the light was flashed on it. Dr. Salsbury tells me of another specimen having been killed on a tennis court at night some time ago.

"All of the specimens observed seemed very inoffensive. When teased with a stick, they coil with the body somewhat flattened and with the head concealed in the center of the coil. If the teasing is then continued, they make spasmodic jerks, throwing the body around, but making no effective effort to escape. In no case did these snakes strike. They occasionally bit the stick with which they were teased, and two specimens confined together bit each other. Two of the specimens could not be induced to bite at all.

"This snake is much feared by the Chinese, which is perhaps why we have been able to secure only a few specimens." (C. H. P.)

***Calliophis maccllellandii* (Reinhardt)**

*Elaps maccllellandii* REINHARDT, 1844, Calcutta Journ. Nat. Hist., IV, p. 532.

*Callophis maccllellandii* GÜNTHER, 1864, 'Rept. Brit. India,' p. 349.

*Calliophis maccllellandii* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 391, Figs. 323-324.

Five specimens, A. M. N. H. Nos. 27776-27780, form the first record of this species from Hainan.

Upper labials six in one case, seven in the rest; lower labials uniformly six; preoculars one, postoculars two; temporals 1-1 on each side; dorsal scales in thirteen rows. Variation in tail-length, ventrals and caudals does not appear to be correlated with sex. Ventrals range from 205 to 216, average 210; subcaudals from 36 to 38; tail-length from .11 to .12 of the total.

The largest male measures 460 mm., the largest female 419 mm.

The color pattern of No. 27777 may be described as follows: reddish brown above, each scale with a darker tip; back crossed at regular intervals by short, narrow, straight black lines, twenty-six in number, reaching the third or fourth scale row; venter yellowish cream color, with fifty-three black blotches, which do not reach the ends of the ventrals, each alternate mark opposite a dorsal line; these cover one or two ventrals, and are frequently offset on the median line; four dorsal black lines on the tail and nine black markings beneath; a nuchal collar, and anterior part of head black, with a vivid yellow band which covers the sixth and seventh labials, the temporals, and the parietals; anterior labials and lower half of rostral lighter. No. 27779 has the dorsal transverse markings broader (half or two-thirds the length of a scale), slightly shorter from side to side, and outlined with light. In No. 27776 the dorsal marks are reduced to spots, usually on alternate sides of the midline, and the ventral blotches are enlarged, covering from two to five ventrals, and only forty-six in number. This apparently is the color-variety *C. m. gori* Wall, of Assam (Wall, 1918, Journ. Bombay Nat. Hist. Soc., XXV, p. 631).

"Dr. Salsbury brought a specimen of the 'Hainan coral snake' from Kachek. The Chinese say that this species is nocturnal. One specimen would only coil around and around, if annoyed, and keep its head in the center of the regular coils. It could not be induced to strike or assume an offensive attitude, nor could it be made to bite. It crawls in a straight line with a smooth gliding motion." (C. H. P.)

***Amblycephalus moellendorffii* Bœttger**

*Pareas moellendorffii* BœTTGER, 1885, Ber. Offenbacher Ver. Naturk., XXIV-XXV, p. 125; 1888, idem, XXVI-XXVIII, p. 84, Pl. II, fig. 1. COPE, 1895, Proc. Acad. Nat. Sci. Phila., (1894), p. 424.

*Amblycephalus moellendorffii* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 443. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 204.

Seven specimens, A. M. N. H. Nos. 27769-27775, in the present collection.

The upper labials are seven, six on one side of one specimen, the lower labials seven, eight on one side of one specimen. One preocular and one postocular in all. Temporals 2-2 to 2-4. Three pairs of chin shields in six specimens, four in one. The dorsal scales are in fifteen rows throughout the body. The ventrals range from 139 to 142 in five males, average 140, and from 147 to 150 in the two females. The caudals in the male specimens range from 52 to 58, average 54, in females 41 to 43. The tail-length in males ranges from .22 to .24 of the total, average .23, in the two females it is only .15 and .16.

The coloration agrees with descriptions and with Bœttger's figure.

The fact that this snake is fairly abundant in Hainan, together with Boulenger's record from Hongkong, disposes of the supposition of Mell and Vogt that this species is replaced in Kwangtung by *A. kuangtungensis*.

### Crotalidæ

#### *Trimeresurus gramineus* (Shaw)

*Coluber gramineus* SHAW, 1802, 'Gen. Zool.,' III, Pt. 2, p. 420.

*Trimeresurus gramineus* GÜNTHER, 1864, 'Rept. Brit. India,' p. 385. BœTTGER, 1894, Ber. Senck. Ges., p. 135. STANLEY, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 31 (part). SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 205.

*Trimeresurus erythrurus* BœTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI-XXVIII, p. 91.

*Lachesis gramineus* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 554 (part). BœTTGER, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 139 (part).

*Trimeresurus albolabris* GRAY, 1842, 'Zool. Misc.,' p. 48.

