

**Article IV.—NOTES ON CHINESE REPTILES<sup>1</sup>**BY KARL PATTERSON SCHMIDT<sup>2</sup>

With Extracts from the Field Notes of Clifford H. Pope

PLATES XXVIII TO XXX, TEXT FIGURES 1 TO 22

## CONTENTS

	PAGE
Introduction.....	467
List of New Forms and Type Localities.....	469
Annotated List of Species.....	469
Testudinata.....	469
Loricata.....	476
Sauria.....	477
Serpentes.....	505
Bibliography.....	549

## INTRODUCTION

The total collection of reptiles from the Chinese mainland, made by the several expeditions of The American Museum of Natural History, amounts to 1487 specimens. The principal component collections come from the provinces of Fukien and Yunnan, collected by R. C. Andrews and Edmund Heller, 1916–1917; Fukien, H. R. Caldwell, 1916–1921; Szechwan, Walter Granger, 1921; Mongolia, R. C. Andrews, 1922; and Chihli, Shansi, and Anhwei, Clifford H. Pope, 1921–1922.

A number of specimens of Chinese reptiles in The American Museum of Natural History, received as a gift from Mr. J. W. Williams, College of Yale-in-China, Changsha, Hunan, and by purchase from Rev. John Graham, Yunnanfu, Yunnan, have also been examined. These and other minor sources add fifteen species and 116 specimens. The whole collection of mainland Chinese reptiles in the American Museum includes 104 species, distributed among the following families:

<sup>1</sup>Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 76.

<sup>2</sup>Of the Field Museum of Natural History.

	NO. OF GENERA	NO. OF SPECIES	NO. OF SPECIMENS
TESTUDINATA			
Testudinidæ	2	3	39
Trionychidæ	1	1	54
LORICATA			
Crocodylidæ	1	1	20
SAURIA			
Gekkonidæ	3	6	144
Agamidæ	4	10	216
Anguidæ	1	2	4
Lacertidæ	2	9	437
Scincidæ	5	11	178
SERPENTES			
Typhlopidae	1	1	1
Colubridæ ( <i>sens. lat.</i> )	20	51	437
Crotalidæ	2	9	73

The necessity for a rigid scrutinization and verification of locality records of Chinese reptiles is well shown by a small collection of snakes purchased by Mr. Pope at Wuhu, Anhwei, and a single specimen of the South Chinese *Sibynophis collaris* purchased at Hsing Lung Shan, Chihli. The Wuhu collection does not contain a single specimen of the local Anhwei fauna, but is composed of species otherwise known from Fukien, Kwangtung, and Szechwan. Mr. Pope notes that the locality records given by a Chinese vendor of such specimens will invariably be the most remote, on the theory of enhanced value, and are thus entirely untrustworthy.

Of the forty-nine species of reptiles collected by Mr. Pope in Hainan, which have already been reported upon, only thirteen are contained in the present collection, and these are forms found chiefly in southern Fukien. The faunal boundary of primary significance to Chinese herpetology seems to be the mountain ranges of northern Kwangtung and western Fukien. These are themselves important centers of evolution and differentiation, as well as highways of eastward migration from the Himalayan area.

The present studies are preliminary to a comprehensive report on the reptiles of China, to include the future as well as the existing collections of the Third Asiatic Expedition. I have accordingly no more than touched upon the highly interesting distributional problems which present themselves in this fauna. For the same reason I have omitted the synonymy of the species considered, except where quoted for a special purpose.

Through the courtesy of Dr. Thomas Barbour of the Museum of Comparative Zoölogy and of Dr. Leonhard Stejneger of the United

States National Museum, I have been able to examine Chinese specimens in their charge in connection with the collections here reported upon, and I have profited on frequent occasions by the advice of both.

My connection with the present report results from a cordial co-operative arrangement between The American Museum of Natural History and the Field Museum of Natural History, arranged at the instance of Mr. Roy Chapman Andrews, leader of the Third Asiatic Expedition. Mr. Clifford H. Pope, to whose efforts the collection of a large part of the material is due, has kindly permitted the incorporation of a part of his field notes, and I have discussed numerous questions with him in the course of the work.

#### LIST OF NEW FORMS AND TYPE LOCALITIES<sup>1</sup>

	TURTLES	
<i>Geoclemys grangeri</i>		Yenchingkau, Szechwan.
	LIZARDS	
<i>Calotes alticristatus</i>		Yunnanfu, Yunnan.
<i>Eremias barbouri</i>		Mai Tai Chao, Shansi.
<i>Leiolopisma monticola</i>		Likiang, Yunnan.
<i>Leiolopisma septentrionale</i>		Hsing Lung Shan, Chihli.
	SNAKES	
<i>Natrix helleri</i>		Tengyueh, Yunnan.
<i>Natrix nivalis</i>		Likiang, Yunnan.
<i>Natrix septemlineata</i>		Tengyueh, Yunnan.
<i>Dinodon rufozonatum williamsi</i>		Changsha, Hunan.
<i>Elaphe bimaculata</i>		Ningkwö, Anhwei.
<i>Elaphe osborni</i>		Tengyueh, Yunnan.
<i>Elaphe porphyracea pulchra</i>		Yunnanfu, Yunnan.
<i>Gonyosoma caldwelli</i>		Yenping, Fukien.
<i>Boiga sinensis</i>		Fukien Province.
<i>Trimeresurus orientalis</i>		Shaowu, Fukien.
<i>Trimeresurus stejnegeri</i>		Shaowu, Fukien.
<i>Trimeresurus yunnanensis</i>		Tengyueh, Yunnan.

#### ANNOTATED LIST OF SPECIES

##### TESTUDINATA

##### *Clemmys mutica* (Cantor)

*Emys mutica* CANTOR, 1842, Ann. Nat. Hist., IX, p. 482.

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

*Clemmys schmackeri* BÄTTGER, 1894, Ber. Senck. Ges., p. 129, Pl. III, fig. 1.

*Clemmys nigricans* SIEBENROCK, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 439.

<sup>1</sup>Diagnoses of these species have appeared in Amer. Mus. Novitates, No. 157, February 13, 1925, and No. 175, May 28, 1925.

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

The above synonymy supplies the key to the further bibliography of this species and presents the principal mutations in its name. It still appears as "*Damonia*" in Mell's list of Kwangtung species, but was not taken by him, unless it is included with the *Clemmys nigricans* of his report.

A single female specimen, A. M. N. H. No. 31065, was collected by Mr. Clifford H. Pope at Ningkwo, Anhwei Province, Sept.-Oct. 1921.

While this specimen presents some variations in general appearance from the Hainan series collected by Mr. Pope, there is no important difference discoverable. Ningpo and Ningkwo are the most northern records of this species, and a good series of it from that area is a desideratum.

The measurements of the present specimen are as follows:

Length of Carapace .	137 mm.
Breadth of Carapace	98
Depth	56
Length of Plastron	114
Breadth of Plastron	71

#### ***Geoclemys reevesii* (Gray)**

Thirty-five specimens of this species are in the collection of The American Museum of Natural History. A. M. N. H. Nos. 17415 and 17417-17420 were collected at Changsha, Hunan, August 1920, by Mr. J. W. Williams; No. 23518 is from Yocow, Hunan, collected December 1921-March 1922, by Mr. Clifford H. Pope; and Nos. 31093-31120 are from Ningkwo, Anhwei Province, September-October 1921, collected by Clifford H. Pope.

Three specimens present the melanistic phase, which is known as var. *unicolor*, of this species; these have no trace of markings on head and neck, as well as a uniformly black shell. Other specimens, with a very dark shell, retain traces of the neck markings. It seems evident that this color variety is co-extensive in range with the parent species.



Measurements of ten specimens of the Ningkwo series are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON	BREADTH PLASTRON
31093	juv.	39 mm.	30 mm.	19 mm.	33 mm.	25 mm.
31095	juv.	52	42	25	45	33
31100	♂	63	46	29	53	38
31109	♀	74	55	34	68	47
31096	♂	85	60	37	74	50
31120	♂	94	65	44	79	54
31119	♀	104	68	46	89	57
31115	♀	117	81	55	109	71
31116	♀	131	87	57	116	72
31117	♀	154	100	72	133	87
Average of 5 Juv.		47	38	24	42	31
Average of 13	♂	75	53	34	64	44
Average of 15	♀	103	72	47	92	61

"The three-ridged, hard-shelled turtle is never taken by the fishermen, who constantly catch the soft-shelled turtles. I have seen them dropping into the water from inclined logs on the bank." (C. H. P.)

#### *Geoclemmys grangeri*, new species

Figures 1 and 2

*Geoclemmys reevesi* VOGT, 1924, Zool. Anz., LX, p. 337 [?]. WERNER, 1924, Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, p. 40 [?].

TYPE.—A. M. N. H. No. 23481; ♂; Yenchingkao, Wanh sien, Szechwan, 1500 ft. alt.; November, 1921; Walter Granger.

DIAGNOSIS.—Differs from *Geoclemmys reevesii* in having the axillary shield larger than the inguinal; the small occipital shields much smaller; and the spots of the plastral shields much smaller and more sharply defined. The gular suture is more than twice that of the humerals; the first marginal is the broadest; and the bridge is a little longer than the posterior lobe of the plastron.

DESCRIPTION OF TYPE.—Snout rather pointed, strongly projecting, vertical profile oblique; edges of jaws smooth, the upper without median notch or hook; head covered with a large smooth shield, behind which are very small scale-like areas on the skin, merging gradually into the rugose skin of the neck; carapace nearly uniform oval as seen from above, the lateral profile uniformly rounded, the greatest depth at about the middle of the shell; carapace with three well-defined keels; lateral marginals with turned up edges; first marginal broadest; plastron very slightly concave, strongly notched behind, the femorals projecting laterally; axillary shield larger than the inguinal; bridge a little longer than the posterior lobe of the plastron, (measured to the points of the anals).

Dorsal shields brown, lightest on the lateral keels, margined with dark lines which define the light lines of the sutures very sharply; a yellow spot on the edges of the five most posterior marginals on each side; plastron yellow, with a black spot on each shield, each nearly as long and about half as wide as the shield; a pair of lateral

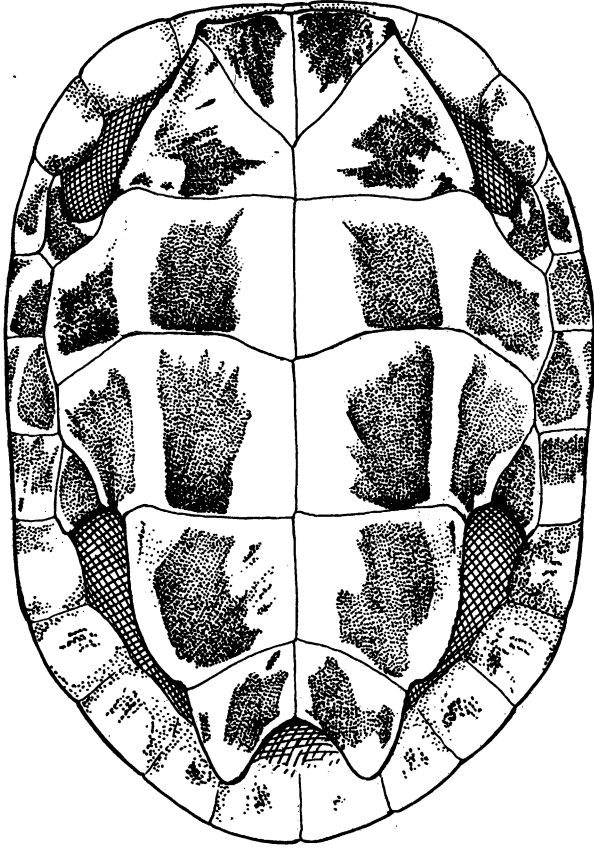


Fig. 1. *Geoclemys grangeri*, new species.  
Plastron of type, natural size.

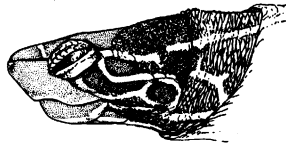


Fig. 2. *Geoclemys grangeri*, new species.  
Head pattern of type, natural size.

spots on each bridge, one on each axillary and inguinal shield, and a diffuse spot on the lower parts of the lateral marginals.

Neck with a median, a dorsolateral, and two lateral light lines; spotted beneath; pattern of the head as in *reevesii*, its chief elements a stirrup-shaped mark on the chin, a sinuous line from the posterior corner of the eye over the ear to the lateroventral line on the neck, a more nearly horizontal line above this, and an irregular line a little behind the ear, from the dorsolateral line to the lateroventral; a faint line from the lower border of the eye to the ear, where it may end in a fork; limbs without markings.

The measurements of the shell and the plastral sutures are as follows:

Length of Carapace	108 mm.
Breadth of Carapace	74
Depth	45
Length of Plastron	91
Breadth of Plastron	61
Gular Suture	18
Humeral Suture	6.5
Pectoral Suture	21
Abdominal Suture	20
Femoral Suture	16
Anal Suture	10

As the present form is unfortunately based on a single specimen, its status requires verification. Should it prove valid, the "*Geoclemmys reevesi*" recorded from Chengtu, Szechwan, by Vogt, should be referable to it, and possibly also the Yunnanfu specimen recorded by Werner.

### Trionychidae

#### *Amyda tuberculata* (Cantor)

*Trionyx tuberculatus* CANTOR, 1842, Ann. Mag. Nat. Hist., (1) IX, p. 482.

*Amyda sinensis* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 524. BARBOUR, 1909, Proc. New England Zool. Club, IV, p. 77. STEJNEGER, 1910, Proc. U. S. Nation. Mus., XXXVIII, p. 114. WANDOLLECK, 1910, Zool. Anz. XXXV, p. 566, fig. 1-3. BARBOUR, 1912, Mem. Mus. Comp. Zool., XL, p. 135.

*Trionyx sinensis* (part) SIEBENROCK, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1768; 1909, Zool. Jahrb., Suppl., X, p. 601.

*Amyda schlegelii* STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 526, fig. 407-409.

The status of the Chinese soft-shelled turtles of the allied forms which Boulenger unites as *Trionyx sinensis* has been a subject of discussion since Dr. Stejneger, in his 'Herpetology of Japan' suggested their separation into several distinct forms, as follows:

- |                         |                      |
|-------------------------|----------------------|
| 1.—A Japanese form      | <i>A. japonica</i>   |
| 2.—An Amur River form   | <i>A. maackii</i>    |
| 3.—A North Chinese form | <i>A. schlegelii</i> |
| 4.—A South Chinese form | <i>A. sinensis</i>   |

This subdivision was proposed as a very tentative one, and it elicited criticism from Siebenrock and Wandolleck. Stejneger himself, in 1910, regards two specimens from Honan as indistinguishable from Japanese specimens. Siebenrock, in 1907, examined a series of fourteen specimens from the Chinese mainland, and compared them with Japanese, Formosan, and Hainan specimens, with reference only to the characters of the median keel and of the carapacial tubercles, which had been employed by Stejneger. It seems obvious that many more characters must be examined in detail before reaching a conclusion on this problem.

In the fifty-eight specimens before me, which are rather well distributed from Mongolia to Hainan, the variation in form of shell is bewildering, so much so that I am convinced that the solution of the problem rests with the accumulation of still more extensive series.

The Chinese specimens in the collection of The American Museum of Natural History are the following: A. M. N. H. No. 17416, Changsha, Hunan, August 1920, J. W. Williams; Nos. 23514-23517, 23519-23520, Yochow, Hunan, December 1921-March 1923, Clifford H. Pope; Nos. 21464-21468, Hsing Lung Shan, Eastern Tombs, Chihli, August 1st-14th, 1921, Clifford H. Pope; No. 31066, Peking, Chihli, (bought in market), 1921, Clifford H. Pope; No. 23480, Chun Chow, Szechwan December 1921, Walter Granger; Nos. 23484-23487, Fukien Province, H. R. Caldwell; No. 31518, Yenping, Fukien, 1921, H. R. Caldwell; Nos. 23482-23483, and 31067-31080, Ningkwo, Anhwei, September-October, 1921, Clifford H. Pope; No. 24719, Niantzekwan, Shansi, September 15 1922, Clifford H. Pope; Nos. 31081-31092, Chen Tzu, Taiyuan, Shansi, July-August, 1922, Clifford H. Pope; and Nos. 23914-23919, Paotowchen, Mongolia, May, 1922, Clifford H. Pope.

The numbers of specimens in geographically comparable series are as follows:

Chihli	6
Shansi	13
Mongolia	6
Anhwei	16
Hunan	7
Szechwan	1
Fukien	5

Besides these, four specimens from Nodda, Hainan, which have been noticed in a previous paper in this series of reports, have been at hand.

The primary division in this entire series seems to be plainly between the Hainan specimens and those of the Chinese mainland from Fukien

north. The Hainan specimens are broader when adult (over 200 mm. in length of carapace); their greatest breadth is anterior to the middle of the carapace; and the ventral pattern is more vivid, apparently more constant, and more persistent with increasing age, than is the case in the northern specimens. As the type locality of *A. sinensis* is Macao, there can be little doubt of the correctness of referring these Hainan specimens to *sinensis* s.s. A much larger series of this form is required to establish the limits of variation of this form, and its range to the north is quite unknown.

Reserving provisionally the name *japonica* for the Japanese turtles, the next available name for the turtles of northern China is *Amyda tuberculata* (Cantor). The type locality of this species is Chusan, which seems geographically satisfactory for the Yangtze Valley form; and for the present material it seems best to employ no other name.

The series from Fukien consists of two juvenile specimens, a medium-sized one, and two of 166 and 174 mm. respectively. There is no ventral pattern in these specimens.

The Szechwan specimen is a monstrosity of the type figured by Mell and named "*cyphus*" by Vogt. There are no ventral markings. Its depth of shell is 0.37 of the length of the plastron.

The Hunan specimens are small, the largest measuring only 108 mm., and therefore are unsatisfactory for the comparison of measurements with adults which, as far as I am able to determine, are less variable than the juvenile specimens. There is no plastral pattern except the markings on the soft parts. The specimen from Changsha, 108 mm. in length of plastron, is relatively broad and its breadth is anterior. In this respect it is decidedly the closest approach to the Hainan specimens in the whole northern series.

The Anhwei series consists of two adult males of 182 and 193 mm., three medium-sized, and eleven juvenile specimens. In the latter the plastral pattern is well-marked in two specimens, four specimens have a reduced pattern of from one to four spots, and five have no pattern except for the lateral spots. In the three larger specimens the breadth of carapace varies from 0.75 to 0.79 of its length.

The six specimens from Chihli should be referable to *A. schlegelii* but I have not been able to find characters to separate them from the Anhwei or from Fukien specimens of similar size. Their depth of shell ranges only from 0.23 to 0.26 of the length of the carapace.

The Shansi series ranges in size from 62 mm. to 140 mm., and is thus without either juvenile or fully adult specimens. Only one specimen has a plastral pattern.

The six male specimens from the Hwang Ho near Paotowchen, Mongolia, north of Ordos, range in size from 217 to 275 mm. This series is the most distinct of those examined, with a narrow carapace, a short plastron, and the least depth of shell. Neither these nor the Hsing Lung Shan specimens correspond with Stejneger's deep-bodied *schlegelii*, and I suspect that, even if *schlegelii* should prove recognizable, other characters will have to be chosen to distinguish it.

On account of the very important variation in proportions with age, it is essential to compare specimens of approximately equal size. The present series is accordingly wholly inadequate for the solution of what may be called the "*sinensis*" problem, and the present remarks are preliminary to a more extended study when additional specimens become available.

### LORICATA

#### Crocodylidae

##### *Alligator sinensis* Fauvel

*Alligator sinensis* FAUVEL, 1879, Journ. N. China Branch Roy. Asiatic Soc., XIII, p. 1, figs. VAILLANT, 1880, Ann. Sci. Nat., (6) IX, Art. 8. BÖTTGER, 1885, Ber. Offenbacher Ver. Naturk., XXIV-XXV, p. 25 (of reprint); 1888, idem, XXVI-XXVIII, p. 111. GÜNTHER, 1889, Ann. Mag. Nat. Hist., (6) IV, p. 219. BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 291; 1890, Proc. Zool. Soc. London, p. 619, Pl. LI-LII. BÖTTGER, 1893, 'Kat. Rept. Mus. Senck.,' I, p. 19; 1894, Ber. Senck., Ges. p. 142. GADOW, 1901, 'Amphibia and Reptiles,' p. 471. WERNER, 1903, Abh. Bayer. Akad. Wiss., 2 Kl., XXII, p. 360. COHN, 1908, Jahrb. Samml. Bremen, I, part 2, p. 1, Pl. I. BARBOUR, 1910, Proc. Acad. Nat. Sci. Phila., 1910, p. 464. WERNER 1912, 'Die Lurche und Kriechtiere,' I, p. 548, Pl. BOULENGER, 1914, 'Reptilia and Batrachia,' p. 45, Pl. STANLEY, 1914, Journ. N. China Branch Roy. Asiatic Soc., XLV, p. 22. BARBOUR, 1922, Proc. New England Zool. Club, VIII, p. 31. MOOK, 1923, Bull. Amer. Mus. Nat. Hist., XLVIII, p. 553, figs. 1-2. STEJNEGER, 1925, Proc. U. S. Nation. Mus., LXVI, p. 34, Art. 25.

Twenty specimens of this species were secured by Mr. Pope. Of these, A. M. N. H. Nos. 23899-23901 are prepared as skulls, 28690-28692 are alcoholic specimens, and 28681-28689, 28693-28696 are dry skins with complete skeletons.

The Chinese alligators collected by Mr. Pope have been noticed in a paper on the skull of this form by Dr. C. C. Mook (1923). The species is included here to complete the series of reports on the reptiles and to record Mr. Pope's interesting field notes, which, it is hoped, he may amplify on a future occasion.

"I bought nineteen alligators in all for \$19.60. There are apparently no very small ones now, or else the small ones are more difficult to obtain. My smallest specimens are about two feet long.

"These alligators were dug out of holes in a grassy plain by the side of the Ching Ssui Ho, the river that flows from the south through Wuhu and into the Yangtze. This plain is about seven miles up-stream from Wuhu, and is well known to the Chinese as the home of a numerous colony of alligators. The plain is treeless, and even the grass is sparse. At this time of year the river flows between steep banks, perhaps twenty-five feet high. In the fall, at flood time, the Yangtze backs up until the plain above these banks is flooded. This is perhaps the reason why the plain where the alligators are found is not cultivated.

"The Chinese say that there are two other colonies within a few miles, and these three are apparently the only ones in this region.

"The alligators are very numerous at this locality. The entire lot was dug up in less than a week, and the supply appeared to be unlimited. The holes in which they are found are about a foot in diameter at the mouth, and seem to run in at an angle to a depth of about five feet.

"At this time the alligators are still hibernating and are quite inert when dug out, so that they may be handled quite freely. They will not use their tails in defense, though some of them will 'roar' and bite a little. If put on the ground, they will not attempt to run and have to be teased to become at all aroused. It was interesting to find a wild cat in the same mound, probably in the same hole, with a large alligator." (C. H. P.)

## SAURIA

### Gekkonidæ

#### *Gekko japonicus* (Duméril and Bibron)

Thirty-four specimens, from three localities, are referable to this species: A. M. N. H. No. 23585, Yenping, Fukien, 1921, H. R. Caldwell; and 31121, Kolan, Shansi, summer, 1922, and 31122-31135, 31137-31153, 31202, Ningkwo, Anhwei, September-October, 1921, Clifford H. Pope. Five specimens, collected by J. W. Williams at Changsha, Hunan, July, 1920, and presented to the American Museum, have also been examined.

These specimens agree in the presence of distinct dorsal tubercles, which amply distinguish the species. It is surprising to find an unquestionable specimen of this species from Shansi, from which province Mr. Pope secured large numbers of *G. swinhonis*; and the single specimen from Yenping, Fukien, was associated with *G. subpalmatus*. The preanal pores of the males of this series range from five to eight, eight occurring once, seven four times, six seven times, and five once.

The variation in the arrangement of the postmentals is of interest in comparison with that of *swinhonis*. The median pair of postmentals extends normally as far as or farther than the lateral pair. One or both of the first pair may be transversely divided, and No. 31121 has a median postmental. The enlarged scales which border the median pair vary in number from two to six, distributed as follows:

SCALES BORDERING POSTMENTALS	NUMBER OF SPECIMENS
2	2
3	9
4	12
5	9
6	5

#### ***Gekko swinhonis* Günther**

Eighty-three specimens represent this species: A. M. N. H. Nos. 21340-21342, 21344-21373, Hsing Lung Shan, Chihli, August, 1921; 31136 and 31434, So Huang, Ping Ting, Shansi, September, 1922; and 31154-31201, Chen Tzu, Taiyuan, Shansi, July-August, 1922, all collected by Clifford H. Pope.

The two specimens from So Huang, Ping Ting differ from the others in lacking entirely the slightly enlarged scales which are scattered among the otherwise uniform dorsal granular scales of the Chen Tzu and Chihli series. A series of specimens from So Huang is a desideratum.

The number of preanal pores and the arrangement of the second row of postmentals contrasts with these characters in *G. japonicus*. They vary as follows:

NUMBER OF PREANAL PORES	NUMBER OF SPECIMENS
6	5
7	6
8	7
9	3
SCALES BORDERING POSTMENTALS	NUMBER OF SPECIMENS
2	39
3	28
4	15
5	0
6	1

#### ***Gekko subpalmatus* Günther**

Four specimens are referable to this species: A. M. N. H. Nos. 18611, 20990, Yenping, Fukien, August, 1916, R. C. Andrews and Edmund Heller; 23586; Fukien Province (doubtless near Yenping), 1921, H. R. Caldwell; and 23608, Wanh sien, Szechwan, December, 1921, Walter Granger.



The palmation of the digits is rather variable, and reaches a maximum in No. 23608, which may be said to have the toes nearly half webbed. The scales bordering the postmentals posteriorly are two or three in number. The single male specimen has ten preanal pores.

**Gekko gekko** (Linnæus)

Four specimens of this species in the American Museum collections were sent by Mr. John Graham from Yunnanfu, but it is possible that they actually come from Tonkin. A specimen of *Hemidactylus frenatus*, also from Mr. Graham, was labeled Hanoi, Tonkin.

**Hemidactylus bowringii** (Gray)

A single specimen, collected by Mr. Graham at Yunnanfu, October 20, 1920, represents this species. It agrees closely with a Field Museum specimen from Lilong, Canton, Kwangtung, received from the Basel Museum.

**Cainodactylus yunnanensis** (Boulenger)

Thirteen specimens of this species in the American Museum's collections have been examined. All come from Yunnanfu, Yunnan, the type locality. They are in excellent agreement with Barbour's recent redescription (1924, p. 134). The femoral pores in five male specimens vary from 15 to 23.

**Agamidæ**

**Acanthosaura dymondi** Boulenger

A single topotypic specimen, A. M. N. H. No. 12802, collected in the Wutingchow district, Yunnan, May 3, 1919, by John Graham, is in the collection. It has 7-8 upper labials; lower labials 8-8; total length 172 mm.; tail 113 mm.; arm 26 mm., and leg 38 mm.

**Acanthosaura kakhienensis** (Anderson)

Seventeen specimens, A. M. N. H. Nos. 19881-19887 and 20970-20979, were collected at Tengyueh, Yunnan, May, 1917, by R. C. Andrews and Edmund Heller.

This form is well characterized by its distinct vertical patches of enlarged lateral scales. It is excellently figured by Boulenger (1887a, Pl. VI, fig. 2) as *Calotes fex*.

## Summary of Scale Characters and Measurements

	SEX	NUMBER OF SPECIMENS	EXTREMES	AVERAGE
Upper Labials	♂ + ♀	17	6- 8	6.5
Lower Labials	♂ + ♀	17	6- 8	7.0
Total Length	♂ + ♀	15	193-258 mm.	234 mm.
Length of Body	♂ + ♀	17	73- 97	87
Hind Leg/Body Length	♂ + ♀	17	.51-.63	.58
Tail/Total Length	♂ + ♀	15	.60-.64	.62

*Acanthosaura lamnidentata* Boulenger

Seven specimens, A. M. N. H. Nos. 19867-19869, 18609, and 23605-23607, collected by H. R. Caldwell, 1917-1921, near Yenping, Fukien.

The upper labials in this series range from 10 to 13. The tail length varies from 0.59 to 0.64 of the total.

*Acanthosaura varcosæ* Boulenger

A single specimen, A. M. N. H. No. 18880, ♀, collected at Snow Mountain Village, 9000 feet altitude, Likiang, Yunnan, November, 1916, by R. C. Andrews and Edmund Heller. Five topotypes, in the American Museum collection, have been available for comparison.

The nearest relative of this form appears to be *Acanthosaura tricarinata*, from which it is well distinguished by the presence of two distinct rows of keeled scales on each side of the dorsal crest. In the Likiang specimen the upper labials are 7-8; the lower labials 6-8. The total length is 175 mm.; tail 108 mm.; body 67 mm.; arm 31 mm.; and leg 42 mm.

This specimen was associated with *Japalura flaviceps*, from which it is almost indistinguishable in habitus. Werner's record of *dymondi* from Likiang (1924, p. 40), may possibly belong with this form.

*Japalura flaviceps* Barbour and Dunn

The two specimens in the collection, A. M. N. H. Nos. 19878, Likiang, Yunnan, and 19879, Snow Mountain Village, Likiang, Yunnan, collected by R. C. Andrews and Edmund Heller, November, 1916, are paratypes of this form (Barbour and Dunn, 1919, p. 16).

Measurements and labials of these two specimens are as follows:

A. M. N. H. No.	19878	19879
Sex	♀	♂
Upper Labials	8-9	7-7
Lower Labials	9-10	9-9
Total Length	148 mm.	116 mm.
Length of Body	60	48
Length of Arm	26	22
Length of Leg	42	30
Tail/Total Length	.59	.59

Werner, 1924, p. 41, refers a specimen of a *Japalura* from Likiang, Yunnan, to *yunnanensis*, with a remark on the difficulty of distinguishing *flaviceps* and *splendida*. This difficulty must be due to the lack of genuine *yunnanensis* in his material, for I find them entirely distinct. In *flaviceps* there is a strong suggestion of a pair of dorsolateral rows of keeled scales, much like those of *Acanthosaura varcoæ*; the lateral scales are small, nearly uniform, with a few rather isolated enlarged scales. All of the upper head scales are keeled, while in *yunnanensis* they are rugose or many-keeled. The latter has much larger laterals, with more numerous enlarged scales, which tend to form transverse rows, suggesting *A. kakhienensis*. It seems possible that *Japalura* is a "polyphyletic genus" whose different sections are derived from different sections of *Acanthosaura*. There is apparently a correlation of concealed tympanum with occurrence at high altitudes, which presents a problem meriting extended study and observation. *Japalura splendida* is so distinct in habitus, head form, and coloration from the above species, that it requires no comparison with them.

### ***Japalura splendida* Barbour and Dunn**

#### Plate XXIX, Figure 2

Eighteen specimens, A. M. N. H. Nos. 23543-23549, 23551-23553, 23558-23565, from Yenchingkau, 1500 feet altitude, Wanhshien, Szechwan, November, 1921, collected by Walter Granger.

This very strikingly colored form is apparently abundant in central Szechwan. The variation in number of labials is as follows:

NUMBER OF LABIALS	UPPER LABIALS No. COUNTS	LOWER LABIALS No. COUNTS
7	5	0
8	26	25
9	5	8
10	0	3

The range of measurements is as follows:

	SEX	NO. OF SPECIMENS	EXTREMES
Length of Body	♂	15	50- 89 mm.
Length Leg Body/Length	♂	15	.80-.92
Total Length	♂	15	163-256 mm.
Length Tail/Total Length	♂	15	.65-.71

The color-pattern of a juvenile female (57 mm. body length) closely approaches that of *Japalura flaviceps*. In a larger female (77 mm. body) the pattern of transverse dark dorsal markings is included between broad light dorsolateral bands. In the smallest male specimen (50 mm. body) the more "contrasty" male pattern is already well developed.

#### ***Japalura yunnanensis* Anderson**

Seven specimens from Yunnan, A. M. N. H. Nos. 19871-19874, 19876-19877 Tengyueh, May, 1917, and 19875, Homushu Pass, April 2, 1917, collected by R. C. Andrews and Edmund Heller.

This series has been mentioned by Barbour and Dunn (1919). The Tengyueh specimens are topotypes.

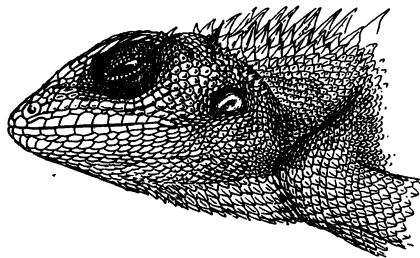


Fig. 3. *Calotes alticristatus*, new species.  
Head of type from the side, natural size.

#### ***Calotes alticristatus*, new species**

##### Figure 3

TYPE.—A. M. N. H. No. 17395; ♀; Yunnanfu, Yunnan; 1919; John Graham.

DIAGNOSIS.—Closely allied to *Calotes emma*, from which it is distinguished by the following characters: (1) a greater number of scales around the body; (2) smaller postcanthal and nuchal spines; (3) a much longer nuchal crest; (4) larger tympanum; (5) no dorsolateral light line.

DESCRIPTION OF TYPE.—Body stout, slightly compressed, head large, limbs and tail long.

Upper head scales imbricate, keeled, sixteen between the supraciliary borders above the eyes; supraoculars slightly enlarged; ten scales on the canthal and supraciliary border; a small spine just behind this series; two groups of spines on each side between the tympanum and the nuchal crest, the longest about half the diameter of the tympanum; upper labials 9-11, lower labials 9-9 dorsal scales keeled, slightly larger than the ventrals, 65 around the body; keels directed upward and backward on the upper half of the body; a strong oblique fold on each side in front of the shoulder covering an area of granular scales; ventrals strongly keeled, largest on the longitudinal gular fold; nuchal crest of eighteen flattened spines, gradually merging into the low dorsal crest, the longest spines 7 mm.

General color olive-green, with about seven transverse dark dorsal bands reaching halfway down the sides; fold on side of neck black; eye with radiating black lines, one extending to the tympanum.

Measurements as follows:

Total Length	407 mm.
Body	113
Tail	294
Arm	56
Leg	85
Snout to Posterior Border of Tympanum	30
Horizontal Diameter of Tympanum	5

I was at first inclined to identify the above specimen as *Calotes yunnanensis* Annandale, whose type locality is Tengyueh. It seems to be distinguished from *yunnanensis* by the greater number of scales around the body, and probably by a difference in the fold in front of the shoulder. It may be remarked that there are remarkably few species whose range includes both Tengyueh and Yunnanfu.

#### ***Phrynocephalus frontalis* Strauch**

A. M. N. H. Nos. 23944-23954, 23956-23991, 23993-23999, 24001-24042, 28350 and 31235, collected at Mai Tai Chao (43 miles E. of Paotowchen), Shansi, May, 1922, by Clifford H. Pope.

The *Phrynocephalus* of northern Shansi are readily distinguished from our Mongolian specimens by the small size of their supraocular scales, which number from 25 to 35, average 29.5, across the top of the head, in twenty specimens.

The final identification of species in this genus will require a large amount of material from typical localities, as well as an exhaustive study of Bedriaga's revision (cf. Stejneger, 1925a, p. 41).

"While crossing the sandy plain east of Sa Hsien (April 26) we found many of the little sand-lizards, which were abundant in the more sandy spots. They scooted in every direction from beneath our feet. Many dodged into holes, but we chased others until we caught them; they attempted to escape by short dashes, and after a minute or two of persistent pursuit were tired out so that they could be picked up. The large ones were hard to catch.

"When chased in loose sand, one of these lizards would frequently stop and by rapid wriggling of the body cause himself to sink into the sand until almost out of sight. In this position his coloration was a perfect match for the sand. I did not see one go completely beneath the surface.

"A more puzzling habit was frequently observed. While being pursued the lizard would come to a full stop, erect his tail to the perpendicular, and then roll it up and down over his back two or three times. After another short dash, this performance would be repeated.

"Even when rocks were numerous and readily available as hiding places, this species rarely made use of them. Many individuals, stationed in front of their burrows, would dive into them at the first sight of danger. Others would refuse to be chased into their holes, but made repeated short dashes away from the pursuer, making circuits so as to return to their original positions beside their burrows.

"The openings of the burrows were somewhat crescentic, about five times as wide as high. The eight burrows examined ranged from four to eight inches in vertical depth, with a horizontal length of from eight to twelve inches." (C H. P.)

#### ***Phrynocephalus cf. versicolor* Strauch**

A. M. N. H. Nos. 31239-31254, collected between Pang Kiang and Iren Dabasu, summer, 1922, by R. C. Andrews.

A. M. N. H. Nos. 31236-31238, 260 miles S.E. of Sairusu on the Kalgan Trail, and 31255-31294, Tsagan Nor, Gobi Desert, collected in the summer of 1922 by R. C. Andrews.

The Pangkiang and Tsagan Nor series offer slight differences, but in the present status of the genus it does not seem profitable to emphasize them. These differences, as well as the contrast between the Mongolian and Shansi specimens, appear in the attached tabular summary of characters.

Tabulation of Characters of *Phrynocephalus frontalis* and *P. versicolor*

	Sex	Upper Labials			Rows of Scales Between Eye and Labials			Scales in a Row Across Top of Head			Total Length mm.			Length Leg/Body			Tail/Total Length		
		No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
{ <i>Phrynocephalus frontalis</i> (Northern Shansi) <i>Phrynocephalus versicolor</i> Pangkiang, Mongolia Tsagan Nor, Mongolia	♂	10	12-18	15.0	10	3-5	3.8	10	25-36	29.5	10	102-123	111	10	.71-.83	.79	10	.52-.57	.55
	♂	10			10			10			10	97-118	109	10	.71-.82	.74	10	.52-.55	.54
	♂	11	12-16	13.4	11	3-4	3.7	11	18-24	21	10	107-119	113	11	.74-.83	.75	10	.54-.58	.56
	♂	5			5			5			5	105-110	107	5	.67-.78	.72	5	.50-.54	.52
{ Tsagan Nor, Mongolia	♂	10	13-17	14.8	10	3-5	4.2	10	18-23	21	9	106-124	114	10	.76-.86	.81	9	.55-.58	.56
	♂	10			10			10			10	104-116	109	10	.67-.80	.74	10	.52-.56	.54

### Anguidæ

#### *Ophisaurus harti* Boulenger

The single specimen, A. M. N. H. No. 20981, comes from Shaowu, Fukien, collected by H. R. Caldwell, 1916.

This specimen agrees exactly with Boulenger's description and figure (1899, p. 160. Pl. xvi) except in having 114 transverse rows of dorsal scales. It is not at all like his specimens in coloration. The general dorsal color is pale brown, the ventral color pale yellowish gray; scattered small dark spots are present on the head and chin, less marked on the back, and more pronounced on the tail; a dorsolateral brown line on the posterior third of the body, extending to the tip of the tail.

#### *Ophisaurus gracilis* (Gray)

Three specimens from Yunnanfu, A. M. N. H. Nos. 20980, 22700, 22701, collected by the Rev. Graham, have three scales in a line between the prefrontal and the rostral, and are thus referable to *O. gracilis* rather than to *O. harti*.

### Lacertidæ

#### *Takydromus amurensis* Peters

A. M. N. H. No. 8910, Mukden, Manchuria, collected by M. Nishimura, August, 1913, represents this species. It has five pairs of chin shields and three femoral pores on each side.

#### *Takydromus wolteri* Fischer

Ninety-seven specimens of this form are in the collection, from the following localities: A. M. N. H. No. 23625, Fukien Province, H. R. Caldwell; 23624, 23626-23634, Wanh sien, Szechwan, 1921, Walter Granger; and 31307-31312, 31314-31316, 31318-31319, 31321-31361, 31363-31378, 31380-31388, 31390-31393, 31395, 31397-31400 from Ningkwo; September-October, 1921; C. H. Pope.

In the sixty Ningkwo specimens examined, the dorsal rows of enlarged scales number 7 in four specimens, 8 in fifty-three, and 9 in three. The ventrals are uniformly in 8 rows, with two to four rows of enlarged, keeled laterals adjacent to them on each side. The chin-shields are 5-5 in two, 4-5 in two, otherwise 4-4. Femoral pores invariably 1-1.

In 86 specimens, 69 have two prefrontals; 3 have a small median scale between the prefrontals, not entirely separating them, and 14 have a median prefrontal, i.e., a row of three prefrontals.



No important variation is to be found in the ten Szechwan specimens. A specimen from Mukden (A. M. N. H. No. 8911, collected and presented by M. Nishimura) falls within the variation limits of the Ningkwo series. The single specimen from Fukien has 25-27 lamellæ beneath the fourth toe, but otherwise agrees with the remaining series. It should perhaps be compared with the Formosan species.

The largest male specimen measures 190 mm.; tail 143 mm.; the largest female 193 mm.; tail 142 mm.

Summary of Scale Characters and Measurements (Ningkwo series):

	SEX	NUMBER OF SPECIMENS	EXTREMES	AVERAGE
Ventrals in a	♂	27	27-31	29
Longitudinal Row	♀	33	28-32	30
Gulars from	♂	27	22-23	26
Collar to Chin-shields	♀	33	23-31	27
Lamellæ beneath	♂	27	21-24	22
the 4th Toe	♀	33	20-26	23
Length of Leg/	♂	27	.44-.50	.47
Length of Body	♀	33	.40-.50	.45
Tail-Length/	♂	20	.70-.75	.72
Total Length	♀	18	.70-.74	.72

#### ***Takydromus septentrionalis* Günther**

Thirty specimens, A. M. N. H. Nos. 23554, 23556, 23589, 23599-23600, Yenchingkau, October, 1921, and 23601-23604, Wanhhsien, Szechwan, December, 1921, Walter Granger; 23568, Yochow, Hunan, 1922, Clifford H. Pope; and 31295-31306, 31313, 31317, 31320, 31362, 31379, 31389, 31394, 31396, Ningkwo, Anhwei, September, October, 1921, Clifford H. Pope.

The Szechwan and Anhwei series of this species are in close agreement, and they fall within the limits of the British Museum series reported upon by Boulenger (1921, p. 137).

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

Thirteen specimens of this species, A. M. N. H. Nos. 18616, 23613-23623, and 23584, were collected in Fukien Province by H. R. Caldwell.

In this series the chin shields are invariably three pairs, the femoral pores uniformly one on each side. The dorsals are in six rows in one specimen. In other characters the series falls within the limits of the large Hainan series which has been reported upon elsewhere.

**Takydromus intermedius** Stejneger

A. M. N. H. Nos. 22697–22698, collected at Yunnanfu, Yunnan, by John Graham, agree closely with the diagnosis of this form, described from Mt. Omei, Szechwan.

All have seven series of enlarged dorsals and six series of ventrals; 23–26 ventrals from anal plate to collar; 25–27 lamellæ beneath the fourth toe; all have four pairs of chin-shields and two femoral pores on each side. No. 22698 measures 171 mm.; tail 129 mm

**Eremias przewalskii** Strauch

Plate XXIX, Figure 1

Ten specimens from Mongolia, collected by R. C. Andrews, summer of 1922. A. M. N. H. Nos. 31503–31504 come from 260 miles S.E. of Sairusu, on the Sairusu-Kalgan trail; 31505–31506 from Pangkiang to Iren Dabasu; and 31507–31512 from Tsagan Nor, Gobi Desert.

The number of ventrals in a transverse row ranges from 16 to 18; the number of gulars from collar to chin-shields from 27 to 34; the number of femoral pores from 10 to 15. The labials anterior to the subocular are 5 in four counts, 6 in twelve, and 7 in four. The subocular reaches the labial border on both sides in one specimen. Variation in other characters is shown in the comparative table.

The extreme development of the vermiculate dorsal pattern is seen in the largest male specimens. Juvenile and female specimen show a tendency toward a pattern of longitudinal lines.

**Eremias argus** Peters

Plate XXX, Figure 1

Seventy-five specimens, A. M. N. H. Nos. 21374–21427 and 21429–21449, collected at Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, by Clifford H. Pope.

This series is without doubt representative of typical *argus*. Boulenger's description of the coloration of this form (1921, p. 338) includes both the typical ocellated pattern and the lineate and cross-barred pattern which is the usual coloration of the western species here described as *Eremias barbouri*, but he states that the ocellate pattern is more frequent. Boulenger's description of the juvenile pattern does not agree with the present series, thirty-five of which are juvenile specimens and have a pattern of distinct, black ringed, white spots, with longitudinal lines only on the temples. In the forty adult specimens, transverse black bars connect the spots in thirteen, and the spots are well isolated in twenty-seven.

The ventrals in a transverse row are 12 in one specimen, 13 in eight, 14 in thirty, and 15 in one. The labials anterior to the subocular are 4 in ten counts, 5 in a hundred and twenty-one, and 6 in nineteen. In the whole series, the suboculars reach the labial border on only one specimen, and on one side in another, with no correlation with other *branchleyi* characters.

The number of gulars bordering the last pair of chin-shields in contact varies from two to nine, averaging 5.0. The number of gulars in line between the collar and chin-shields in forty specimens ranges from nineteen to twenty-five, averaging twenty-one. Variation in number of femoral pores is independent of sex (see below, under *E. barbouri*). Variation in measurements and in dorsal and ventral scale counts is shown in the comparative table (see below).