*Trimeresurus gramineus albolabris* MELL, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 126.

Forty-one specimens of this species were brought to Mr. Pope at Nodda, A. M. N. H. Nos. 27910-27950.

In this series, the preoculars are two or three, according as the scale bordering the loreal pit below enters or is very narrowly excluded from the eye. There is a narrow, curved subocular, and between this and the supraocular there are usually two small postoculars, occasionally three.

The internasals are rather large, in contact in thirty-five specimens, and in the remaining six they are separated by a single scale, a character which distinguishes this form from the closely allied *Trimeresurus stejnegeri*<sup>1</sup> of Fukien and Formosa.

The range of variation of the dorsal scale rows from neck to anus may be summarized as follows:

DORSAL SCALE	No. OF
ROWS	SPECIMENS
27-15	1
25-15	11
23-15	28
21-15	1

<sup>1</sup>Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 4.



## Summary of Scale Counts and Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	21	153-162	158
	♀	20	158-167	161
Caudals	♂	21	65- 73	69.5
	♀	19	52- 60	56
Scales Between Supraoculars	♂	21	8- 13	11
	♀	20	9- 13	11
Upper Labials	♂	21	10- 12	10.4
	♀	20	10- 12	11.1
Lower Labials	♂	21	11- 14	12.2
	♀	20	12- 16	13.0
Total Length, mm.	♂	21	313-626	498
	♀	19	335-945	703
Tail-Length + Total Length	♂	21	.18-.22	.20
	♀	19	.14-.18	.16

Seven stomachs contained the remains of mammals, three contained frogs, and one a lizard (*Calotes versicolor*).

Mell, 1922, p. 126, on the basis of extensive field observation, found the Chinese pit vipers of the *gramineus* group evidently divisible into two forms, a northern, mountain form, for which he retained the name *gramineus*, and a southern, plains form, for which he suggested the use of the name *Trimeresurus gramineus albolabris* Gray. It is evident from his description and from the range suggested by him, that it is the latter form which is common in Hainan. I find that specimens from Formosa, Fukien, and Yunnan are readily distinguishable from the Hainan form, and evidently represent Mell's *gramineus gramineus*. The examination of specimens of *gramineus* from Indo-China, Siam, Java, and India, however, proves that it is the southern form which ranges to Hainan and Canton, and that *T. albolabris* is therefore a strict synonym of *gramineus*. I have proposed names for the allied Yunnan and central Chinese species in a former paper, and hope to return in the future to a more extended discussion of their relations.

"This viper must be rated as common. At one time it was brought in often, about one specimen every other day. I have never found one myself, in spite of the fact that I was out collecting every day during the time it was being brought in so often. Perhaps it stays in the green, and perhaps it was brought in more frequently in the winter because of the scarcity of green cover. It was rarely brought in later in the season, though we continued to advertise for it.

"One of these vipers was hanging on the outside of a basket containing a python, and I unconsciously put it (the viper) in my lap. It made no attempt to strike. A viper that was quite exhausted after disgorging its meal soon recovered its activity. I found that it would snap as well as strike. When the end of a stick was placed just back of its head, its jaws snapped on it with lightning speed, the fangs obviously being brought into action. It repeated this performance several times when the stick was brought near it. When put out and worried with a piece of cloth, it still snapped viciously, but would wait until the object was quite near. It assumes the usual S shape in preparing to strike.

"A half-grown specimen disgorged a small rat; an eighteen inch specimen disgorged a lizard, probably *Calotes*; a fifteen-inch specimen disgorged two half-grown rats. A thirty-three-inch specimen had swallowed a large rat. Its diameter at the neck was half an inch, and at the place where the rat was contained, one and three-fourths inches." (C. H. P.)

#### LIST OF THE SPECIES OF REPTILES KNOWN FROM HAINAN

##### TURTLES

1. *Platysternon megacephalum* (Gray)
2. *Ocadia sinensis* (Gray)
3. *Clemmys bealii* (Gray)
4. *Clemmys mutica* (Cantor)
5. *Cyclemys trifasciata* (Bell)
6. *Pyxidea mouhotii* (Gray)
7. *Amyda sinensis* (Wiegmann)
8. *Amyda steindachneri* (Siebenrock)
9. *Pelochelys cantorii* (Gray)

No endemic species of turtle is known from Hainan. Mell (1922, p. 108) lists *Testudo emys* as recorded from this island, but on what authority I am unable to discover. It seems possible that he may have misinterpreted Siebenrock's note (1906, p. 583), to which he refers. Smith (1923a, p. 196) also ascribes five species of turtles to Hainan, apparently following Mell. He indicates a species of turtle (not specified) as confined to Hainan, but this is doubtless *Clemmys schmackeri*, whose identity with *Clemmys mutica* of the Chinese mainland can scarcely be doubted. As in other groups of reptiles, it seems evident that the turtle fauna of Hainan is by no means exhausted with the present list.