Three specimens from Manchuria, presented to the American Museum by Mr. M. Nishimura, agree closely with the Chihli series.

***Eremias barbouri*,<sup>1</sup> new species**

Plate XXX, Figure 2; Figure 4

TYPE.—A. M. N. H. No. 24045; ♂; Mai Tai Chao, (40 miles east of Paotow-chen) Shansi; May, 1922; Clifford H. Pope.

DIAGNOSIS.—Directly allied to *Eremias argus*, from which it may be distinguished by its larger dorsal scales and a color pattern of light longitudinal lines combined with transverse black bars.

DESCRIPTION OF TYPE.—Habitus unspecialized, head broad and deep, blunt in profile.

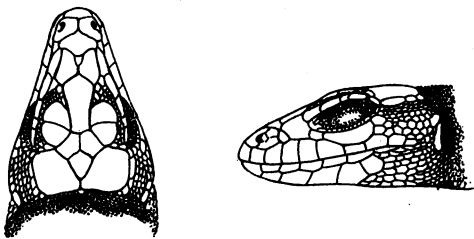


Fig. 4. *Eremias barbouri*, new species.  
Dorsal and lateral views of head of type,  $\times 2$ .

Rostral pentagonal, in contact with the first labials and supranasals; supranasals much larger than the subnasal and postnasal together, broadly in contact behind the rostral, a single frontonasal, partly divided, much broader than long, in contact with the supranasals, the prefrontals, and narrowly with both loreals; a pair of prefrontals

<sup>1</sup>Named for Dr. Thomas Barbour, of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

in contact, longer than broad, with a small median anterior scute between them, each broadly in contact with the second loreal and the frontal, not in contact with the first supraciliary; frontal as long as its distance from the rostral, in contact posteriorly with the first supraocular, and very narrowly, on one side, with the second; two large supraoculars, followed by a very small one; four supraciliaries on each side, separated from the prefrontal and frontal by granules, which are reduced to a single series between the supraciliaries and the supraoculars; frontoparietals smaller than the posterior supraoculars, larger than the interparietal, much shorter than the parietals, in contact with the second large supraocular; parietals broadly in contact behind the interparietal; a series of four scales along the side of each parietal; two loreals, the anterior narrow, vertical; five labials on each side anterior to the subocular, which is cut off from the labial border by a sixth labial; chin-shields 4-5, the first one on one side being transversely divided.

Back covered with small uniform granular scales, forty-eight across mid-body; fifteen ventrals in the longest transverse row; thirty-two transverse rows of ventrals; eleven enlarged scales in the collar; eighteen gulars from collar to chin shields; five gulars border the last pair of chin-shields in contact; a transverse row of small scales on the neck indicates a slight gular fold; femoral pores 11-12; lamellæ beneath the fourth toe twenty-two.

Color olive-gray above, with a pair of interrupted dorsolateral lines from the corners of the parietals to the base of the tail, on which they extend for a short distance; a double row of dorsal white spots between the dorsolateral lines, continuing as a single row on the base of the tail; a broad light lateral line, composed of united spots, and bordered with a few round black spots below; a series of black transverse bars above and below the dorsolateral lines, corresponding to the original spots, and extending to the dorsal and lateral lines; a few median dorsal black spots; venter uniform yellowish white; fore limbs with a few, hind limbs with numerous black spots.

Total length 123 mm., tail 68 mm., body 55 mm., leg/body, .49.

NOTES ON PARATYPES.—One hundred and seventy-one paratypes, all collected by Clifford H. Pope from localities in Shansi, have been examined in some detail. Of these Nos. 28348-28349, 31435, 24043-24044, and 24046-24141 are from Mai Tai Chao, May, 1922; 31411, 31418, 31425 and 31431 from So Huang Ping Ting, September, 1922; 31436-31442 from Ma Ying Hai, Ningwu July-August, 1922; and 31443-31495 and 31497-31502 from Chen Tzu. Taiyuanfu, July-August, 1922.

This large series shows a high degree of variability. A number of characters are compared with both *brenchleyi* and *argus* under the discussion of *brenchleyi* (see below). The variation in dorsals, ventrals, and measurements is shown in the comparative table for the genus.

In the four specimens from So Huang, Ping Ting, which were associated with *brenchleyi*, the dorsals across the body range from 46 to 59, and one specimen has the color pattern typical of *argus*. These specimens are thus possibly intergrades between *argus* and *barbouri*, while less close to *brenchleyi* than the series of *barbouri* from other localities.

In the seven specimens from Ningwu, which agree excellently with *barbouri* in scale characters, the pattern is ocellate, and apparently like

that of *argus*. The dorsal ocellæ of *argus*, however, differ from the Ningwu series, and from *barbouri* in general, by being more widely spaced. In the Chen Tzu series the dorsal scales are somewhat smaller than in the topotypes.

The subocular reaches the labial border in four specimens, (very narrowly in two), and on one side in two more of the Mai Tai Chao series. Four specimens from Chen Tzu have the same character, but all of these agree in other respects with *barbouri* and not with *brenchleyi*. This character, which is normal in *brenchleyi*, may appear as an abnormality in both *argus* and *barbouri* without making the specimen in any sense an intergrade with *brenchleyi*; its occurrence in a high percentage of specimens from a given locality might be taken as evidence of intergradation. Specimens of *brenchleyi* in which the subocular is cut off from the lip may be expected; but the So Huang, Ping Ting specimens referred to *barbouri* can not be so regarded on account of their color and scale characters.

Juvenile specimens from Chen Tzu all have an interrupted dorso-lateral and lateroventral white line; the lateroventral line forks in front of the shoulder and passes under and over the ear; the dorsolateral line is continuous anteriorly, and begins at the corner of the parietal; two series of dorsal white spots form straight lines, their black borders mostly connected with that of the dorsolateral line; the dorsolateral line continues on the base of the tail, (*argus* has spots on the base of the tail); the entire space between the two lateral lines is frequently dark, and the black on the back may be so increased as to leave only a distinct gray mid-dorsal band between the dorsal lines.

In twenty adults from Chen Tzu, all but one have the dorsolateral spots strongly elongated to form a well-defined dorsolateral line; this is quite continuous in No. 31491; dorsal white spots are never absent; transverse black bars on the back connect the spots, and are well marked in all except 31498, which has isolated ocellæ, only a few of which are connected by black markings.

Adult Mai Tai Chao specimens agree in coloration with the type. In forty juvenile specimens an ocellate pattern occurs in three, and these prove readily distinguishable from juvenile *argus* on direct comparison, as they have a larger number of spots and a much better defined lateroventral line.

"At Mai Tai Chao the Chinese call this lizard 'Rock Lion.' It is well named, as it was found only where rocks were plentiful, and it invariably sought shelter under or among them when alarmed. Its dashes

for safety are much swifter and longer than those of the Sand Lizard (*Phrynocephalus*). Its attempts to hide under bushes only if no rocks are available.

"In the course of a two-hour walk through the dry, bushy, elevated area to the southeast of Chen Tzu, I saw fourteen 'Rock Lizards.' Instead of making for the stones and boulders, which were numerous at various places on the plain, these specimens nearly always made for a bush, hiding beneath it, or dodging around it. Only when hard pressed would they resort to holes beneath rocks." (C. H. P.)

***Eremias brenchleyi* Günther**

Plate XXX, Figure 3

Thirty specimens are referred to *Eremias brenchleyi*; A. M. N. H. Nos. 31401-31410, 31412-31417, 31419-31424, 31426-31430, 31432-31433 from So Huang, Ping Ting, Shansi, September, 1922, and 31496, Chen Tzu, Taiyuan Fu, Shansi, July-August, 1922, collected by Clifford H. Pope.

It is gratifying to find a series of specimens representing this form, whose status was somewhat uncertain, even in Boulenger's latest revision (1921, p. 339). Unfortunately, even the present collection does not give the key to its distribution. The confusion of *brenchleyi* with typical *argus* has been largely due to the failure to distinguish between eastern *argus* and the Shansi form which I have described above as *E. barbouri*. It is highly probable that all three of these forms are connected by intergrades, as they are in fact connected by overlapping extremes in all of the characters which distinguish them. I have retained them as distinct forms, rather than as subspecies, only on account of my inability to explain their geographic relations. The range of *argus* is Korea, Chihli, and Shantung; type locality, Chefoo. That of *barbouri* is Shansi and probably southern Mongolia; type locality, Mai Tai Chao, northern Shansi. And *brenchleyi*, whose type locality is "Land of Grass," Mongolia, appears in the present collection from eastern Shansi, thus inserted between the ranges of *barbouri* and *argus*. It seems likely that, when the necessary field observations are made, habitat or altitude preference may afford a simple explanation of geographic ranges which at present appear complicated.

In the present series, which are at once placed with *brenchleyi* on account of the descent of the subocular to the labial border, the low number of dorsal scales across the back, the tendency to uniform dorsal coloration, and the more pointed head are in further agreement with the

descriptions of Günther and Boulenger. The average values of other characters differ from both *barbouri* and *argus*. Thus, the femoral pores of the three forms vary as follows:

NUMBER OF FEMORAL PORES ON ONE SIDE	NUMBER OF SPECIMENS		
	<i>argus</i>	<i>barbouri</i>	<i>brenchleyi</i>
7	1	3	..
8	7	45	..
9	16	98	4
10	35	73	12
11	21	30	24
12	..	1	9
13	..	..	1

The ventral plates in the three forms range as follows:

NUMBER OF VENTRALS IN A TRANSVERSE Row	NUMBER OF SPECIMENS		
	<i>argus</i>	<i>barbouri</i>	<i>brenchleyi</i>
12	1	2	16
13	8	15	3
14	30	44	9
15	1	7	..
16	..	5	..

The labials anterior to the subocular are less variable in the three forms, but *brenchleyi* has five in 26 cases and six in 22, while in both *barbouri* and *argus* five is exceeded in a much smaller proportion of specimens.

Variation in the number of gulars bordering the last pair of chin-shields in contact has been examined, and differs in the three forms as follows:

NUMBER OF SCALES	<i>argus</i>	<i>barbouri</i>	<i>brenchleyi</i>
2	1	10	..
3	..	10	..
4	13	45	3
5	15	23	10
6	28	12	6
7	13	1	5
8	3	..	1
9	1	..	..

Comparative Table of Variation in Chinese *Eremias*

Species	Sex	Dorsals Across Back			Ventrals From Groin to Collar			Length Leg/ Length Body			Length Tail/ Total Length		
		No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
<i>Eremias przewalskii</i> (Mongolia) <i>brenchleyi</i> (Shansi)	♂	6	50-56	53	6	31-35	33	6	.51-.56	.53	2	.54-.56	.55
	♀	4	49-60	52	4	31-37	34	4	.47-.51	.49	2	.52-.57	.54
	♂	11	40-47	43	11	26-29	28	11	.59-.68	.64	10	.61-.67	.63
	♀	14	38-45	42	14	27-32	28	14	.55-.67	.61	13	.60-.65	.62
	♂	35	42-54	48	35	28-34	31	33	.49-.56	.53	28	.54-.59	.57
	♀	26	43-54	47	26	30-34	33	26	.43-.52	.48	22	.50-.56	.53
<i>barbouri</i> (Mai Tai Chao, Shansi) <i>barbouri</i> (Chen Tzu, Taiyu- an, Shansi) <i>barbouri</i> (Ningwu, Shansi) <i>argus</i> (Chihli)	♂	8	48-52	50	8	27-32	28	8	.55-.61	.58	5	.56-.68	.63
	♀	11	45-55	49	11	28-32	30	11	.50-.64	.55	7	.55-.62	.58
	♀	7	44-47	46	7	29-31	30	7	.45-.56	.51	6	.53-.56	.54
	♂	10	54-66	57	10	29-32	31	10	.52-.56	.54	8	.57-.61	.59
	♀	30	48-65	56	30	28-34	31	30	.43-.55	.48	28	.52-.57	.54



Variation in dorsal and ventral counts and in measurements is shown in the comparative table.

In juvenile specimens the lateroventral line is continuous, straight-sided, and has a broad, lateral, dark brown band above it; the dorso-lateral line is nearly continuous; the white spots of the dorsal series are very small and without black borders; they may be absent or may be represented by faint continuous lines. In medium-sized and adult specimens the mid-dorsal area tends to be uniform olive, or with scattered small black spots. The white spots are faint, when present, except in No. 31403, in which they are well defined; strap-shaped transverse black bars, characteristic of *barbouri*, are present in only a single specimen. The single Chen Tzu specimen has the typical *brenchleyi* coloration, a low dorsal scale count (44), and the subocular bordering the lip.

#### • Scincidae

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

Two specimens, A. M. N. H. No. 20984 and 20985, are from the Mom Ting River, Burma Border of Yunnan, March, 1917, collected by R. C. Andrews and Edmund Heller.

These two specimens agree in all essential characters with the series from Hainan, reported upon in a former paper.

##### **Sphenomorphus indicus** (Gray)

Eight specimens of this lizard come from widely distributed localities: A. M. N. H. No. 17459, Changsha, Hunan, July, 1921, J. W. Williams; 18610, 18613, 20991, near Yenping, Fukien, August 5, 1920, H. R. Caldwell; 20988-20989, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller; and 23555 and 23588, Yenchingkau, Szechwan, October, 1921, Walter Granger.

These specimens exhibit some geographic variation, but the series are insufficient for definite conclusions as to the recognition of local races. The specimen from Changsha has the lateral band broken into vertical bars, much as in *L. zebratum* Boulenger, which Boulenger himself refers to *S. indicus*. The two Yunnan specimens have longitudinal black lines on the mid-dorsal brown area, which are absent in Fukien and Szechwan specimens, but such lines reappear in Formosan specimens (Stejneger, 1907, p. 216). The Yunnan and Szechwan specimens have 37-38 scales around mid-body, the Hunan and Fukien specimens 34-36. Werner, however, (1910, p. 43), records a Fukien specimen with 38 scales around the body.

**Lygosaurus sowerbyi** Stejneger

A single specimen, A. M. N. H. No. 23610, Fukien Province, 1921, collected by H. R. Caldwell, is in the collection.

This specimen, the second known, is notably larger than the type.

It has 30 scales around the body; 45 scales from base of tail to the parietals; 51 ventrals from anus to chin shields; 6 upper labials; 9 supraciliaries; 15-16 lamellæ beneath the fourth toe; body length, 76 mm.; hind leg, 22 mm.; leg/body, .29.

**Leiopisma monticola**, new species

## Figure 5

TYPE.—A. M. N. H. No. 20998; Snow Mountain Village, 9000 feet altitude, Likiang, Yunnan, China; November, 1916; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Body elongate, limbs weak, separated when adpressed by the length of the arm; digits 5; head wider than the neck; an undivided transparent shield in the lower eyelid; no supranasals; ear opening without denticles; dorsal

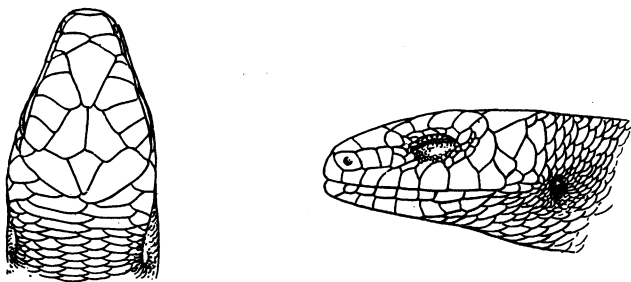


Fig. 5. *Leiopisma monticola*, new species.  
Dorsal and lateral views of head of type,  $\times 3$ .

scales smooth, slightly larger than the ventrals, in 24 rows around the body; a pair of enlarged preanals; anterior loreal longest; frontal in contact with the anterior two supraoculars; front parietals larger than the interparietal; 12 lamellæ beneath the fourth toe; back light brown, with rows of darker spots; sides dark brown; venter very dark gray.

DESCRIPTION OF TYPE.—Habitus elongate, limbs weak, separated when adpressed by the length of the arm; digits 5; head wider than the neck; ear opening small.

Rostral wider than high, broadly in contact with the frontonasal; frontonasal twice as broad as long; prefrontals meeting in a point behind the frontonasal; frontal kite-shaped, in contact with the two anterior supraoculars; frontoparietals larger than the interparietal; parietals meeting behind the interparietal; three pairs of enlarged nuchals; four supraoculars and small latero-posterior one; second supraocular largest; seven supraciliaries; nostril pierced in a single nasal; seven upper labials; anterior loreal largest.

Dorsal scales perfectly smooth, in twenty-four rows around the body, seventy from a point opposite the posterior border of the thighs to the parietals; two strongly enlarged preanals; twelve lamellæ beneath the fourth toe.

General ground color light brown; a dorsolateral light line, outlined above by a nearly continuous row of dark spots, below by solid brown, which lightens toward the belly and continues as a lateral line to the end of the tail; two somewhat discontinuous rows of dark spots on the middle of the back suggest the presence of a vertebral lighter line between them; upper surface of tail with dark spots; venter very dark gray.

The type measures 136 mm. from snout to tip of tail, the body composing 55 mm. and the tail 81; the arm measures 9 mm., the leg 12 mm.

NOTES ON PARATYPES.—In four male paratypes, A. M. N. H. Nos. 20996–20997, 20999–21000, from the type locality, the scales around the body are uniformly 24, and range from 66 to 78 from parietals to thigh. The subdigital lamellæ beneath the fourth toe are ten in two counts, eleven in three, and twelve in three. The prefrontals are in contact in two specimens, narrowly separated in one, and well separated in one. A single female specimen, A. M. N. H. No. 20995, from Snow Mountain at timberline, 13,000 feet altitude, has twenty-six scales around the body and a decidedly more elongate habitus, with a minute ear opening. These differences are in part accountable as sexual, perhaps in part due to variation in the 4000 feet of altitude difference.

This form differs from *Leiolopisma potanini* (Günther), (1896, p. 204), in having fewer scales around the body and fewer subdigital lamellæ. The latter character is unknown for *L. exigua* (Anderson), from Tengyueh, but *exigua* is said to have twenty-eight scales around the body, and is geographically remote from northern Yunnan. *L. sikkimense* seems to be allied to the present form, but it has 16 to 19 subdigital lamellæ and a much less elongate body.

#### ***Leiolopisma modestum* (Günther)**

Seventy-seven specimens are referred to this species: A. M. N. H. Nos. 23635–23650, Wanh sien, Szechwan, and 23651–23710, Chin Chow, Szechwan, collected by Walter Granger, 1921; and 23567, Huping College, Yochow, Hunan, spring of 1922, collected by Clifford H. Pope.

These specimens differ from the form of southern China, regarded as *reevesii* by me, in having fewer scale rows around the body, fewer dorsal scales in a longitudinal row, fewer subdigital lamellæ, and in having the prefrontals usually in contact, besides being strikingly different in coloration. I do not think that *modestum* is to be thought of as subspecifically related to *reevesii*, and it is certainly much more closely related to the North American *laterale* than to *reevesii*.

The type locality of *L. modestum* is Ningpo, and it is unfortunate that there is no topotypic material at hand for comparison with the Szech-

wan series under consideration. I do not believe, however, that the *Leiolopismas* of the Lower Yangtze Valley will be found to differ from those of Szechwan.

The present series agrees with *septentrionale* and differs from *reevesii* in having a scalloped dorsal margin of the lateral brown band, and in having this band unbroken by light spots. The American *L. laterale* has a straight lateral band, lineate sides, and differs from *modestum* in the average values of scale characters. These relations are shown in the accompanying table of scale characters and measurements of the Chinese *Leiolopismas*, in which the Formosan and Rui Kiu species are included as far as available data permits.

***Leiolopisma septentrionale*, new species**

Figure 6

TYPE.—A. M. N. H. No. 21451; Hsing Lung Shan, Eastern Tombs, Chihli Province; August, 1921; Clifford H. Pope.

DIAGNOSIS.—Body elongate, limbs failing to meet by half the length of the arm; digits five; head wider than the neck; an undivided transparent shield in the lower eyelid; no supranasals; ear-opening without denticles; dorsal scales smooth, in 28 rows around the body; a pair of enlarged preanals; anterior loreal smaller than

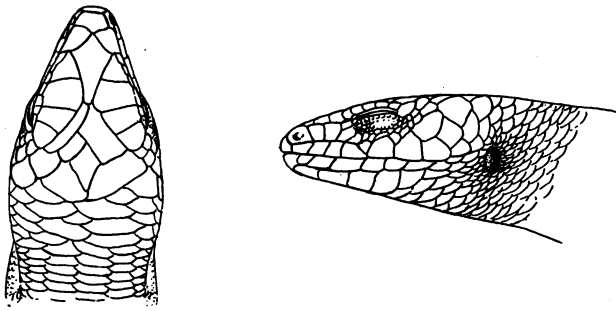


Fig. 6. *Leiolopisma septentrionale*, new species.  
Dorsal and lateral views of head of type,  $\times 3$ .

the second; fourteen or fifteen lamellæ beneath the 4th toe; sides dark brown, back light metallic brown, the dorsolateral line where the two colors meet regularly scalloped, not straight; throat lighter than the venter, with brown spots.

DESCRIPTION OF TYPE.—Body elongate, not depressed, limbs failing to meet by half the length of the arm; digits normal; head broader than the neck; ear opening larger than the transparent shield in the lower eyelid

Rostral and frontonasal in broad contact, frontonasal broader than long, in contact with the frontal in a point; prefrontals moderate, barely meeting in front of

the frontal; frontal kite-shaped, nearly as long as the frontoparietals and interparietals frontoparietals unequal, one nearly twice as large as the other; a small extra shield cut off from the interparietal; parietals forming a suture behind the interparietal; three pairs of broad nuchals; four supraoculars, the frontal in contact with the anterior two; six supraciliaries; anterior loreal smaller than the posterior; eight upper labials; temporals 2-2-3, the upper anterior smallest, the lower second, lower anterior, and upper second, in order of increasing size.

Twenty-eight smooth scales around the body mid-way between the limbs; 67 dorsal scales from the parietals to the posterior face of the thighs; seventy-eight ventrals from the postmental to the preanals; enlarged preanals as long as broad; fifteen smooth lamellæ under the fourth toe.

Back light metallic brown, covering the six dorsal scale rows and the adjacent half rows; sides dark brown sharply outlined above, less distinctly set off from the dark gray below; dorsolateral line, where the dorsal and lateral colors meet not straight, rather regularly scalloped; sides gray, with scattered brown spots; venter lighter gray; throat and lower labials light, spotted with brown; black spots forming fairly regular longitudinal rows on the light brown of the back.

#### Measurements:

SEX	A. M. N. H. No.	21450 (PARATYPE)
	21451 (TYPE)	
Snout to Anus	55 mm.	46
Snout to Ear	10	9
Snout to Arm	16.5	15.5
Axilla to Groin	33	29
Arm	12	10
Leg	16	14

NOTES ON PARATYPE.—The single paratype, also from Hsing Lung Shan, agrees in every respect with the type. It has 28 scales around the body; 67 from the parietals to the posterior face of the thighs; and fourteen lamellæ beneath the fourth toe.

When first described, I had compared this species primarily with *Leiolopisma reevesii* of southern China and with *L. laterale* of the southeastern United States. The subsequent examination of the large series of *L. modestum* from Szechwan (described above) proves that *septentrionale* is most closely allied to *modestum* to which it is also nearest geographically. I believe it to be well distinguished from *modestum* by its more elongate body. Additional material of this form is much to be desired for further comparison with both *modestum* and *laterale*.

#### *Leiolopisma barbouri* Stejneger

##### Figure 7

A. M. N. H. No. 22695, Yunnanfu, Yunnan, and 12803, Wutingchow District, Yunnan, collected by John Graham, represent this recently described form.

**DIAGNOSIS.**—Head notably small, limbs short, body and tail elongate; scales around body 24–26; subdigital lamellæ of the 4th toe 14–16; no white spots interrupting the lateral dark band; black borders of the dorsal scales forming a feather-stitch pattern; prefrontals separated.

**DESCRIPTION OF A. M. N. H. No. 22695.**—Body elongate, somewhat compressed, limbs short, separated when adpressed by the length of the leg; head proportionately small; tympanum well developed, nearly as large as the eye-opening; tail stout, slightly compressed, slightly constricted at its base.

Rostral broadly in contact with the frontonasal; frontonasal wider than long, narrowly in contact with the frontal; prefrontals narrowly separated, in contact with two loreals; frontal kite-shaped, about once and a half as long as broad; frontoparietals and interparietal subequal; parietals oblique, in contact behind the interparietal;

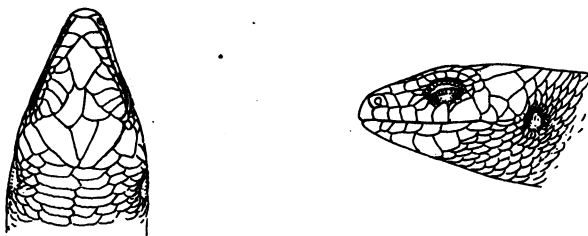


Fig. 7. *Leiolopisma barbouri* Stejneger.

A. M. N. H. No. 22695, Dorsal and lateral views of head,  $\times 3$ .

enlarged nuchals 3–4, the first pair wedge-shaped; four large supraoculars followed by a small one between the last supraciliary and the parietal; seven supraciliaries; a few small postoculars, followed by four temporals of which the upper anterior is smallest and the upper posterior largest; anterior loreal higher than the second; dorsal scales smooth slightly smaller on the sides, 26 around the body, 68 in a line from parietals to thighs; 77 ventrals from anal cleft to chin; two enlarged preanals; 15 and 16 lamellæ beneath the fourth toes.

General color olive-green, heavily maculate with black on back, sides, and venter, especially at the angles of the scales; throat with parallel dark lines, less distinct on the belly; a dark dorsolateral band from the end of the snout to the end of the tail (absent on the reproduced tip).

**Measurements:**

Body	48 mm.
Arm	8
Leg	12
Shielded part of head	7

This form may prove to be near *L. potanini*. The latter is very close to what I have called *modestum* in the present paper. It is certainly possible that *potanini* and my *modestum* may prove the same, but the Yunnan form here described is certainly distinct from our Szechwan series.

Comparative Table of Variation in Chinese *Leiopisma*

Species	Sex	Scales Around Body			Dorsal Scales in a Longitudinal Row			Lamellæ Beneath 4th Toe			Length Leg/Length Body			Length Tail/Total Length		
		No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
<i>Leiopisma laterale</i> (North America)	♂ + ♀	33	26-30	27.0	33	61-75	68	38	15-20	17	10	29-37	.32	7	59-.66	.62
<i>modestum</i> (Szechwan)	♂	15	26-30	28.1	15	57-67	62	30	13-17	15	15	30-37	.34	10	59-.63	.61
	♀	15	28-30	28.9	15	59-72	65				15	29-33	.32	10	58-.62	.60
<i>septentrionale</i> (Chihli)	♂	2	28	28.0	2	67		2	14-15	14.5	2	29-30	.295			
<i>formosensis</i> (Formosa)	♂ + ♀	19	26-30	27.2	19	53-65	58	4	14-17							
<i>batigieri</i> (Ishigakishima)	♂ + ♀	26	28-32	29.2	26	59-66	63									
<i>vanderburghi</i> (Tsushima)	?	1	28	28.0	1	69	69	1	12	12						
<i>reevesii</i> (Hainan)	♂	18	30-32	30.4	18	66-74	70	18	16-19	18	18	31-37	.34	10	63-.67	.65
	♀	9	30-33	31.2	9	69-76	73	9	17-19	18	9	28-33	.31	4	62-.64	.63
<i>barbouxii</i> (Yunnan)	♂ + ♀	4	24-26	25.0	4	68-74	72	4	14-16	14.5	3	25-28	.27			
<i>monticola</i> (Yunnan)	♂ + ♀	6	24-26	24.3	6	66-78	72	6	10-12	11	6	18-26	.23	1	.60	.60
<i>exigua</i> (Yunnan)	?	1	28	28.0												
<i>potanini</i> (Szechwan)	?	1	27	27.0				1	17	17	1	.31	.31			

***Leiolopisma doriae*, Boulenger**

Two specimens from Yunnanfu, Yunnan, A. M. N. H. Nos. 9123 and 12786, collected by John Graham, are referred to this species with some hesitation. They have 30–32 scales around the body instead of 26–28, but otherwise agree with Boulenger's description. Comparison material of the *Leiolopismas* of Upper Burma and western Yunnan is required for the satisfactory determination of the species in this area.

***Eumeces pekinensis* Stejneger**

Twelve specimens, A. M. N. H. Nos. 21452–21463, collected at Hsing Lung Shan and 13 miles north of Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, by Clifford H. Pope.

Two very distinct color phases, connected by intermediate specimens, are represented in the present series. Six specimens are black above with five narrow white lines, a vertebral, a pair of dorsolateral on the third row, and a lateral on the fifth and sixth rows, passing through the ear; the lower line is black-bordered below; the vertebral line forks at the interparietal and outlines this shield and the frontal. The dorsolateral lines extend on the supraciliary border to the canthus; the three upper lines extend on the base of the tail; venter dark gray, throat lighter.

The second color-phase is represented by three specimens which have the two and a half scale rows on each side of the vertebral line uniform greenish olive; a black lateral band on the next  $1\frac{1}{2}+1+1\frac{1}{2}$  scale rows, below which is the light lateral line; the lateral line is faint because its black lower border is narrow and interrupted. Head brownish olive above.

The transitional stages between the two patterns are represented by three specimens. The two broad dark dorsal bands become lighter until they are represented by narrow black lines which outline the position of the light lines, while the latter come to be of the same shade as the new dorsal ground color.

The upper labials are seven in eleven specimens, six in one. The supraciliaries range from six to eight. The lamellæ beneath the fourth toe are fifteen or sixteen. The scales around mid-body are 24 in two, 23 in two, and 22 in eight specimens. The dorsal scales from the posterior border of the thighs to the parietals vary only from 52 to 58, averaging 55.

The largest specimen measures 210 mm. of which the tail occupies 130 mm. The length of the hind leg averages 0.39 of the body length. The tail length (in seven specimens) averages 0.60 of the total.



"Three skinks were found August first, each in a burrow with eggs. The burrows were under two rather large stones on a rocky hillside, within ten feet of each other. In each case, a part of the burrow extended beyond the stone into the soil, while the eggs were spread out in the portion exposed by lifting the rock. The burrows were about twelve inches in length, two inches wide, and less than an inch in depth. Two nests contained four eggs each and the third eight. The eggs measured  $11 \times 15$  mm. Their color was a uniform grayish brown.

"Persistent search on the same hillside, though at some distance from the three nests, failed to locate others. A single specimen, without eggs, was found in a burrow beside a stone on another hillside. On August fourth we returned to the site of the first nests found, and discovered three more, within a radius of a few feet, each with eggs, and guarded by a female skink. These three burrows were much like the first ones found, but were under small stones, which merely covered the opening. The eggs were immediately beneath the stone in two nests, distributed along the burrow in the third. The number of eggs in the several nests was four, seven and eight.

"These observations show that this species has a well-defined type of burrow, that the female remains with the eggs, and probably indicate that the breeding females assemble in small colonies." (C. H. P.)

#### ***Eumeces chinensis* Gray**

Six specimens, A. M. N. H. Nos. 20986-20987, from Futsing, Fukien; 23569-23570 from Yenping, Fukien; and 23609, from Fukien Province, the first two collected by R. C. Andrews and Edmund Heller, July, 1916, the remaining by H. R. Caldwell, 1921; 23550, Yenchingkau, Wahnsien, Szechwan, collected by Walter Granger, October, 1921.

This series is compared in detail with the specimens referred to *E. pulcher*, under the discussion of the latter form.

#### ***Eumeces pulcher* (Duméril and Bibron)**

Seven specimens; A. M. N. H. Nos. 23557, Huping College, Yochow, Hunan, spring, 1922; and 31203-31207 and 31226, Ningkwo, Anhwei, September-October, 1921, all collected by Clifford H. Pope.

This series differs from the Fukien *chinensis* in a number of characters, each insufficient if taken alone, to warrant the distinction of a species (or subspecies) but amounting to conclusive evidence when taken together. The number of scales around the body is 24 in five, 25 in one, and 26 in one. In six *chinensis* 24 occurs in three, 26 in three. The

dorsals in a longitudinal row range from 48 to 53 in *pulcher*, from 50 to 53 in *chinensis*. The ventrals in *pulcher* range from 53 to 56, from 54 to 57 in *chinensis*. The upper labials in *pulcher* are 6 in ten counts, 7 in four, while in *chinensis* they are 6 in two cases and 7 in ten. The supraciliaries range from 7 to 9 in *chinensis* and from 6 to 9 in *pulcher*. The lamellæ beneath the fourth toe are uniformly 16 in *chinensis* and range from 13 to 17, with an average of 15, in *pulcher*. The average length of the hind leg, compared with that of the body (length of leg/body length), is much greater in *chinensis*:

	SEX	NO. OF SPECI- MENS	EXTREMES	AVERAGE
<i>chinensis</i>	♂	4	.37-.38	.38
	♀	2	.33	.33
<i>pulcher</i>	♂	2	.30	.30
	♀	4	.28-.33	.31

In addition to the number of labials and the length of the leg, the two forms are decidedly different in coloration. None of the Fukien specimens show a trace of longitudinal dorsal lines, and they have scarcely any black markings on the sides. In the Ningkwo specimens adult male and female and juvenile color patterns are well represented.

In No. 31203, ♂, the back is uniform olive; head brownish above, especially on the temporal region and the snout; venter very light gray, extending well up on the sides; a diffuse dark band on the sides consisting chiefly of dark posterior margins of the scales of the fourth and fifth rows from the vertebral line; numerous scales on the anterior portion of the sides and especially on the neck, entirely pinkish orange; scales on the upper sides of the limbs with dark outlines.

In No. 31205, ♀, the venter is light gray, the anterior margin of each scale black; these black marks become faint on the throat and are absent on the chin; a pair of black dorsal lines, which occupy the outer half of the first scale row and the inner half of the second (counted from the vertebral line) outline three olive dorsal lines, of which the vertebral is the most sharply defined; the black lines consist of nearly confluent black spots; top of head uniform olive with a few faint black markings; sides largely black but with numerous light spots on the anterior margins of individual scales; labials outlined with black; limbs largely black above.

No. 31226, juvenile, is coal black above, very dark gray below; vertebral light line sharply defined and continuous; dorsolateral lines slightly interrupted; sides with a number of light spots, not arranged in

a definite row; top of head olive, clouded with black; upper and lower labials with very distinct white spots.

The juvenile color pattern was described by Duméril and Bibron, the type of *pulcher* having been a juvenile specimen. As the type locality of neither *pulcher* nor *chinensis* was fixed more closely than "China" in the original descriptions, I have adopted the two names in the sense of Duméril and Bibron, who are the first revisors. Cantor's *Tiliqua rufoguttata*, type locality Chusan, is evidently a synonym of *pulcher*.

The specimens from Hunan and Szechwan, referred respectively to *pulcher* and *chinensis*, are somewhat unlike the Ningkwo and Fukien series, and are indistinguishable in scale characters from each other. They have been assigned to their respective species on the basis of coloration and geographic probability. It seems highly probable that additional collections will make it possible to unite these two forms as subspecies of *chinensis*.

#### **Eumeces elegans Boulenger**

Forty-nine specimens represent this species: A. M. N. H. Nos. 17422, collected at Changsha, Hunan, July, 1921, by J. W. Williams; 18612, 20992, 23571-23583, near Yenping, Fukien, and 23611-23612, Fukien Province; 22696, Yunnanfu, Yunnan, collected by John Graham; 20993-20994, Yunnan Province, collected by R. C. Andrews and Edmund Heller, 1916-1917; 23587, Wanhsien, Szechwan, December, 1921, collected by Walter Granger; and 23566, 31208-31225, and 31227-31234, Ningkwo, Anhwei, collected by Clifford H. Pope, September-October, 1921.

This series is remarkably uniform and presents no evidence of geographic variation.

### **SERPENTES**

#### **Typhlopidae**

##### **Typhlops braminus (Daudin)**

A single specimen, A. M. N. H. No. 23490, represents this species in the present collection. It was collected near Yenping, Fukien Province, 1921, by H. R. Caldwell.

The interesting note by Robert Mell (1922, p. 114) that this species is frequently found in flower pots throws light on the mode of dispersal of this singularly distributed form. It is quite as singular that no other species of *Typhlops* exhibits a similar erratic distribution.

## Colubridæ

***Sibynophis collaris chinensis* (Günther)**

Three male specimens of this form are in the collection: A. M. N. H. Nos. 18615, mountains near Yenping, Fukien Province, August, 1916, R. C. Andrews and Edmund Heller; 23493, Fukien Province, 1921, H. R. Caldwell; and 21471 "China," purchased at Hsing Lung Shan, Chihli, 1921, by Clifford H. Pope.

The two Fukien specimens each have 182 ventrals, and 104 and 108 caudals respectively. The specimen without locality has 168 ventrals and 106 caudals. No. 18615 has the lower anterior temporal extended to the labial border, thus constituting an extra labial, i.e., labials 10-10, instead of 9-9, as in the other specimens. In all three the dorsal scales are in 17 rows from head to tail; the 4th, 5th, and 6th labials enter the eye; the lower labials are 9; the pre- and postoculars are 1-2; and temporals 2-2, except in the anomaly noted above. No. 23493 measures 694 mm., the tail amounting to .31 of the total length. A fourth specimen, from Changsha, Hunan, has 182 ventrals and 103 caudals.

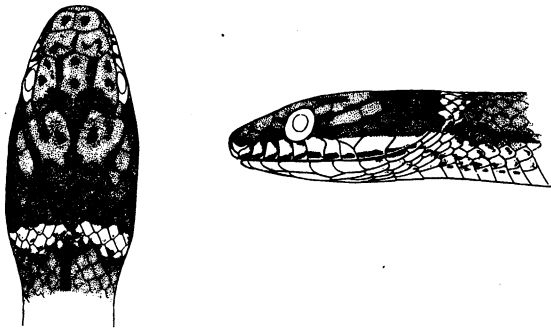


Fig. 8. *Sibynophis grahami* (Boulenger).  
Dorsal and lateral views of head of A. M. N. H. No. 12804,  $\times 2$ .

***Sibynophis grahami* (Boulenger)**

## Figure 8

Two specimens of this species, A. M. N. H. Nos. 18080 and 12804, from Yunnanfu and Wutingchow, Yunnan, in the Graham collection, are in the American Museum. These agree with Boulenger's description (1904, p. 132) in coloration. Their ventral counts are 188 and 194; tails incomplete.

***Natrix æquifasciata* Barbour**

## Figure 9

A single male specimen of this striking species, A. M. N. H. No. 21037, Futsing, Fukien, R. C. Andrews and Edmund Heller, July, 1916.

The dorsal scale count is 21-19-17, ventrals 151, anal divided, subcaudals 76. The dorsal scales are without pits, all strongly keeled except the outer row, which is faintly keeled. The maxillary teeth are 26, subequal. The internasals are narrowed anteriorly, their suture with the rostral less than that of rostral and first labial. Upper labials 9. One preocular, 3-4 postoculars, and 2-3 very small suboculars, which exclude

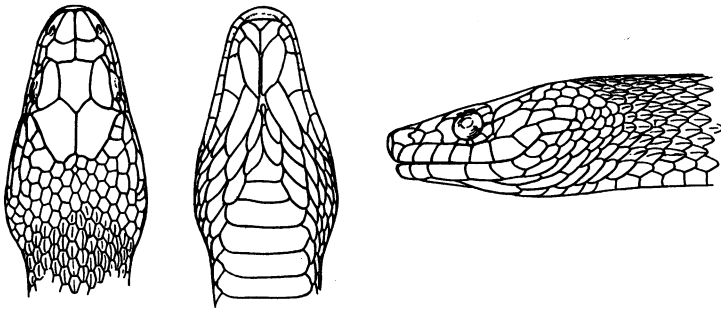


Fig. 9. *Natrix æquifasciata* Barbour.

Dorsal, ventral, and lateral views of head of A. M. N. H. No. 21037, natural size.

the labials from the eye. Lower labials 9-10. Temporals 4-3-3 and 2-3-4, two of the first row on the side with four being very small. The total length is 813 mm. of which the tail constitutes .23.

The top and sides of the head, including the labials, are uniform dark brown. Back brown, with broad transverse dark bands which join the more strongly marked quadrangular black blotches of the venter. These bands are hourglass-shaped on the sides and dorsally are split with a short transverse light marking. The ventral black marks are mostly offset on the mid-ventral line. Ventral ground color yellowish, clouded with brown posteriorly; lower labials clouded with brown, chin-shields like the venter. Twelve black marks beneath the tail.

Barbour's types of this species were two juvenile specimens from Hainan. The specimen above described differs chiefly in the presence of the suboculars, and in the less distinct color pattern. Even in the two types, however, the oculars are highly variable, and the pattern difference appears to be an age character. In habitus and general features of both

scaling and coloration, *Natrix equifasciata* appears to be allied to *Natrix annularis* and *percarinata*.

***Natrix annularis* (Hallowell)**

Thirty-two specimens of this species as follows: A. M. N. H. Nos. 18617, Fukien Province, March 18, 1921, H. R. Caldwell; 23525, 23530, 23532, 24626-24630, Wuhu, Anhwei, September-October, 1921, C. H. Pope; 24527-24528, 24568-24577, 24596-24606, Ningkwo, Anhwei, September-October, 1921, C. H. Pope.

In this series the dorsal scales are uniformly 19-17. The upper labials are normally 9, 8 occurring five times and 10 twice, in which cases the 4th and 6th labials, respectively, enters the eye, instead of the 5th. Lower labials 10, rarely 9. Pre- and postoculars invariably 1-3. Temporals normally 2-3, 1-3 occurring fourteen times.

No. 24597 gave birth to nine young September 28, 1921. One of these is a monster, grown together where it was doubled upon itself in the egg-membrane and with a projecting lower jaw.

Summary of Measurements and Scale Characters<sup>1</sup>

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	5	152-159	156
	♀	12	149-153	151
Subcaudals	♂	3	61- 68	64
	♀	10	51- 62	59
Total Length	♂	3	381-541 mm.	477 mm.
	♀	10	407-837 mm.	654 mm.
Tail/Length	♂	3	.20-.22	.21
	♀	10	.20-.22	.21

***Natrix percarinata* (Boulenger)**

Six specimens in the collection belong to this species: A. M. N. H. Nos. 21036, Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller; 23491, Fukien Province, H. R. Caldwell, 1921; 23522, Yenping, Fukien, H. R. Caldwell, 1921; 23498-23499, Yenchingkau, Wanhhsien, Szechwan, October, 1921, Walter Granger; and 23538, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

The two Szechwan specimens, a male and female, each have 139 ventrals and 71 caudals. In the Fukien specimens the ventrals range from 138 to 143, the caudals from 70 to 74. No. 21036 has the dorsal scale formula 19-21-17, 19-17 in the others. One specimen has eight

<sup>1</sup>Adult specimens from Wuhu and Ningkwo.

upper labials, nine in the rest; lower labials uniformly ten; preocular single in all; postoculars four or five; anterior temporals two except in a single specimen, which has one on one side; second row of temporals usually three, four in one case. The largest specimen, No. 23499, ♀, measures 964 mm. The tail length in the series varies from .25 to .27 of the total.

This species is evidently allied to *Natrix annularis*. The juvenile coloration is much more sharply defined than in the adult, and the dorsal crossbands are split with a white line as in *N. æquifasciata*. These three forms therefore compose a closely connected group although there is no doubt that they are to be retained as fully distinct species.

The record from Szechwan is a great extension of the range of this species, which has hitherto been known from Fukien and Hainan. It has recently been recorded from Indo-China by Parker (1925, pp. 302, 304).

#### ***Natrix piscator* (Schlegel)**

Three specimens, A. M. N. H. Nos. 21038, 21039, and 21042, from Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller.

This species seems to reach the northern boundary of its range in southern Fukien. The Fukien specimens are in excellent agreement with the Hainan series of which I have given an account elsewhere.

#### ***Natrix sancti-johannis* Boulenger**

Two specimens, A. M. N. H. Nos. 21070, 21071, Mom Ting River, Yunnan, March, 1917, R. C. Andrews and Edmund Heller.

This species is apparently new to China, and must be supposed to have entered via the tropical river valleys from Burma. It has previously been known from northern and central India.

#### **Scale Characters and Measurements**

A. M. N. H. Nos.	21070	21071
Sex	♀	♂
Dorsal Scales	21-19-17	19-17
Ventrals	151	143
Subcaudals	78	86
Upper Labials	9	9
Lower Labials	10	10
Preoculars	1	1
Postoculars	3	3-4
First Temporals	2	2
Second Temporals	2-3	1-3
Total Length	730 mm.	805 mm.
Tail/Length	.26	.30

***Natrix craspedogaster* (Boulenger)**

Four specimens in the collection: A. M. N. H. Nos. 18614, 21018, 21019, Mountains near Yenping, Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 23528, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

These specimens agree excellently with Boulenger's description and figure. The dorsal scales are uniformly 19-17; the ventrals range from 144 to 150 (without sex distinction); the subcaudals are 82-89 in two females, 91 in the two males; upper labials 8, with a single exceptional 9; lower labials 10, with an exceptional 11; preocular uniformly single; postoculars 3, except in one specimen which has 3-4. The temporals, due to the height of the seventh labial, show an evident tendency to reduction in the second row; they are 1-0, 2-2-3, 2-1-2, and 1-1-2 in the four specimens. No. 18614 has two loreals on each side. The maximum size is attained by the Wuhu specimen, a female, 516 mm. in length. The tail length ranges from .29 to .31 of the total.