## LIZARDS

1. *Goniurosaurus lichtenfelderi* (Mocquard)
2. *Hemidactylus frenatus* Duméril and Bibron
3. *Hemidactylus garnotii* Duméril and Bibron
4. *Peropus mutilatus* Wiegmann
5. *Gekko similignum* M. A. Smith
6. *Draco whiteheadi* Boulenger
7. *Calotes versicolor* (Daudin)
8. *Acanthosaura hainanensis* Boulenger
9. *Leiolepis belli* (Gray)
10. *Varanus salvator* (Laurenti)
11. *Takydromus sexlineatus meridionalis* (Günther)
12. *Mabuya longicaudata* (Hallowell)
13. *Mabuya multifasciata* (Kuhl)
14. *Sphenomorphus indicus* (Gray)
15. *Sphenomorphus leveretti*, new species
16. *Leiopisma reevesii* (Gray)
17. *Lygosaurus salsburyi*, new species
18. *Eumeces chinensis* (Gray)
19. *Eumeces quadrilineatus* (Blyth)
20. *Tropidophorus hainanus* M. A. Smith

Besides the two new species, the two named by Boulenger, and the two recently discovered by Dr. Malcolm A. Smith are known only from Hainan. I am convinced that *Goniurosaurus hainanensis* Barbour and *Eublepharis lichtenfelderi* Mocquard must be united. The differences discoverable in the original descriptions relate to the sex of the specimens examined or are due to different methods of description. The type locality of *E. lichtenfelderi* is the Norway Islands, across the Gulf of Tonkin from Hainan. Mr. F. Angel, of the Museum d'Histoire Naturelle in Paris, to whom I have been indebted for similar favors in the past, has kindly examined this type and has supplied me with an excellent photograph (Plate XXVII), and a figure of the scales surrounding the nostril (Text Fig. 17). The photograph, compared with Barbour's figure of *hainanensis*, proves their identity in habitus and color pattern, and the figure shows the nasal scales, which are differently described, to be in reality the same. Through the courtesy of Dr. Barbour, I was able to examine the type of *G. hainanensis* at the Museum of Comparative Zoölogy.

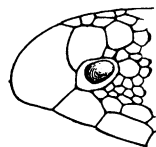


Fig. 17. Tip of snout of *Eublepharis lichtenfelderi* (type).

To show arrangement of the nasals (figured through the courtesy of M. F. Angel, Museum d'Histoire Naturelle, Paris).

## SNAKES

1. *Typhlops braminus* (Daudin)
2. *Python bivittatus* Schlegel
- \*3. *Sibynophis hainanensis*, new species
4. *Natrix æquifasciata* Barbour<sup>1</sup>
- \*5. *Natrix andrewsi*, new species
6. *Natrix chrysarga* (Schlegel)
7. *Natrix percarinata* (Boulenger)
8. *Natrix piscator* (Schneider)
- \*9. *Natrix popei*, new species
10. *Natrix stolata* (Linné)
11. *Natrix subminiata* (Schlegel)
12. *Trimerodytes balleatus* Cope
13. *Pseudoxenodon melli* Vogt
- \*14. *Achalinus meridianus* M. A. Smith
15. *Lycodon subcinctus* Boie
16. *Ptyas korros* (Schlegel)
17. *Ptyas mucosus* (Linné)
18. *Elaphe porphyracea* (Cantor)
19. *Elaphe tæniura vaillanti* (Mocquard)
20. *Ahaetulla boiga* (Lacépède)
- \*21. *Holarchus formosanus hainanensis* (Bœttger)
- \*22. *Holarchus nesiotis* Barbour
23. *Holarchus violaceus* (Cantor)
24. *Enhydris bennetti* (Gray)
25. *Enhydris chinensis* (Gray)
26. *Enhydris plumbea* (Boie)
27. *Boiga multimaculata* (Boie)
28. *Psammodynastes pulverulentus* (Boie)
29. *Thalassophina viperina* (Schmidt)
30. *Hydrophis cyanocinctus* (Daudin)
31. *Microcephalophis gracilis* (Shaw)
32. *Naja naja atra* (Cantor)
33. *Bungarus multicinctus* Blyth
34. *Calliophis maclellandii* (Reinhardt)
- \*35. *Amblycephalus carinatus hainanus* M. A. Smith
36. *Amblycephalus moellendorffii* (Bœttger)
37. *Trimeresurus gramineus* (Shaw)

The seven species marked with an asterisk in the above list are known only from Hainan. As the snake fauna of the more northern island of Formosa consists of about fifty species, it is evident that numerous additions to the above list may still be expected.

The known reptile fauna of Hainan is now brought up to a total of sixty-six species, exclusive of marine turtles.

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<sup>1</sup>This species is now known from the Chinese mainland.

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PLATE XXVII

Dorsal view of type of *Eublepharis lichtenfelderi* (figured through the courtesy of M. F. Angel, Museum d'Histoire Naturelle de Paris).