***Natrix stolata* (Linnæus)**

Ten specimens, A. M. N. H. Nos. 21016-21017, Yenping, Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 21029-21032, 21040, 21041, Futsing, Fukien, R. C. Andrews and Edmund Heller, July 28, 1916; 23492, Fukien Province, H. R. Caldwell, 1921; and 23526, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

There is more black on the outer ends of the ventrals in this series than in the Hainan series which I have recently examined. The examination of Wall's figure (1911, Pl. xiv) indicates that the yellow neck, which is so characteristic of the Hainan and Kwangtung specimens of this species, is unknown in Indian specimens.

**Summary of Scale Characters and Measurements**

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	3	146-157	150
	♀	7	143-157	149
Subcaudals	♂	2	75-76	75.5
	♀	5	69-79	73
Length	♂	2	495-507 mm.	501 mm.
	♀	5	309-650 mm.	534 mm.
Tail/Length	♂	2	.25-.26	.255
	♀	5	.24-.25	.248



***Natrix tigrina lateralis* (Berthold)**

Fifty-two specimens of this species are in the collection: A. M. N. H Nos. 23501, 23507, 23509, Yenchingkau, 1500 feet altitude, Wanhsien, Szechwan, October 1921, Walter Granger; 23506 Luanshikau, 3000 feet altitude, Wanhsien, Szechwan, September, 1921, Walter Granger; 24578-24593, 25548-25549, Ningkwo, Anhwei, September-October, 1921, C. H. Pope; 21476-21478, Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, C. H. Pope; 23935-23943, Mai Tai Chao, Shansi, May, 1922, C. H. Pope; 28268, 28314-28328, Chen Tzu, Taiyuan, Shansi, July-August, 1922, C. H. Pope; 28335, Niantzekwan, Shansi, September, 1922, C. H. Pope; 24623, Tsing Ling Mts., Shensi, 1922.

I am unable to find characters of any importance to distinguish the Szechwan series from eastern or northern specimens. The chief characters of the Anhwei series may be compared with those of the North Chinese specimens from Chihli, Shansi, and Shensi in the following two tabulations:

## Summary of Scale Character and Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Anhwei Series				
Ventral Plates	♂	13	144-154	151
	♀	5	151-155	153
Subcaudals	♂	12	59-65	62
	♀	5	50-58	55
Length	♂	12	451-692 mm.	617 mm.
	♀	5	538-670 mm.	640 mm.
Tail/Length	♂	12	.21-.23	.22
	♀	5	.17-.19	.18
Chihli, Shansi, and Shensi Series				
Ventral Plates	♂	11	148-157	153
	♀	18	152-163	157
Subcaudals	♂	11	60-69	64
	♀	11	59-61	58
Length	♂	10	588-759 mm.	671 mm.
	♀	11	589-860 mm.	727 mm.
Tail/Length	♂	10	.21-.23	.215
	♀	11	.18-.19	.185

Many specimens of this species exhibit a tendency to an even number of scale rows on the neck, with a nuchal groove which suggests the much more pronounced one of *Natrix nuchalis*.

A specimen from Mai Tai Chao contained a large *Bufo raddei*.

"A small green and red 'tiger snake' caught at Chen Tzu gave an excellent exhibition of the behavior of this species when annoyed. It flattened the whole body, especially the neck, and the sides of the neck were drawn down until the angle below was a right angle, or less, and the skin above was tightly stretched over the vertebræ. Just behind the head the neck was strongly arched, to such a degree as to make a fold of loose skin appear under the head where head and neck meet. The head, held in this position, was raised from one to four inches from the ground. The body was thrown into varying but gracefully regular coils. This snake could not be induced to bite or strike, but when its body was pinched at any point it would turn and 'butt' with its nose, but not with any particular violence. Sometimes the head and arched neck would be thrown well back, and then its attitude was much like that of a cobra.

"This flattening of the neck brings into vivid contrast the alternate red and green bars of its sides, and gives the snake a highly venomous appearance." (C. H. P.)

#### ***Natrix leonardi* Wall**

Six specimens, A. M. N. H. Nos. 21061-21064, 21068-21069, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller.

The dorsal scales in this series range from 18-17-15 to 16-15; ventrals from 145 to 155, 155 in the single male specimen; caudals from 46 to 52 in the five female specimens, 64 in the male. The upper labials are uniformly six, the lower labials eight with an exceptional seven. All have a single preocular, and the postoculars are two or three. The temporals are 1-0-1 in one, 1-1 in three, and 1-2 in two. The length ranges from 444 mm. to 615 mm. The tail length is .23 of the total in the male specimen, and ranges from .17 to .20 in the female specimens.

The reddish or orange nuchal collar, interrupted on the two median scale rows, is a striking color character.

The type locality of this species is about opposite Tengyueh, in Burma. (Wall, 1923, p. 466.)

Parker (1925, p. 296) refers this species to *Natrix nuchalis* (Boulenger) after examining the variation in dorsal scale counts in a series from Tonkin, Burma, and Yunnan. He does not account for the differences in ventral count and coloration, and in fact the table of variation in dorsal scale rows seems to indicate a considerable degree of geographic differentiation. Steindachner (1914, p. 321, fig. 1) has examined a series of fourteen *Natrix swinhonis* from Formosa and proposes to unite *nuchalis* with *swinhonis*. The range of ventral counts given by him unfortunately

contains an error, so that it is impossible to tell whether the maximum for Formosan specimens is 155 or 165. The reddish nuchal collar apparently allies *swinhonis* and *leonardi*.

For the present I have accordingly retained four of the species with a nuchal groove as distinct, though they undoubtedly compose a "Formenkreis."

The origin of the nuchal groove may be dependent on some characteristic attitude. *Natrix tigrina* occasionally has an even number of scale rows on the neck, and Mr. Pope's field notes are instructive in this connection.

#### ***Natrix nivalis*, new species**

TYPE.—A. M. N. H. No. 21021; ♀; Snow Mountain Village, at 900 feet altitude, Likiang, Yunnan; November, 1916; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Directly derived from *Natrix nuchalis*, from which it is distinguished by the lower number of ventral plates, and a proportionately broad and short frontal. Dorsal scales weakly keeled, in 17 rows; ventrals 150–152; anal divided; subcaudals 43–54; upper labials 6, the fifth very large; one preocular; postoculars 1–3; temporals 1–1 or 1–2; general color dark olive brown, without markings at the base of the scales; venter dark gray, the median part black.

DESCRIPTION OF TYPE.—Habitus not specialized; head slightly distinct from the neck; eye moderate.

Rostral wider than high, well visible from above; internasals about as wide as long, shorter than the prefrontals; frontal nearly as broad as long, slightly longer than its distance from the rostral; parietals nearly as long as their distance from the rostral, truncate posteriorly; two nasals; loreal small, as high as long; one preocular; postoculars 1–2; upper labials five, the first with a notch indicating the fusion of two labials, the fourth very large, the second and third entering the eye; lower labials eight, four in contact with the anterior chin-shields; second pair of chin-shields longer than the first, divergent; temporals 1–1 and 1–2, the first elongate.

Dorsal scales with low keels, the two lower rows perfectly smooth anteriorly, in 18–17–15 rows. A well-defined nuchal groove, correlated with the even number of the scale rows, as in *Natrix nuchalis* and *N. leonardi*. Ventrals 152; anal divided; subcaudals 54.

Color uniform dark olive-gray above, without markings at the bases of the scales; venter lighter anteriorly, clouded with darker markings posteriorly, especially on the anterior borders of the ventrals; no trace of a nuchal collar; labials without markings.

The type measures 625 mm., of which the tail occupies .18.

NOTES ON PARATYPES.—The two paratypes, both female specimens, A. M. N. H. Nos. 21025–21026, come from the type locality. Both have a nuchal groove, scales without black markings, and a very large penultimate labial. The ventral counts are 150 and 151, the subcaudals 43 and 46. The upper labials are six in both. The postoculars are two in one and three in the other. The temporals are 1–1–2 in No. 21025, due to the division of the elongate first temporal. One has the scales in fifteen rows throughout, seven on one side and eight on the other anteriorly, the other has sixteen scale rows on the neck, fifteen posteriorly.

This species is evidently directly allied to *Natrix nuchalis*, whose type locality is Ichang. Besides the difference in the form of the frontal, the ventral scales are decidedly fewer in the Yunnan form.

Eight specimens from Yunnanfu and Wutingchow in the Graham collection support the distinction of *nivalis* from *nuchalis* on the ventral scale count, which ranges from 137 to 147. These specimens lack the reddish nuchal collar which apparently distinguishes *leonardi*. Yunnan specimens recorded by Werner (1924, p. 44), as *nuchalis* have a similar ventral count, 140 to 148, and thus agree with *nivalis*.

***Natrix handeli* (Werner)**

Figure 10

A. M. N. H. No. 21023, ♂, Likiang, Yunnan, R. C. Andrews and Edmund Heller, 1916.

The dark venter of our specimen, which is wholly black for its posterior third, differs from Werner's description (1924, p. 45), in which the venter of his specimen is said to be light. The present specimen

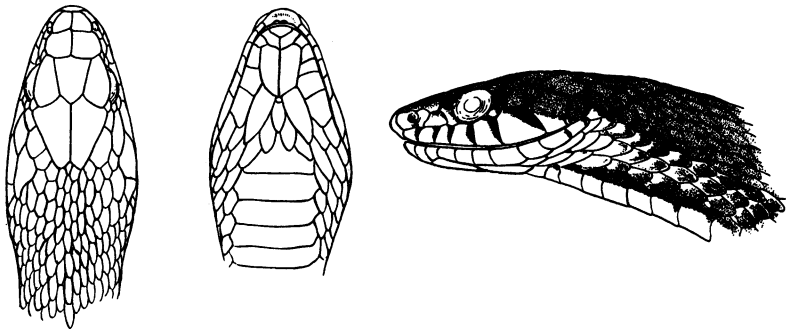


Fig. 10. *Natrix handeli* (Werner).

Dorsal, ventral and lateral views of head of A. M. N. H. No. 21023, natural size.

agrees in many details of scaling, in general features of coloration, and comes from the type locality, but differs in minor characters.

Dorsal scales 19-17-15, strongly keeled, the outer row smooth; ventrals 153; anal divided; subcaudals 65; upper labials 8, 4th and 5th, entering the eye; lower labials 9; oculars 1-3 on each side; temporals 1-2; length 755 mm., tail length .23. The maxillary teeth are 21+1, the last strongly enlarged. Dorsal scales with distinct apical pits. The internasals are subquadrate, their rostral suture greater than that of rostral and first labial.

The color is very dark brown above, loreal area and upper labials light brown; lower labials immaculate; sutures of the upper labials black, the seventh and eighth largely black; some square, obscure, light marks on the sides; throat and venter anteriorly light, with a well-defined longitudinal black line on the ends of the ventrals, beginning on the chin, but quickly merged into the increasing dark clouding of the venter; posterior third of the venter wholly black.

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

Figure 11

TYPE.—A. M. N. H. No. 21049; ♀; Tengyueh, Yunnan, 5500 feet altitude; April 24, 1917; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Closely allied to *Natrix subminiata* of Java and southeastern Asia, from which it is distinguished by a higher number of ventral scales, 160–172, compared with 132–157 in *subminiata* as here restricted.

Dorsal scale rows 19, the outer smooth, the median rows sharply keeled; ventrals 163–172; anal divided; caudals 75–86; upper labials 7–9, three entering the eye; a single preocular; three postoculars; temporals 2–2; general color uniform olive, with reddish markings on the neck, chiefly confined to the skin between the scales.

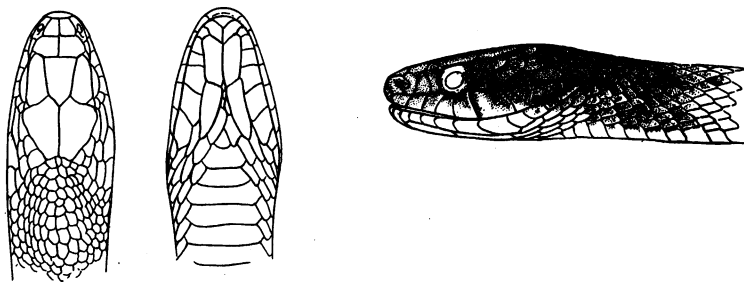


Fig. 11. *Natrix helleri*, new species.  
Dorsal, ventral, and lateral views of head of type, natural size.

DESCRIPTION OF TYPE.—Habitus of *Natrix subminiata*. Nineteen subequal maxillary teeth, followed by two strongly enlarged ones. Rostral visible from above; internasals as long as broad, their sutures with the rostral subequal to those of rostral and first labial; internasals slightly shorter than the prefrontals; frontal slightly longer than its distance from the rostral, slightly shorter than the parietal suture; parietals truncate behind; frontal wider than the supraoculars; nasal divided; loreal higher than long; eight upper labials, sixth largest, seventh highest, and the third, fourth, and fifth entering the eye; ten lower labials; a single preocular; postoculars 2–3; temporals 2–2.

Dorsal scales in nineteen rows at mid-body, twenty-two on the neck, and seventeen near the tail, narrow, strongly keeled, and notched at the tip; outer scale row

<sup>1</sup>Named for Mr. Edmund Heller, Assistant Curator of Mammals, Field Museum of Natural History.

smooth; a pair of faint scale pits, often difficult to discern; ventrals 169; tail incomplete.

General color uniform olive, with reddish markings on the neck, chiefly confined to the skin between the scales; lower labials cream; upper labials gray anteriorly and posteriorly, the middle ones lighter, with a black mark on the 5th-6th suture.

NOTES ON PARATYPES.—The five paratypes agree in general with the type; No. 21047, ♀, from the type locality, has 21-19-17 dorsal scales; 165 ventrals; 83 subcaudals; labials 7-8; oculars 1-3; and temporals 2-3. This specimen measures 860 mm., the tail occupying .23 of the total. No. 21048 is from Yungchang, Yunnan; it agrees with the type in having an even number of scale rows on the neck, (twenty); ventrals 172; tail incomplete; labials 8-9; otherwise in complete agreement with the type.

A specimen from Yenping, Fukien, A. M. N. H. No. 23533, ♂, collected November 25, 1921 by H. R. Caldwell agrees excellently with the Tengyueh specimens. It has 172 ventrals, 83 caudals, upper labials 8, lower labials 10, oculars 1-3, and temporals 2-2 and 2-3. The characteristic coloration of the upper labials is present.

Two specimens from the Wutingchow District, Yunnan, collected May 3, 1919 by John Graham, may be placed here. Their ventrals are 160-161, caudals 73-80.

This species has, of course, long been known simply as *Natrix subminiata*; its ventral count is quite different, however, and does not even overlap that of its relative in southeastern Asia, of which considerable numbers are now on record.

#### ***Natrix parallela* (Boulenger)**

Two specimens, A. M. N. H. Nos. 21022 and 21024, collected at Likiang, Yunnan, October, 1916, by R. C. Andrews and Edmund Heller, are tentatively referred to this form. Their scale characters and measurements are as follows:

A. M. N. H. Nos.	21022	21024
Sex	♀	♂
Dorsal Scales	19-17	19-17
Ventrals	170	169
Caudals	69	73
Upper Labials	8	..
Lower Labials	9-11	..
Preoculars	1-1	..
Postoculars	3-3	..
Temporals	2-1-2, 2-1-3	2-2
Total Length	595 mm.	488 mm.
Tail/Total Length	.21	.23

The coloration of No. 21022 is as follows: ground color of venter uniform yellow; ventrals with narrow black tips, and each with a longi-

tudinal black spot on each side, forming an interrupted lateroventral line; outer three scale rows light brown, each scale with a black base; these black markings are emphasized on the lower half of the fourth scale row, and outline an obscure light band on the fourth, fifth, and sixth rows; dorsal area between these rows darker; an obscure light vertebral line on the neck.

Each of these specimens had a number of small fish in its stomach.

***Natrix octolineata* (Boulenger)**

Figure 12

A specimen in the American Museum collection from Tungchuan, Yunnan, was purchased from Rosenberg as *octolineata*. It agrees in coloration with the original description (Boulenger, 1904, p. 133). It has 160 ventrals, 63 caudals, 8 upper labials, 11 lower labials, 2 pre-

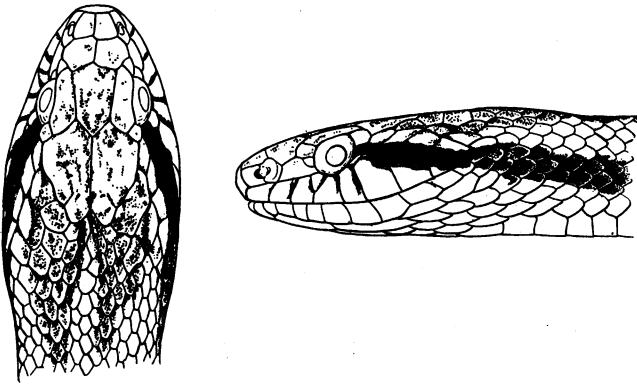


Fig. 12. *Natrix octolineata* (Boulenger).

Dorsal and lateral views of head of A. M. N. H. No. 13595,  $\times 1.5$ .

oculars, 3 postoculars, and temporals 2-2. It differs somewhat from the type in having two preoculars on each side. On one side it has an irregular subocular cut off from a labial and the loreal united with a third preocular and thus entering the eye.

***Natrix septemlineata*, new species**

Figure 13

TYPE.—A. M. N. H. No. 21051; ♂; Tengyueh, Yunnan; May 17, 1917; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Dorsal scale rows 19, weakly keeled, the outer row smooth; ventrals 159-171; anal divided; caudals 82-89; upper labials 8; one preocular; three postoculars; temporals 2-1-2; venter uniform light, without spots at the ends of the ventrals; back with seven dark longitudinal stripes.

DESCRIPTIONS OF TYPE.—Body slender, tail about one-fourth of the total; head narrow, elongate; eye rather large.

Rostral barely visible from above, nearly twice as wide as high, its suture with an internasal equal to that with the first labial; internasals as long as wide, shorter than the prefrontals; frontal as long as the parietal suture, slightly longer than its distance from the end of the snout; nasal divided, nostril large, lateral; loreal a little longer than high; one preocular; three postoculars; temporals 2-1-2 and 2-1-3; upper labials 8, the 4th and 5th entering the eye; lower labials 10, five in contact with the anterior chin-shields; second pair of chin-shields slightly longer than the first.

Dorsal scales weakly keeled, in 19-17 rows, the outermost smooth; ventrals 171; anal divided; subcaudals 89.

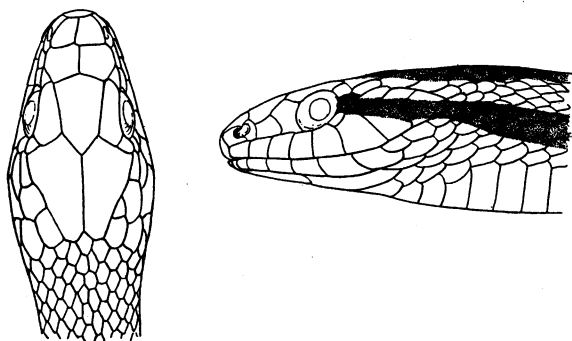


Fig. 13. *Natrix septemlineata*, new species.

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

Venter uniform light fawn; back longitudinally striped; a narrow black line on the tips of the ventrals and the lower edge of the first row of scales; a light fawn-colored band on the first and second rows; a black band on the second, third, and fourth rows; a light band above this on the fifth and sixth rows; dorsal area between these rows dark gray with the margins of the seventh rows and of the vertebral row black, thus forming three additional double black lines; the lateroventral lines and the vertebral line are absent on the neck, which has four sharply defined black bands, of which the lower originate at the eye and the upper on the parietals; labials entirely immaculate, except where the postocular stripe crosses the seventh and eighth.

The type measures 627 mm., tail 165 mm., .26 of the total length.

NOTES ON PARATYPES.—The two paratypes, A. M. N. H. Nos. 21050 and 21052, bear the same data as the type. They agree closely in coloration and scale characters, except that one has only 159 ventrals.

This species is closely allied to *Natrix himalayana* in scale characters, but differs radically in coloration, in which it resembles *Natrix pleurotaenia* from Yunnanfu.



**Natrix johannis** (Boulenger)

## Figure 14

A. M. N. H. Nos. 12808, Wutingchow District, and 21076, Yunnanfu, Yunnan, collected by John Graham, represent this species in the American Museum collection.

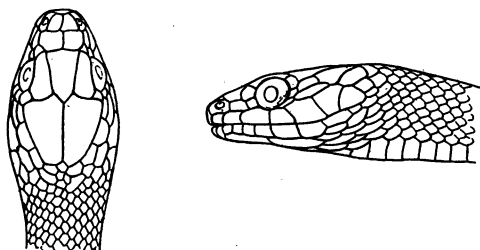


Fig. 14. *Natrix johannis* (Boulenger).  
Dorsal and lateral views of head of A. M. N. H. No. 21076,  $\times 2$ .

These specimens extend the range of ventrals and present some variations from Boulenger's description (1908, p. 244). They agree exactly in coloration. Their scale characters are as follows:

A. M. N. H. Nos.	12808	21076
Sex	♀	♂
Dorsal Scales	21-19-18	20-19-17
Ventrals	161	175
Caudals	85	89
Upper Labials	8	7
Lower Labials	10	9
Preocular	1-1	1-2
Postoculars	2-3	3-3
Temporals	1-2, 2-2	2-1
Total Length	470 mm.	380 mm.
Tail/Total Length	.26	.26

**Pseudoxenodon macrops** (Blyth)

Two specimens, A. M. N. H. Nos. 21033 and 21074, Tengyueh, May, 1917, R. C. Andrews and Edmund Heller.

These two specimens might be identified with *P. sinensis* Boulenger, as their scale counts fall just at the upper limit of variation in the latter. Their locality is intermediate between the ranges of the two forms, and additional specimens may unite them as subspecies. The characters of the two Tengyueh specimens are as follows:

A. M. N. H. Nos.	21033	21074
Sex	♂	♀
Dorsal Scales	17-19-15	19-19-15
Ventrals	154	164
Subcaudals	71	67
Upper Labials	7	7
Lower Labials	8	8
Preoculars	1	1
Postoculars	3	2-3
Temporals	2-2	2-3
Length	700 mm.	370 mm.
Tail/Length	.23	.20

### ***Pseudoxenodon sinensis* Boulenger**

Twenty-two specimens of this species, A. M. N. H. Nos. 5270, 8915, 12790-12798, 17398-17401, 17703, 18081, 21077-21081, were purchased by The American Museum of Natural History from the Rev. John Graham, all collected near Yunnanfu, Yunnan.

In this series, the dorsal scale count is uniformly 19-17-15, with 19 rows at mid-body; the upper labials are 7, with a single exception, in which they are 8 on one side; the lower labials are 8 or 9; the preocular is invariably single; postoculars invariably 3; anterior temporals invariably 2; second row of temporals 1-3.

### Summary of Ventrals, Caudals and Tail/Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	8	138-146	144
	♀	14	149-162	155
Caudals	♂	7	60- 68	62
	♀	14	57- 66	61
Tail/Total Length	♂	7	.18-.22	.20
	♀	14	.19-.20	.19

### ***Pseudoxenodon dorsalis* (Günther)**

A. M. N. H. No. 21014, Yenping, Fukien, 1916, collected by H. R. Caldwell.

This specimen differs notably from the type of *dorsalis* in both scale characters and coloration, and agrees closely with the series from Formosa described by Steindachner as *Pseudoxenodon macrops* (1914, p. 327, Pls. III-IV, text figs. 5-7). It differs from all of the species described in having an immaculate venter. Its dorsal pattern is more distinct than that of *dorsalis* or of the Formosan specimens, doubtless

accounted for, however, as a juvenile color phase. It differs from *P. stejnegeri* Barbour in having a single preocular and a different coloration. Altogether, the status of the Formosan and Fukien *Pseudoxenodons* is far from clear. Werner (1909, p. 214) describes two specimens from Canton and locality unknown, which have ventrals 131-143, caudals 52-58, and dorsals at mid-body 17-19.

In the present specimen there are 24+5 light dorsal spots, a little wider than long, each of which is bordered by black, and accompanied by a black lateral bar which extends from the border of the spots to the ventrals. The top of the head is immaculate; a broad black nuchal marking begins just behind the parietals, forks, and extends to the ninth ventral. Fourth, fifth, sixth, and seventh upper labials with small black spots at their posterior margins.

A singular anomaly consists in the fusion of the loreal and posterior nasal on each side. The scale characters and measurements of this specimen and of the type of *dorsalis* are as follows:

	A. M. N. H.	B. M.
Museum Number	21014	
Sex	♀	♀
Dorsal Scales	19-17-15	17-15
Ventrals	153	140
Caudals	56	51
Upper Labials	8	8
Lower Labials	9	...
Preoculars	1	1
Postoculars	3	2-3
Temporals	2-2	2-2
Total Length	243 mm.	610 mm.
Tail/Total Length	.18	.17

#### ***Pseudoxenodon bambusicola* Vogt**

A single specimen, purchased at Wuhu, Anhwei, by Clifford H. Pope, 1922, is A. M. N. H. No. 23527.

The type locality of this species is "Mountains of the Hunan and Kiangsi border (of Kwantung), 600 to 900 meters altitude." The present specimen, a male, has dorsal scales 19-17-15; ventrals 131; anal divided; subcaudals 51; upper labials 8, the 4th and 5th entering the eye; lower labials 9; oculars 1-2; temporals 2-2; total length 339 mm., tail 60 mm., tail/length .18.

**Zaocys dhumnades** (Cantor)

Twenty-five specimens, A. M. N. H. Nos. 23540, 24504-24506, 24510-24523, 24544-24548, 24594-24595, from Ningkwo, Anhwei, collected by Clifford H. Pope, September-October, 1921.

The scaling of the head is equally invariable and almost identical with that of *Z. nigromaculatus*. A number of specimens in this series being skins, the sex consequently indeterminable, and their being no apparent difference in scale characters in the sexes, I have combined the data for the two sexes in the following tabulation.

## Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂ + ♀	25	186-197	192
Subcaudals	♂ + ♀	9	105-118	113
Length	♂ + ♀	8	452-1258 mm.	...
Tail/Length	♂ + ♀	8	.26-.30	.28

**Zaocys nigromarginatus** (Blyth)

Eight specimens agree with Boulenger's diagnosis of this species: A. M. N. H. Nos. 21001, 21002, 21059, 21060, Tengyueh, Yunnan, May, 1917, collected by R. C. Andrews and Edmund Heller; and 23496, 23502, Luanshikau, 3000 feet altitude, Wanhshien, Szechwan, September, 1921; and 23503, 23510, Wanhshien, Szechwan, December, 1921, collected by Walter Granger.

I find no differences between the Yunnan and the Szechwan specimens. The dorsal scales are uniformly 16-14; the upper labials invariably 8; the preoculars and postoculars 2-2; the temporals 2-2; and the lower labials are 10 with an occasional 9.

## Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	8	197-202	199
Subcaudals	♂	4	123-131	127
Length	♂	5	1505-1915 mm.	1710 mm.
Tail/Length	♂	4	.28-.31	.30

***Coluber spinalis* Peters**

## Plate XXVIII, Figure 1

Seven specimens in the collection: A. M. N. H. Nos. 21470, 26 miles south of Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, Clifford H. Pope; 23921-23922, Mai Tai Chao, Shansi, May, 1922, C. H. Pope; 28257, 28266, Chen Tzu, Taiyuan, Shansi, July-August, 1922, Clifford H. Pope; 28261, 28284, So Huang, Ping Ting, Shansi, September 4-15, 1922, Clifford H. Pope.

The dorsal scales are 17-15, except in one specimen which has 17-16-14. The ventrals range from 190 to 195 in four males, 197 to 209 in three females; the caudals from 98 to 103 in males, 88 to 99 in females. Upper labials uniformly 8, lower labials 9 or 10. Preoculars uniformly 2, the postoculars 2 with a single exceptional 1. Temporals 2-3 or 2-2. The range in length is from 280 mm. to 944 mm. The tail/length varies from .25 to .27 of the total in females, .25 to .29 in males.

It is interesting to note that the juvenile specimen shows no signs of crossbars, which are so characteristic of the supposed congeners of this form in North America.

***Ptyas korros* (Schlegel)**

Two specimens, A. M. N. H. Nos. 21046, Fukien Province, 1916, R. C. Andrews and Edmund Heller, and 23521, Yenping, Fukien, 1921, H. R. Caldwell, represent this species. They afford no noteworthy variation from the Hainan series collected by Clifford H. Pope.

***Lycodon fasciatus* (Anderson)**

A. M. N. H. No. 12799, Yunnanfu, Yunnan, February, 1919, John Graham, much extends the range of this form, which has recently been described and figured by Wall (1911, p. 948, Pl. xv, map).

This specimen has 195 ventrals and 70 caudals, compared with a minimum of 200 and 74, respectively, given by Wall. Otherwise it evidently agrees with the Burman specimens of this species. Additional specimens from Yunnan might establish the existence of a subspecific form in this area.

***Dinodon rufozonatum rufozonatum* (Cantor)**

Twenty-six specimens represent this most strikingly colored of Chinese snakes, all collected by Clifford H. Pope. These are distributed as follows: A. M. N. H. Nos. 21473-21474, 26 miles south of Hsing Lung Shan, Eastern Tombs, Chihli, August 12, 1921; 28256, Niantzekwan,

Shansi, September 15-18, 1922; 28267, 28329-28334, Chen Tzu, Taiyuan Shansi, July-August, 1922; 23488, 24529, 24531, 24551-24557, 25573-25575, Ningkwo, Anhwei, October, 1921; 24624, 24654, Wuhu, Anhwei, September-October, 1921.

It is natural to compare the Chihli and Shansi series with the specimens from Anhwei, and some differences are apparent. Thus the loreal enters the eye in 69% of the Anhwei series and only in 35% of the northern specimens. The number of light crossbars is fewer on both body and tail in the northern series, but the extremes overlap; the figures are as follows:

		DORSAL LIGHT	CAUDAL LIGHT
		BARS	BARS
Anhwei Series, 14 Specimens	Extremes	50-70	14-26
	Average	61	20
Chihli and Shansi Series, 9 Specimens	Extremes	46-63	12-20
	Average	56	17

When these series are analyzed for sex differences, the numbers of specimens are too small to give conclusive results on the degree of geographic variation.

Most of the scale characters of this species are extremely constant. The dorsal scales are uniformly 19-17-15 in the Anhwei specimens, 19-17-15 in five of the northern specimens, 17-15 in five. Undivided subcaudals appear as an anomaly, No. 28256 having eight subcaudals entire.

#### Summary of Measurements and Scale Characters

	SEX	No. OF SPECIMENS	EXTREMES Anhwei Series	AVERAGE
Ventral Plates	♂	5	196-200	199
	♀	8	196-205	201
Subcaudals	♂	3	69- 84	75
	♀	8	65- 73	68
Length	♂	3	241-971 mm.	..
	♀	8	507-991 mm.	778 mm.
Tail/Length	♂	3	.18-.21	.19
	♀	8	.17-.19	.18
			Chihli and Shansi Series	
Ventral Plates	♂	6	192-200	195
	♀	4	188-197	191
Subcaudals	♂	6	66- 74	70
	♀	3	60- 68	61
Length	♂	5	770-1023 mm.	876 mm.
	♀	3	784- 888 mm.	824 mm.
Tail/Length	♂	5	.17-.19	.18
	♀	3	.17-.18	.17

***Dinodon rufozonatum williamsi*<sup>1</sup>**, new subspecies

## Figure 15

TYPE.—A. M. N. H. No. 17453; ♀; Changsha, Hunan, China; July, 1920; J. W. Williams.

DIAGNOSIS.—Distinguished from *Dinodon rufozonatum* by a greater number of ventrals, subcaudals, and transverse dorsal markings.

DESCRIPTION OF TYPE.—Body stout, head short, depressed, tail moderate; eye small, with the pupil shortly elliptic, directed somewhat upwards; a strong ventral angle.

Rostral well visible from above; internasals broader than long, about half as long as the prefrontals; frontal as wide as long, as long as its distance from the rostral and as long as the parietal suture; parietals six-sided, bordered by three temporals, of which the last is the largest; loreal elongate, entering the eye on both sides; a small preocular; two postoculars; temporals 2-2; upper labials eight, 3rd, 4th, and 5th entering the eye on both sides; lower labials eleven, five in contact with the anterior chin-shields.

Dorsal scales entirely smooth anteriorly, weakly keeled on the upper rows on the posterior fourth of the body, in 18-17-15 rows; ventrals 207; subcaudals 81.

Ground color above very dark brown, with eighty-seven light fawn crossbars, each about one scale-length in width, about half as wide as the dark interspaces; the light scales punctate with dark brown; the two colors mixed on the sides, which are without regular markings; upper head-shields are of the ground color with light margins; sides of head light with a dark postocular band to the angle of the mouth and a temporal stripe from the parietals to the neck; venter immaculate, between the lateral angles, light yellow; ends of ventrals, outside the angle, with a large brown spot, sometimes indistinct; tail darker beneath, especially toward its tip.

The total length is 1190 mm., tail 218 mm., .18 of the total.

NOTES ON PARATYPES.—Five paratypes in the Williams collection from Changsha are A. M. N. H. Nos. 17437, 17439, 17440, 17443, and 17450. Four of these have nineteen scale rows at mid-body. The ventrals and caudals in three females are 207, 212, 213, and 86, 77, 78; in two males 211, 211 and 78, 84. Upper labials uniformly eight; lower labials ten except in one specimen which has 11-12; oculars 1-2; temporals 2-2 or 2-3; loreal excluded from the eye on one side in one specimen. The dorsal crossbars range from 59 to 74 on the body and from 21 to 26 on the tail.

The ventral count in this form is decidedly higher than in the series of *rufozonatum* examined by me, and is reached in only one recorded specimen (from Korea) which has 208 ventrals; the subcaudals average more, and the dorsal crossbars are decidedly more numerous. The Anhwei and Shansi and Chihli specimens have a more "contrasty" coloration, the



Fig. 15. *Dinodon rufozonatum williamsi*, new species.

Dorsal view of head of type, natural size.

<sup>1</sup>Named for Mr. J. W. Williams of the College of Yale-in-China, Changsha, Hunan.

light crossbars extending farther down on the sides, and have more red in the pattern. The ventral angle is very sharply defined in the Hunan series. It is surprising that the Kiukiang specimens in the British Museum do not correspond with the Changsha form.

***Elaphe schrenckii* Strauch**

Nine specimens, A. M. N. H. Nos. 21484-21492, collected at Hsing Lung Shan, Eastern Tombs, Chihli Province, August, 1921, by Clifford H. Pope.

The dorsal scale count varies from 21-19 to 25-23-21-19 and 23-21-19-17. Eight upper labials are normal, seven occurring once. The lower labials range from nine to eleven. The preoculars are two six times and one twelve times. The postoculars are two fifteen times and one three-times. A single anterior temporal occurs three times, two in the remaining cases. The second row of temporals varies from one to four.

The maximum length reaches 1365 mm., and a specimen of 472 mm. is so strikingly different in coloration that it offered some difficulty in identification. The juvenile pattern of this specimen consists of a dark brownish gray ground color, with about thirty-one light crossbands on the body, two to three scales wide, sharply defined anteriorly by narrow white borders and by the black borders of the intermediate brown spaces. Posteriorly the contrast diminishes and the brown and light brown cross bands become equal, the dark borders remaining distinct. The venter is light, heavily spotted with black. The chin and upper labials cream color. Labials, rostral; and mental with narrow black posterior edges. A black band from the eye to the angle of the mouth, bordered above by a light band which extends obscurely across the supra-oculars and frontal to join its fellow. A  $\wedge$  shaped nuchal light mark behind this, its apex at the posterior edge of the parietals.

The adult coloration is uniform olive-brown above, with obscure black bars on the sides of the neck and black crossbands arranged in pairs on the posterior third of the back, very faint on the sides. About sixteen black crossbands on the tail, the first ten in pairs. The contrast of adult and juvenile color patterns is in some degree a parallel to that of the African water snakes of the genus *Grayia* (Boulenger, 1909, Proc. Zool. Soc. London, p. 944, Figs. 296-298).



## Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	4	206-216	212
	♀	4	220-222	221
Subcaudals	♂	4	70- 77	74
	♀	4	64- 72	69
Tail/Length	♂	4	.16-.18	.17
	♀	4	.15-.17	.16

The pattern development from juvenile to adult has been described by both Boulenger and Stejneger.

***Elaphe carinata* Günther**

This highly interesting species is represented by a single specimen, A. M. N. H. No. 21043, Tengyueh, Yunnan, May 10, 1917, R. C. Andrews and Edmund Heller.

The dorsal scales, strongly keeled except the outermost row, are in 23-21-19-17 rows; ventrals 223; anal divided; subcaudals 82; upper labials 8; lower labials 10; preoculars 2; postoculars 2-3; temporals 2-3 and 2-6; total length 1595 mm.; tail/total length .17.

The pattern is distinctive, though complicated. Anteriorly there are black crossbands, somewhat obscured by their scales having light centers, on the first half of the body; posteriorly the scales are brown, each with a black border. There are obscure longitudinal lines of black on the neck.

It seems likely that *Elaphe halli* (Boulenger) is directly related to this species. A. M. N. H. No. 21472, a skin without head, brought to Mr. Pope at Hsing Lung Shan, Chihli, either represents a transported specimen of *carinata* or may be a mutilated *Elaphe halli*, whose type locality is Chifeng, northeast Chihli. A second specimen of *carinata*, No. 22702, from Yunnanfu, Yunnan, agrees closely with the one described.

***Elaphe mandarina* (Cantor)**

Three specimens, A. M. N. H. Nos. 23500, 23504, Yenchingkau, 1500 feet altitude, Wanh sien, Szechwan, October, 1921, Walter Granger, and 24622, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

The dorsal scales are in 23-21-19 rows; ventrals vary from 212 to 231; subcaudals from 67 to 70; upper labials 7; lower labials 9 in one specimen, 10 in two; preanal postoculars 1-2 in all three; temporals variable, 1-2 to 2-3; dorsal dark crossbars on body and tail 24+8 to 27+11. The largest specimen, a male, measures 1175 mm., the tail amounting to .18 of the total.

The Szechwan specimens present a well-marked color variation, the lateral spots being united with the dorsal markings to form complete crossbands, each of which encloses a light spot dorsally.

***Elaphe porphyracea porphyracea* (Cantor)**

Three specimens, A. M. N. H. Nos. 21065–21067, Tengyueh, Yunnan, May, 1917, collected by R. C. Andrews and Edmund Heller.

The principal characters of this series may be tabulated as follows:

A. M. N. H. Nos.	21065	21066	21067
Sex	♀	♀	♂
Dorsal Scales	19–17	19–18	19–17
Ventrals	190	196	198
Subcaudals	48	52	54
Upper Labials	7	7	8
Lower Labials	9	9	11
Prealanal Postoculars	1–2	1–2	1–2
Temporals	0–2	0–2	1–2
Length	815 mm.	289 mm.	784 mm.
Tail/Length	.14	.14	.15
Dorsal Crossbands+Those on Tail	13+0	15+3	15+4

These specimens differ from the two Hainan specimens at hand in having shorter tails, with fewer subcaudals, and a larger number of dorsal crossbands. The Hainan specimens appear to represent *Elaphe nigrofasciata* (Cantor), type locality Singapore, and typical *porphyracea* are intermediate between *nigrofasciata* and the Yunnan form described below.

***Elaphe porphyracea pulchra*, new subspecies**

Figure 16

TYPE.—A. M. N. H. No. 17705; ♂; 20 miles North of Yunnanfu, Yunnan; July 6, 1920; John Graham.

DIAGNOSIS.—Closely allied to *Elaphe porphyracea porphyracea* in pattern; distinguished by having fewer ventrals, 177–185, and subcaudals, 51–56.

DESCRIPTION OF TYPE.—Habitus undifferentiated; rostral wider than high, just visible from above; internasals three-fourths as long as the prefrontals; frontal slightly longer than its distance from the rostral, as long as the parietal suture, a little longer than wide; loreal small, a little longer than high; one preocular; two postoculars; temporals 1–2; upper labials 8, the 3rd and 4th entering the eye; lower labials 9, the first four in contact with the anterior chin-shields, which are about twice as long as the posterior; dorsal scales in 19–17 rows, nearly smooth; ventrals 177; subcaudals 54.

Venter uniform pale yellow; dorsum grayish fawn, with fourteen dark transverse markings on the body and four on the tail; these markings, which are narrowly margined with yellow, consist of a pair of black lines meeting below at the ends of the

ventrals and enclosing an area of the dorsal ground color one and a half scale-lengths broad; a pair of black longitudinal dorsolateral lines begins between the tenth and eleventh crossbands on the seventh and eighth scale-rows; at first discontinuous, these lines become more sharply defined and broader posteriorly, where they lie on the sixth and seventh scale rows, and continue to the end of the tail; head with a black median stripe from the internasal suture to the first dorsals, and a pair of dorsolateral stripes from the eyes to the first crossband on the nape.

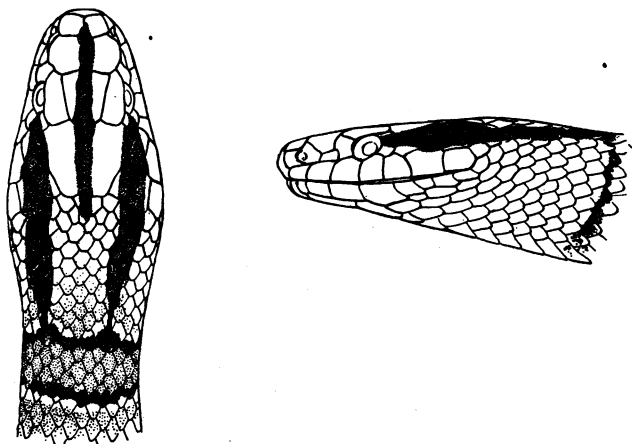


Fig. 16. *Elaphe porphyracea pulchra*, new subspecies.

Dorsal and lateral views of head of type,  $\times 1.3$ .

Total length 583 mm., tail 103 mm., .18 of the total.

NOTES ON PARATYPES.—The three paratypes are female specimens, all from Yunnanfu, A. M. N. H. Nos. 17396, 22704, 22705. Their ventrals are 181, 185, 185, subcaudals 56, 55, 51. Two have eight upper labials, the other seven. One has nine lower labials, one 9–10, and one 10–10. No other variation in head shields.

In coloration the two adults agree closely with the type, with 12+3 and 13+3 crossbands. No. 17396, measuring 302 mm., has solid black crossbands, the last two exactly alternate, stopping at the vertebral line; the dorsolateral lines begin between the 7th and 8th crossbands; there are small black spots just halfway between the crossbands, on the second scale row.

The tail length in the three specimens is .16 of the total once and .17 twice.

#### ***Elaphe rufodorsata* (Cantor)**

Thirty-five specimens of this species collected by Clifford H. Pope in Anhwei; A. M. N. H. Nos. 23539, 24631–24639, 24641,–24653, Wunu, September–October, 1921; 24501–24503, 24532, 24550, 24559–24561, 24563–24566, Ningkwo, September–October, 1921.

It is remarkable that this entire series fails to show a deviation from the dorsal scale formula 21–19–17. The preoculars and postoculars are

also constantly 1-2. The upper labials are seven, with six exceptions, in which they are eight. The lower labials range from nine to eleven, ten on both sides in thirty specimens. The temporals are normally 2-3, but are occasionally single in the first row, and range from one to four in the second.

The largest male measures 555 mm., the largest female 755 mm.

#### Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	14	163-172	166
	♀	21	173-182	177
Subcaudals	♂	14	56-63	60
	♀	20	49-53	51
Tail/Length	♂	14	.18-.21	.20
	♀	20	.15-.18	.16

#### *Elaphe dione* (Pallas)

##### Plate XXVIII, Figure 2

Sixty-four specimens of *Elaphe dione*, all collected by Clifford H. Pope except as noted, are from the following localities: A. M. N. H. Nos. 21479-21480, 13 miles north of Hsing Lung Shan, Chihli, August, 1921; 21481-21483, Hsing Lung Shan, Chihli, August, 1921; 23923-23934, 24142, 28258, Mai Tai Chao, Shansi, May 6, 1922; 28259-28260, 28285-28295, So Huang, Ping Ting, Shansi, September, 1922; 28263-28266, 28296-28313, Chen Tzu, Taiyuan, Shansi, July-August, 1922; 28269-28277, Tsing Glo, Shansi, August, 1922; 28283, Inner Mongolia, 260 miles s.e., of Sairusu on the Kalgan Trail, R. C. Andrews, 1922.

These specimens agree excellently with Stejneger's account of this species. The single specimen from Inner Mongolia is a very pale one, but it can be matched by many of the Shansi specimens.

#### Summary of Scale Characters and Measurements (Shansi Series)

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrols	♂	22	177-193	183
	♀	29	188-207	197
Subcaudals	♂	21	69-78	73
	♀	27	60-72	67
Tail/Length	♂	21	.20-.24	.22
	♀	27	.16-.20	.18

The largest size is reached by a female 1104 mm. in length. The largest male measures 883 mm.

The five specimens from Chihli have a maximum subcaudal count of 79, otherwise falling within the limits of the Shansi series. The Mongolian specimen is close to the average of the Shansi specimens in scale characters.

Three specimens from Ningkwo, at first identified with *Elaphe dione*, appear to require recognition as a distinct form.

***Elaphe bimaculata*, new species**

Figure 17

TYPE.—A. M. N. H. No. 24640; ♀; Ningkwo, Anhwei; September–October, 1921; Clifford H. Pope

DIAGNOSIS.—Closely allied to *Elaphe dione*, from which it is distinguished by color characters. Dorsal scales 25; ventrals 188–207; subcaudals 67–74; transverse dorsal spots dumb-bell-shaped, often separated as a pair of spots; several of these spots unite on the neck and are confluent with the head marking; tail with a light median and dark dorsolateral stripes.

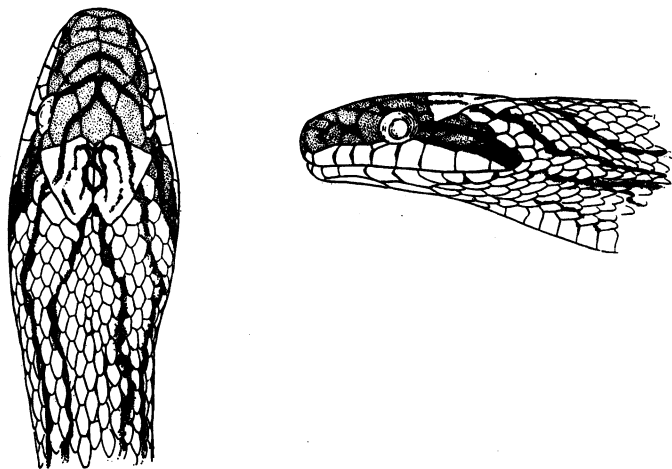


Fig. 17. *Elaphe bimaculata*, new species.

Dorsal and lateral views of head of type,  $\times 1.5$ .

DESCRIPTION OF TYPE.—Rostral broader than high, visible from above; internasals a little broader than long, their suture more than half the length of the prefrontal suture; prefrontals broadly in contact with the supraoculars; frontal as long as its distance from the snout, shorter than the parietals, much broader in front than behind; nostril between two nasals; loreal small, longer than high; two preoculars, of which the lower is a subpreocular; two postoculars; temporals 2–3; upper labials 8, the fourth and fifth entering the eye; lower labials 9–10; anterior chin-shields longer than the posterior; dorsal scales 25–23–21–19, the first reduction occurring behind the middle of the body; dorsal scales smooth anteriorly, feebly keeled posteriorly; ventral plates 200; subcaudals 74.

Brownish gray above, with transverse darker dumb-bell-shaped markings, sharply outlined with black. These in some places are separated into a pair of spots, and posteriorly they become indistinct; a series of lateral spots alternate with the dorsal series, also outlined with black; a light mid-dorsal line, with less distinct lateral lines, appear on the posterior part of the body, and these become sharply defined on the tail; venter gray with numerous small darker maculations. Head markings sharply defined; a faint black line from eye to eye crossing on the internasals; a pair of black lines from eye to eye on the prefrontals and anterior border of the frontal; a post-ocular black band to the angle of the mouth, enclosing a brown area next the eye; head and neck with a closed, black-margined figure which has its apex on the frontal and extends backward to about the fifteenth ventral, enclosing dark maculations on the parietals; the neck marking evidently consists of two or three confluent dorso-lateral spots; lateral spots on the neck similarly united into a line.

The total length is 770 mm., of which the tail occupies 154 mm., or .20 of the total.

NOTES ON PARATYPES.—A. M. N. H. No. 24549, also from Ningkwo, a juvenile female, has 207 ventrals and 67 subcaudals. No. 24562, from the same locality, is an adult male, with 188 ventrals and 73 subcaudals. Both have a dorsal color pattern identical with that of the type. In No. 24562 the venter is nearly uniform light gray.

It seems barely possible that this is the form referred to as *Elaphe conspiciillata* by Werner (1904, p. 357) and by Stanley (1914, p. 28). Although closely allied to *dione*, it seems to be a perfectly distinct form.

#### ***Elaphe tæniura tæniura* (Cope)**

Fifteen specimens of this form all collected in Anhwei, September–October, 1921, by Clifford H. Pope: A. M. N. H. Nos. 24507–25509, 24567, at Ningkwo; 24607–24616, 24625, at Wuhu.

In a former paper I have considered a Hainan specimen of *Elaphe tæniura* as *Elaphe tæniura vaillanti*, which I believe to be a recognizable subspecies in Hainan and S.E. Asia. The type locality of *E. tæniura* is Ningpo, and the present series may be regarded as representative of the typical subspecies. They differ from *vaillanti* and from *yunnanensis* in having a decidedly lower number of ventral plates.

The dorsal scales range from 23–21–19–17 to 25–23–21–19; the lower labials range from 10 to 13, 12 most frequent; the upper labials are usually 8 or 9; one specimen lacks the subpreocular on one side; postoculars invariably 2; temporals 1–2 to 2–5, usually 2–3.

## Summary of Scale Characters and Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
<i>Elaphe tæniura tæniura</i> (Cope)				
Ventral Plates	♂ + ♀	15	225-245	236
Subcaudals	♂ + ♀	13	84-101	95
Tail/Length	♂ + ♀	10	.19-.21	.20
<i>Elaphe tæniura yunnanensis</i> (Anderson)				
Ventral Plates	♂ + ♀	8	240-254	249
Subcaudals	♂ + ♀	9	90-108	97
Tail/Length	♂ + ♀	7	.18-.22	.20
<i>Elaphe tæniura vaillanti</i> (Mocquard)				
Ventral Plates	♂ + ♀	2	256-259	258
Subcaudals	♂ + ♀	2	106-120	113
Tail/Length	?	1	.24	.24

***Elaphe tæniura yunnanensis* (Anderson)**

Nine specimens: A. M. N. H. Nos. 21003-21005, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller; 21006, Shaowu Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 21007-21009, South China (probably Tengyueh), 1916-1917, R. C. Andrews and Edmund Heller; and 23497, 23511, Wanhhsien, Szechwan, December, 1921, Walter Granger.

This form differs from *Elaphe tæniura tæniura* in a number of overlapping characters. The dorsal scales are somewhat fewer both at mid-body and posteriorly, 23 occurring at mid-body in the South Chinese specimens in 66%, 25 in the Anhwei specimens in 73%. The subpreocular is wanting in five out of nine specimens of *yunnanensis*, very rarely absent in *t. tæniura*. The ventrals, subcaudals and proportionate tail length are compared with *tæniura* and *vaillanti* in the tabulation above.

Slight differences distinguish the two Szechwan specimens, which have a slightly higher number of dorsal scales, of subcaudals (103-108) and the subpreocular present in both.

The specimens recorded by Boulenger from the "Western Hills of Pekin" offer some difficulty to my subspecific arrangement, as one of the three specimens has 255 ventrals. The specimens recorded by Stejneger from the Amur Province and from Korea, however, have 229 and 231 ventrals, and thus agree with our Anhwei series and help to maintain the lower average.

The two specimens recorded from Darjeeling by Boulenger evidently may be referred to *yunnanensis*.

It seems decidedly preferable to bring the Riu Kiu *Elaphe schmackeri* into the present "Formenkreis." It appeals most directly to *vaillanti*, but is apparently well distinguished by the frequent occurrence of 27 dorsal scale rows.

***Elaphe osborni*,<sup>1</sup> new species**

**Figure 18**

TYPE.—A. M. N. H. No. 21073; ♀; Tengyueh, Yunnan; May 10, 1917; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Most closely allied to *Elaphe hodgsoni* (Günther), and *E. taeniura* Cope.

Body form not specialized, ventrals not angulate, head distinct from neck; dorsal scales faintly but sharply keeled, in 21 rows; ventrals 215–225; anal divided;

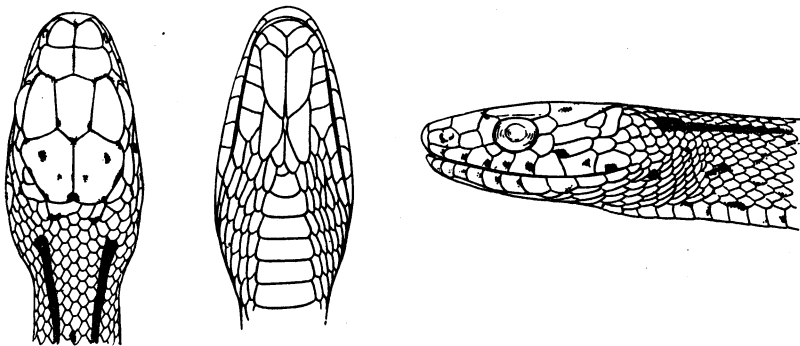


Fig. 18. *Elaphe osborni*, new species.  
Dorsal, ventral, and lateral views of head of type,  $\times 1.5$ .

subcaudals 77–79; supralabials 8, 4th and 5th entering the eye; preoculars 2; postoculars 2; temporals 2–3. Color fawn, with black transverse bars anteriorly and longitudinal lines posteriorly; no black line through the eye.

DESCRIPTION OF TYPE.—Habitus little specialized, ventrals not angulate, head distinct from neck. Maxillary teeth 15, subequal.

Rostral well visible from above, wider than high; internasals a little shorter than the prefrontals; frontal as long as its distance from the tip of the snout, as long as the parietal suture, parallel sided; nasal elongate, the nostril moderate; loreal about as high as long; two preoculars, of which the lower is a small subpreocular; two postoculars; temporals 2–3; upper labials 8, the fourth and fifth entering the eye; lower labials 10, five in contact with the anterior chin-shields, which are longer than the posterior; mental triangular, wider than long.

Dorsal scales with apical pits, faintly but sharply keeled, at least two lateral rows smooth, in 21–23–21–19 rows; ventrals 225; anal divided; subcaudals 79.

<sup>1</sup>Named for Professor Henry Fairfield Osborn, President of The American Museum of Natural History, whose personal interest in the Museum's Asiatic Expeditions has greatly furthered their work.



General color fawn-brown; a dorsolateral black line on each side of the neck, reaching and passing the first black dorsal crossbar, and indicated on subsequent crossbars; a longitudinal row of narrow black spots below this; middle third of the body with somewhat irregular narrow dorsal black crossbars from ventral to ventral, mostly elongate between the 4th and 5th row to indicate a lateral line, which becomes, continuous on the posterior third of the body, between the 3rd and 4th scale rows; a row of dorsolateral spots on the 7th and 8th scale rows in this part of the body also tend to form a line, and continue as very distinct lines on the tail, which is otherwise uniform; most of the anterior and middle ventrals with black dots near their outer ends, and the ventrals opposite the black dorsal bars with large black marks on their tips; venter posteriorly uniform; a few small black spots on parietals and labials.

This specimen measures 404 mm., of which the tail occupies .18.

A second specimen, A. M. N. H. No. 21072, from the same locality, agrees very closely with the above in coloration and essential scale characters; its dorsal scale formula is 21-19-17; ventrals 215; subcaudals 77.

This species is apparently identical with *Elaphe walli* (Werner), which is compared with the same species, *E. hodgsoni*, and differs from the above description chiefly in coloration. The differences may well be explained as age characters, Werner's specimen being much larger than ours. Though dated 1924, Werner's paper (1924a) was not received until some two months after the date of publication of my diagnosis<sup>1</sup> of *Elaphe osborni*, February 13, 1925. The question of priority thus raised must evidently be referred to a European authority for the exact date of Werner's paper.

### **Gonyosoma caldwelli,<sup>2</sup> new species**

#### Figure 19

TYPE.—A. M. N. H. No. 21010; ♂; Yenping, Fukien; 1916; H. R. Caldwell.

DIAGNOSIS.—Very closely allied to *Gonyosoma melli* (Vogt), from Kwangtung, and to *Gonyosoma frenata* Günther, of the Khasi Hills.

Head and body elongate, body compressed; ventrals sharply angulate; snout obliquely truncate, projecting; dorsal scales very faintly keeled, in 19 rows; ventrals 223; anal divided; subcaudals 108 (?+); supralabials 8, third, fourth, and fifth entering the eye; no loreal; one preocular; two postoculars; temporals 1-2; uniform green above and below, with a black stripe through the eye.

DESCRIPTION OF TYPE.—Habitus of a tree snake, body and tail elongate, body compressed, ventrals strongly angulate; head slightly elongate, distinct from the neck, convex above in lateral profile; snout obliquely truncate, strongly projecting. Pupil round. Maxillary teeth 21 or 22, the last slightly enlarged.

Rostral just visible from above, broader than high; internasals broader than long, their suture half that of the prefrontals; frontal a little shorter than its distance from the rostral, as long as the parietal suture, five-sided, the lateral borders slightly concave; supraoculars as broad as the frontal; parietals truncate behind, drawn down

<sup>1</sup>American Museum Novitates, No. 157, p. 4.

<sup>2</sup>Named for Mr. Harry R. Caldwell, who is largely responsible for the Expedition's Fukien collections.

at their latero-anterior corners to meet the lower postoculars; nasal elongate rhomb, longer than its distance from the eye; nostril large, in the middle of the nasal, with a groove extending to the upper border of the nasal; loreal absent; prefrontals in contact with the second labial; preocular large, not in contact with the frontal; upper labials 8, third, fourth, and fifth entering the eye; lower labials 10-11, five or six in contact with the anterior chin-shields, which are longer than the posterior; oculars 1-2; temporals 1-2; mental wider than long.

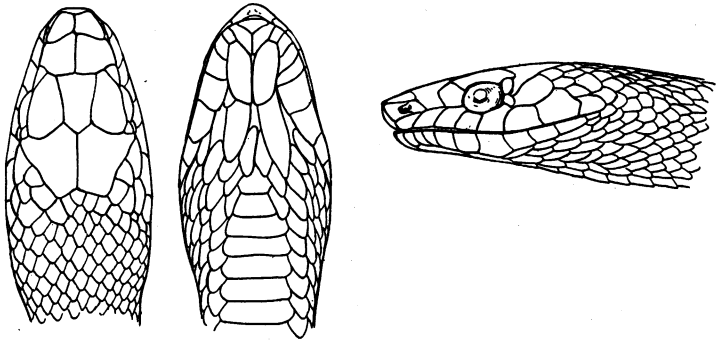


Fig. 19. *Gonyosoma caldwelli*, new species.  
Dorsal, ventral, and lateral views of type, natural size.

Dorsal scales with rather faint apical pits, all except the outer row with very low and faint keels; scale rows 19-17-15; ventrals 223; anal divided; subcaudals 108.

Uniform bluish green above and below, doubtless green in life; a black post-ocular streak, apparently obscured by the preservation.

Length 1231 mm., tail length .26 of the total.

This species approaches *Rhadinophis melli* Vogt (Vogt, 1922, p. 140), from Kwangtung, rather closely. The latter has 212-216 ventrals, 144-148 subcaudals, and two anterior temporals, and thus appears to be amply distinct from *G. caldwelli*. The supposed generic characters of the dentition of *Rhadinophis* may easily be explained by the loss of alternate teeth, a very common phenomenon in the preparation of snake maxillæ for examination.

The *Coluber frenatus* from Col des Nuages, Ngoi-Tio, 4500-6500 feet altitude, Tonkin, Indo-China, recorded by Parker (1925, p. 305) is stated to have 205 ventrals and 145 subcaudals. It thus approaches *Gonyosoma melli* very closely.

#### ***Liopeltis major* (Günther)**

Four specimens, A. M. N. H. Nos. 21011, Yenping, Fukien, 1916, R. C. Andrews and Edmund Heller; 21034, 21035, Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller; and 23531, bought at Wuhu, by Clifford H. Pope, 1921.

These specimens agree excellently with the Formosan series described by Stejneger. The minimum ventral count is reached in No. 21035 with 156. The uniform presence of only six lower labials is highly characteristic. Good series of this species from Fukien are much to be desired for comparison with the Formosan representatives.

The dorsal scale rows are uniformly fifteen throughout in three specimens, reducing to thirteen near the anus in one. Ventrals range from 156 to 168; subcaudals from 82 to 88; temporals 1-1 or 1-2. The largest specimen measures 836 mm. In the two male specimens the tail length is .27-.28 of the total, .24-.26 in the two females.

#### ***Holarchus chinensis* (Günther)**

Two specimens, A. M. N. H. Nos. 25571 Ningkwo, Anhwei, September-October, 1921, Clifford H. Pope, and 22706, Yunnanfu, Yunnan, John Graham, represent this species.

The Yunnan specimen agrees closely with the type in scale characters. The specimens recorded by Boulenger as coming from Hainan (cf. Schmidt, 1927, p. 398) agree closely with the Ningkwo specimen. It seems possible that there are two forms at present confused under this name. The Yunnan specimen differs from the Anhwei specimen in having narrower black crossbands intermediate between the principal series, and a light vertebral line. The scale characters and measurements are as follows:

A. M. N. H. No.	25571	22706
Sex	♂	♀
Dorsal Scales	17-15	17-15
Ventrals	170	192
Caudals	61	51
Upper Labials	7	9
Lower Labials	9	..
Preoculars	1	1
Postoculars	2	2
Temporals	1-2	1-2, 2-2
Dorsal Crossbands	12+4	13+3
Total Length	261 mm.	496 mm.
Tail/Total Length	.19	.15

#### ***Holarchus violaceus* (Cantor)**

Three specimens, A. M. N. H. Nos. 18618, Fukien Province, H. R. Caldwell, March 18, 1921; 21015, Yenping, Fukien, R. C. Andrews and Edmund Heller, summer, 1916; and 23536, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

These specimens fall within the range of the Hainan series examined by me. There is no noteworthy difference in scaling or coloration.

***Ahaetulla boiga* (Lacépède)**

A. M. N. H. No. 21045, Lung Ling Ling, Yunnan, R. C. Andrews and Edmund Heller, March, 1917, represents this form.

The dorsal scales are 15-13-11; ventrals 192; tail incomplete; upper labials 9-10; lower labials 10; oculars 1-2; temporals 1-2-3 and 2-2-2.

***Calamaria septentrionalis* Boulenger**

Eight specimens, A. M. N. H. Nos. 23535, 24533-24535, collected at Wuhu, Anhwei, and Nos. 24618-24620, 25572 at Ningkwo, Anhwei, September-October, 1921, by Clifford H. Pope.

This series shows the most complete uniformity. The dorsal scales are in 13 rows from head to tail; ventrals range from 160 to 161 in two males, from 170 to 184 in six females; subcaudals in the male specimens 18, in the females 9-11; upper labials 4; lower labials 5; oculars 1-1; temporals none; tail length .03 of the total in females, .07 in male specimens. The maximum length is 373 mm.

"A small 'two-headed snake' was discovered by a Chinaman while cutting grass on the side of a mound of earth beside an old garden path. When taken in the hand it went through violent spasmodic contortions for about five minutes, whereupon, apparently exhausted, it relaxed and turned over on its back.

"Another specimen, when put on the floor, was able to progress in regular snake-fashion. When held by the tail it continued to try to escape. When its head was held to the floor, the whole body was instantly thrown forward, wrapped around the restraining fingers, and the tip of the tail was repeatedly pressed against them. It seems that the tail takes the offensive while the head invariably tries to escape! The tail, in short, not only mimics the head in form and color pattern, but in behavior as well." (C. H. P.)

***Enhydryis plumbea* (Boie)**

This species is represented by A. M. N. H. Nos. 21013, Yenping, Fukien, R. C. Andrews and Edmund Heller, 1916, and 23537, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

These specimens present no anomaly. The Fukien mountain range apparently represents the western limit of the range of this form in this part of China.

***Enhydris chinensis* (Gray)**

Two specimens, A. M. N. H. Nos. 21075, without data, and 23494, Fukien Province, collected by H. R. Caldwell, 1921.

These specimens agree with the Hainan series. This species reaches the Yangtze Valley.

***Boiga sinensis*, new species**

## Figure 20

TYPE.—A. M. N. H. No. 23495; ♂; Fukien Province; 1921; H. R. Caldwell.

DIAGNOSIS.—Closely allied to *Boiga kræpelini* Stejneger, from Formosa.

Head short and broad, the snout longer than the diameter of the eye; body compressed, tail long; ventrals not angulate; anterior palatine teeth slightly enlarged; posterior pair of chin-shields much smaller than the anterior; dorsal scales smooth, oblique, in 21 rows, the mid-dorsal row not enlarged; ventrals 230; anal divided;

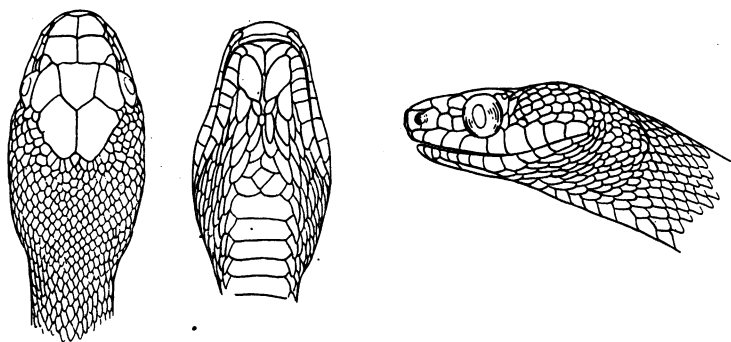


Fig. 20. *Boiga sinensis*, new species.

Dorsal, ventral, and lateral views of head of type, natural size.

caudals 127; preoculars 3; postoculars 2-3; temporals very small, 4 to 6 in the first row, 6 to 7 in the second, not regularly arranged; ground color light reddish brown, with three series of darker brown spots.

DESCRIPTION OF TYPE.—Body strongly compressed, head short and broad, very distinct from the neck; eye large, with vertically elliptic pupil; tail long and slender. Anterior palatine teeth slightly enlarged; maxillary teeth 12, subequal, with two enlarged, grooved fangs.

Rostral visible from above, narrowed above, wider than high; internasals wider than long, their suture two-thirds that of the prefrontals; prefrontals laterally on the side of the head to the loreal; frontal five-sided, as long as its anterior breadth, its sides nearly parallel, wider than the supraocular, shorter than its distance from the rostral, as long as the parietal suture; nasals large, divided, nostril large, anterior nasal on the front of the snout; loreal small, slightly higher than long; preoculars three, the upper not in contact with the frontal; postoculars 2-3; temporals replaced by very small undifferentiated scales, four to six in the first row; upper labials 9-10,

the third, fourth and fifth entering the eye; lower labials 13, four in contact with the anterior chin-shields; anterior chin-shields a little longer than and twice as wide as the posterior pair, which are widely separated; mental broader than long.

The dorsal scale rows range from twenty-five on the neck to twenty-one at mid-body and fifteen near the tail; the dorsal scales are smooth, pointed, in oblique rows, the dorsal series not at all enlarged; I am unable to discover apical pits; ventrals 230; anal divided; subcaudals 127. The top of the head is light reddish brown, uniform, and the ground color of the back is similar; a series of darker brown dorsal spots, 5-7 scales wide and 2-3 scales long, and an alternate series of smaller spots on each side, their scales black edged; posteriorly the lateral spots become indistinct; venter brown, with faint darker and lighter clouding; tail punctate beneath with dark brown.

The total length is 1201 mm., of which the tail occupies .25.

This species is very closely allied to *Boiga kræpelini* of Formosa, which has a much higher range of ventral and subcaudal counts, 236-250, and 140-154 (Steindachner, 1914, p. 343).

Both species have an ally in *Boiga forsteni* of India and Ceylon.

#### **Bungarus multicinctus** Blyth

This species is represented by A. M. N. H. Nos. 21027, Shaowu, Fukien, R. C. Andrews and Edmund Heller, 1916, and 23512, Yochow, Hunan, Clifford H. Pope, 1922.

These specimens present no noteworthy variation.

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

The common cobra of South China is represented by A. M. N. H. Nos. 21012, Yenping, and 21044, Futsing, Fukien Province, R. C. Andrews and Edmund Heller, 1916.

These specimens agree excellently with the series collected in Hainan by Clifford H. Pope.

#### **Amblycephalus chinensis** Barbour

Two specimens, A. M. N. H. Nos. 23505, collected at Luanshikau, 3000 feet altitude, Wanhshien, Szechwan, September, 1921, by Walter Granger, and 22703, Yunnanfu, Yunnan, John Graham, represent this rare form. These agree with Barbour's description and figure (1912, p. 132, Pl. II, fig. 1). Their scale characters and measurements are as follows:

A. M. N. H. Nos.	23503	22703	M. C. Z. 7326
Sex	♀	♀	♀
Dorsal Scales	15	15	15
Ventrals	177	169	180
Subcaudals	63	64	60
Upper Labials	7-8	7	7
Lower Labials	9-10	8-7	8-8
Preoculars	2	2	2
Postoculars		2	2-1
Temporals	2-2, 2-3	2-3	2-3
Total Length	496 mm.	502 mm.	..
Tail/Total Length	.19	.22	..

### Crotalidæ

#### *Agkistrodon trauchi* Bedriaga

A single specimen, A. M. N. H. No. 21020, Snow Mountain, 9000 feet altitude, Likiang, Yunnan, R. C. Andrews and Edmund Heller, November, 1916, represents this species.

The dorsal scales are 21-19-17-15; ventrals 140; anal single; subcaudals 32; upper labials 6; lower labials 9; oculars 1-2; temporals 2-3 and 2-4; length 470 mm., tail 60 mm., .13 of the total. The color is brown with obscure black markings; a pair of black spots on the fronto-parietal area.

The specimen contained 6+3 eggs, measuring about 12×15 mm., without embryos.

This specimen was identified as *A. tibetanus* Barbour, which must be united with *Agkistrodon trauchi* Bedriaga.

#### *Agkistrodon halys brevicaudus* (Stejneger)

Forty-eight specimens are referred to this form: A. M. N. H. Nos. 21475, 21496-21506, Hsing Lung Shan, Chihli, August, 1921, C. H. Pope; 24524-24526, 24536-24543, 24558, 25550-25570, Ningkwo, Anhwei, September-October, 1921, C. H. Pope; 23489, Shez, Wanhhsien, Szechwan, 1921, Walter Granger; 23513, Yochow, Hunan, March, 1922, C. H. Pope; 28278, Chen Tzu, Taiyuan, Shansi, July-August, 1922, C. H. Pope.

The Ningkwo series contains two color phases, reddish brown and dark gray respectively, of which only the gray phase is matched in the Chihli series. The identity in scale characters of these three series is shown in the following tabulation.

The normal dorsal scale count is 23-21-19-17; 21-19-17 occurs twice in the Chihli series, twice in the Anhwei series, and in the Hunan

Variation in *Agkistrodon halys brevicaudus* and *intermedius*

	Sex	Ventrals			Caudals			Tail/Total Length mm.		
		No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
<i>Agkistrodon h. brevicaudus</i> (Chihli Series) (Gray Phase Series Anhwei Red Phase Series)	♂	3	138-142	140	3	39-44	41	3	12-15	.13
	♀	9	142-147	144	9	28-39	36	9	10-13	.12
	♂	10	135-143	140	10	37-43	40	10	12-14	.13
	♀	7	138-147	141	7	31-37	35	7	11-13	.12
	♂	9	139-144	141	9	34-44	40	9	11-14	.13
	♀	3	139-147	144	3	34-38	36	3	11-13	.12
<i>Agkistrodon h. intermedius</i> Chili Series Shansi Series	♂	3	160-168	164	3	40-45	42	3	12-14	.13
	♂	3	165-175	170	3	48-51	49	3	13-15	.14
	♀	3	173-181	176	3	43-47	44	3	10-14	.12



and Szechwan specimens; 25-17 occurs once in the Chihli series, and 27-17 in the single Shansi specimen.

There are no noteworthy differences in head scaling or measurements.

The Shansi specimen, No. 28278, is of especial interest, as it is the only one whose ventral and caudal counts ally it to *intermedius*. It has 153 ventrals and 47 subcaudals. Its coloration agrees more closely with that of *intermedius* than with that of normal *brevicaudus*.

#### ***Agkistrodon halys intermedius* Strauch**

Six specimens, A. M. N. H. Nos. 23920, Mai Tai, Chao, Shansi, May, 1922, collected by Clifford H. Pope; and 28279, Tsagan Nor, Gobi Desert; 28280, 28281, 28347, Tze Tzen Wang, Mongolia, 28282, 260 miles s.e. of Sairusu on the Kalgan Trail, collected in the summer of 1922 by R. C. Andrews.

Three specimens, A. M. N. H. Nos. 21493-21495, collected by C. H. Pope, August, 1921, 13 miles north of Hsing Lung Shan, Chihli, plainly belong with *A. intermedius* rather than with *A. blomhoffii brevicaudus*, though they differ somewhat in scale formula from the Mongolian specimens.

The dorsal scale rows range from 23 to 28 anteriorly, from 21 to 25 at mid-body, and are uniformly 17 near the tail. The upper labials range from six to nine, the lower from nine to twelve. Preoculars and postoculars are uniformly two. Temporals 2-3 to 3-5. The length ranges from 422 to 568 mm., the tail length from .10 to .14 in the three female specimens, and from .13 to .15 in the three males. The ventrals in the male specimens range from 165 to 175, and from 173 to 181 in the females; the subcaudals in males are 48 to 51, in females 43 to 47.

The three Hsing Lung Shan specimens are juvenile males; their coloration agrees closely with that of the Mongolian series; the dorsal scale count and head scales are similar; but the ventrals, ranging from 160 to 168, and the subcaudals, 40 to 45, are distinctly fewer. Nevertheless, the range of ventrals in twelve *brevicaudus*, both male and female, from Hsing Lung Shan, is 138 to 147, so that these specimens are certainly much closer to *intermedius*.

#### ***Agkistrodon acutus* (Günther)**

A single male specimen, A. M. N. H. No. 24665, collected at Shengchorefu, Hunan, by H. H. Johnson.

This specimen agrees closely with Boulenger's description (1896, p. 524). It has 166 ventrals and 55 caudals, of which the first 13 are entire. It measures 1058 mm., of which the tail occupies .14.

**Trimeresurus orientalis**, new species

TYPE.—A. M. N. H. No. 21028; ♀; Shaowu, Min River, Fukien; 1916; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Distinguished from its very near relative, the Himalayan *T. monticola*, by having ten upper labials instead of eight or nine; its second near ally, *T. okinavensis*, has seven or eight upper labials.

DESCRIPTION OF TYPE.—Habitus stout; head short and broad, eye very small; body apparently somewhat compressed, with a slight vertebral ridge.

Upper head-shields flat, smooth, frequently broader than long, eight between the supraoculars; temporals smooth; a well-developed pair of internasals, separated by a single small scute; rostral wider than high; upper labials ten on each side, the second forming the anterior border of the loreal pit, the fourth largest; three rows of scales between the eye and the upper labials; lower labials eleven, only two in contact with the anterior chin-shields; second pair of chin-shields scarcely distinguishable; two preoculars, two suboculars, and two postoculars.

Dorsal scales 27–25–21, the uppermost rows very faintly keeled, the rest perfectly smooth; ventrals 138; anal entire; subcaudals 37.

Ground color a light brown, consisting of a brown punctation on a still lighter yellowish brown; a series of subquadrate very dark brown markings on each side of the vertebral line, nearly always alternate and overlapping, and reaching the eighth scale row; a lateral row of small spots of the same color, often connected with the upper row; a lateroventral row of similar spots, often nearly confluent, on the lower scale rows and ends of the ventrals; ventrals light brown, punctate with darker brown, and each with two dark brown markings, which form irregular longitudinal bands; head black anteriorly and on the sides; the posterior part of the top of the head light brownish yellow, with obscure darker markings; posterior upper labials and several of the lower labials with light markings; some of the lateral gulars dark with light central spots on each scale; tail nearly black above with sharply defined small yellow spots, almost forming a longitudinal line.

Length 600 mm., tail 82 mm., .14 of the total.

RANGE.—Fukien and Formosa.

This is the form recorded from Formosa as *T. monticola*. Both Barbour (1909, p. 74) and Steindachner (1914, p. 37) record ten upper labials in their Formosan specimens. It has been recorded from Fukien (also as *monticola*) by Stanley (1914, p. 31). The head pattern of *monticola* figured by Günther (1864, Pl. xxiv, fig. B) is quite different from that of the present specimen; and Steindachner's description (*loc. cit.*), indicates agreement between our Fukien and his Formosan specimens in this respect.<sup>1</sup>

**Trimeresurus mucrosquamatus** (Cantor)

A. M. N. H. Nos. 23508, Yenchingkau, 1500 feet altitude, Wanhhsien, Szechwan, Walter Granger, October, 1921, and 23523, Yenping, Fukien, H. R. Caldwell, 1921, represent this species.

<sup>1</sup>Werner (1926), regards *orientalis* as a synonym of *monticola*. Where his material is more ample than mine I am disposed to follow his judgement. He has failed, however, to understand the relations of *gramineus* and its Chinese allies, which are discussed below.

The characters of these specimens are as follows:

A. M. N. H. Nos.	23508	23523
Sex	♀	♂
Dorsal Scales	27-23-19	29-25-19
Ventrals	206	203
Subcaudals	86	93
Upper Labials	9	10
Lower Labials	14	13-14
Oculars	3-1-2	3-1-2
Scales Between Internasals	3	3
Length	1000 mm.	864 mm.
Tail/Length	.19	.19

***Trimeresurus gramineus* (Shaw)**

Figure 21

A single specimen of this species, as I propose to restrict it, was purchased at Wuhu, Anhwei, by C. H. Pope, 1921 (A. M. N. H. No. 23529). This specimen is therefor of uncertain origin, and it does not

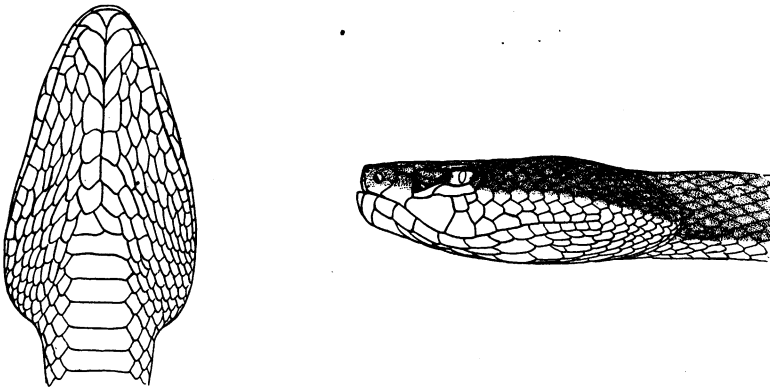


Fig. 21. *Trimeresurus gramineus* (Shaw).

Ventral and lateral views of head of A. M. N. H. No. 27935, Nodda, Hainan. To show paired gulars behind chin-shields, fusion of nasal and first labial, and coloration.

enter into the discussion of the partition of *gramineus* auct. It is remarkable as the only specimen of this group which is brown instead of green. It agrees in scale characters with the Hainan series. A typical Hainan specimen is figured for comparison with the following species.

**Trimeresurus stejnegeri**,<sup>1</sup> new species

## Figure 22

TYPE.—A. M. N. H. No. 21054; ♂; Shaowu, Fukien; summer, 1916; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Differs from the widespread *Trimeresurus gramineus*, with which it has hitherto been confounded, in the very small shields between the chin-shields and the first ventral plate, the smaller and more widely separated supranasals, the distinct first labial (which in South Chinese *gramineus* is frequently fused with the nasal), and the usual uniform green coloration of the side of the head.

DESCRIPTION OF TYPE.—Habitus of *T. gramineus*.

Upper head shields smooth and flat; no especially enlarged internasals; seven scales bordering the nasals and rostral above; twelve scales between the supraoculars; rostral about as high as wide; upper labials 10–11, the first distinct from the nasal,

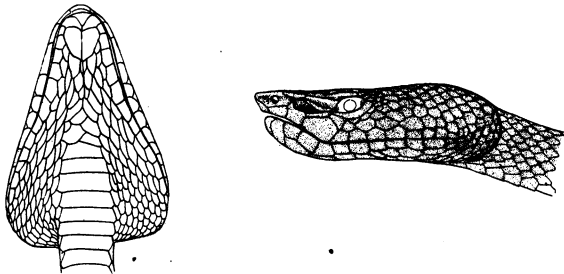


Fig. 22. *Trimeresurus stejnegeri*, new species.<sup>2</sup>  
Ventral and lateral views of head of type, natural size.

the second bordering the loreal pit in front, and the third largest and in contact with the subocular; lower labials twelve, three in contact with the anterior chin-shields; only a single pair of chin-shields is regularly developed and these are followed by irregular gulars which extend to the first ventral; two preoculars, a strap-shaped subocular, and two or three postoculars; one supraocular is transversely divided.

General color dark bluish green (in alcohol), the venter lighter, each ventral with a narrow white posterior border; a narrow white lateroventral line extends along the middle of the first scale row, which is otherwise green; tip of tail brownish; no light markings on the side of the head.

Total length 688 mm., tail 111 mm., .16 of the total.

NOTES ON PARATYPES.—Two additional specimens are associated with this species, A. M. N. H. Nos. 21053, Futsing, Fukien, and 23534 bought at Wuhu, Anhwei. The latter specimen, a female with 155 ventrals and 56 subcaudals, has a pair of slightly developed internasals, separated by a single scale; it has irregular gulars and a uniform green head like the type; the lateral stripe is broad, involving the edge of the second scale row. In the Futsing specimen the lateral stripe is confined to the scales of the first row, the upper halves of which are white and the lower gray. This specimen,

<sup>1</sup>Named for Dr. Leonhard Stejneger, Head Curator of Biology, United States National Museum, as a small tribute to his invaluable contributions to Oriental herpetology.

<sup>2</sup>The pupil is vertical, not round as indicated in the figure.

also a female, has a well-developed pair of internasals, separated by a median scute; somewhat more regular gulars; and but for the uniform green side of the head it would offer some difficulty to distinguish it from *T. gramineus*. It has 164 ventrals and 63 subcaudals. In both paratypes the dorsal scales formula is 25-21-15.

RANGE.—Mountains of Chekiang, Fukien, northern Kwangtung, and Formosa.

In establishing this form I have been guided by the fact that all of the Hainan specimens examined by me (Schmidt, 1925, p. 4), as well as all the available specimens from Indo-China, Siam, and India, have a strikingly distinct series of paired gulars extending from the chin-shields to the first ventral; the supranasals well-developed and usually in contact; and nearly always a light subocular line, below which the side of the head may be white or yellow. The type locality of *T. gramineus* is Vizigapatam, India, and the Indian specimens available for examination (A. M. N. H. No. 5166, "India," 2861, Punjab, and M. C. Z. No. 4490, "India," 4369, Amballa, and 5702, E. India), agree with the Hainan series. I therefore feel justified in restricting *gramineus* to this form, for which *T. albolabris* Gray is obviously a strict synonym.

The Formosan specimen described and figured by Stejneger (1907, p. 480, Figs. 370-372) agrees exactly with my diagnosis of *T. stejnegeri*. Two specimens in the Museum of Comparative Zoölogy (M. C. Z. No. 7389) from Bankoro, Central Formosa, also agree with the northern form. A specimen from Horisha, Formosa (A. M. N. H. No. 5076), combines the widely separated supranasals with somewhat more regular gulars, and has a distinct stripe on the side of the head. The series of nine Formosan specimens examined by Steindachner (1914, p. 39) are described as having small internasals, separated by one to three scales, and the side of the head usually unmarked. It is evident that intergradation between *gramineus* and *stejnegeri* may occur. Mell (1922, p. 126), who first suggested the division of Chinese *gramineus* into a northern and southern form, considers them as subspecies. He differentiated them on the basis of field observation in Kwangtung. Future collections from Fukien may be expected to define the status of *stejnegeri* and its relations with *gramineus* in a satisfactory way.

Two specimens from Moh Kan Shan, Chekiang (U. S. N. M. Nos. 64022, 64023), agree with the Fukien and Formosan specimens on both the supranasal and gular characters.

#### ***Trimeresurus yunnanensis*, new species**

TYPE.—A. M. N. H. No. 21058; ♂; Tengyueh, Yunnan; April-May, 1917; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Closely allied to *Trimeresurus stejnegeri* and distinguished from *T. gramineus* by the same characters. It is distinguished from the former species by

having only nineteen rows of dorsal scales at mid-body, and twenty-one on the neck, compared with twenty-one at mid-body and 23-25 on the neck in *T. stejnegeri*. The average number of ventral plates, 155-160, is perhaps somewhat lower in *T. yunnanensis*.

DESCRIPTION OF TYPE.—Habitus of *T. gramineus*,

Head-shields on top of head smooth and flat; no enlarged internasals; seven scales border the nasals and rostral above; rostral about as high as wide; upper labials 9-10, the first distinct from the nasal, the second forming the anterior border of the loreal pit, the third largest, and in contact with the subocular; eight scales between the supraoculars; three preoculars, a strap-shaped subocular, and two postoculars; lower labials 11-12, three in contact with the first pair of chin-shields; gulars not paired, irregular.

Dorsal scale-rows twenty-one on the neck, nineteen at mid-body, and fifteen near the tail; ventrals 156; subcaudals 67; dorsal scales all with low keels.

General color bluish green, in alcohol, the venter lighter, each ventral narrowly light-edged behind; a lateral strip on the first scale row, the upper half white, the lower half reddish brown; no markings on the side of the head.

Length 707 mm., tail 145 mm., .21 of the total.

NOTES ON PARATYPES.—The three paratypes, A. M. N. H. Nos. 21055-21057, all from Tengyueh, agree with the type in the low number of dorsal scales, which drop to thirteen near the tail in one specimen, in the coloration of the side of the head, and in the gular character. They have more distinctly developed internasals, in each case separated by a median scute. One has a lateral line like that of the type, one has a narrow white line occupying only the middle of the first scale row, and the third has scarcely any distinguishable lateral line. The ventrals range from 155 to 160, and the subcaudals are 55 in the only one with a complete tail. I have examined two specimens at the Museum of Comparative Zoölogy, M. C. Z. No. 14671, from Yunnan Fu and No. 16734 from Luchien-hsien, Yunnan, which agree excellently with my diagnosis and can accordingly be named paratypes.

This form evidently requires comparison only with *T. stejnegeri*, with which it may prove to intergrade when the intermediate territory is explored.

## BIBLIOGRAPHY

- BARBOUR, THOMAS. 1909. 'Notes on Amphibia and Reptilia from Eastern Asia.' Proc. New England Zool. Club, IV, pp. 53-78, Pls. vi-vii.
1910. 'A note regarding the Chinese Alligator.' Proc. Acad. Nat. Sci. Phila., pp. 464-467.
1912. 'Some Chinese Vertebrates. Amphibia and Reptilia.' Mem. Mus. Comp. Zool., XL, pp. 125-136, Pls. i-ii.
1922. 'Further remarks on the Chinese Alligator.' Proc. New England Zool. Club, VII, pp. 31-34.
1924. 'A Yunnan Gecko.' Occ. Papers. Boston Soc. Nat. Hist., V, pp. 133-135, fig.
- BARBOUR, THOMAS, AND DUNN, EMMETT REID. 1919. 'Two new Chinese Japaluras.' Proc. New England Zool. Club, VII, pp. 15-19.
- BEDRIAGA, J. VON. 1907. 'Wissenschaftliche Resultate der von N. M. Przewalski nach Central Asien unternommenen Reisen.' Zoolog. Theil., Band III, Abt. 1, Amphibien und Reptilien, Lfg. 2. Lacertilia, pp. 73-278, Pls. ii-iv.
1909. Idem, Lfg. 3, pp. 279-502, Pls. v-vii.
1912. Idem, Lfg. 4, pp. i-iv, 503-769, Pls. viii-x.
- BOULENGER, GEORGE ALBERT, 1885. 'Catalogue of the Lizards in the British Museum (Natural History).' Second Edition. London, 8°, I, pp. xii+436, Pls. i-xxxii.
1887. Idem, III, pp. xii+575, Pls. i-xl.
- 1887a. 'An account of the Reptiles and Batrachians obtained in Tenasserim by M. L. Fea of the Genoa Civic Museum.' Am. Mus. Civ. Stor. Nat. Genova, (2) V, pp. 474-487, Pls. vi-viii.
1890. 'Remarks on the Chinese Alligator.' Proc. Zool. Soc. London, pp. 619-620, Pls. li-lii.
1893. 'Catalogue of the Snakes in the British Museum (Natural History).' London, 8°, I, pp. xiii+448, text figs. 1-26, Pls. i-xxviii.
1894. Idem, II, pp. xi+382, text figs. 1-25, Pls. i-xxv.
1896. Idem, III, pp. xiv+727, text figs. 1-37, Pls. i-xxv.
1899. 'On a collection of Reptiles and Batrachians made by Mr. J. D. Latouche in N. W. Fokien, China.' Proc. Zool. Soc. London, pp. 159-172, Pls. xvi-xix.
1903. 'Descriptions of new Lizards in the British Museum.' Ann. Mag. Nat. Hist., (7) XII, pp. 429-435.
1904. 'Descriptions of new Frogs and Snakes from Yunnan.' Idem, (7) XIII, pp. 130-134.
1906. 'Descriptions of new Reptiles from Yunnan.' Idem, (7) XVII, pp. 567-568.
1908. 'Description of a new Snake from Yunnan.' Idem, (8) II, p. 244.
1909. 'On the Ophidian Genus *Grayia*.' Proc. Zool. Soc. London, pp. 944-952, text figs. 295-299.
1914. 'Description of a new Snake of the genus *Coluber* from Northern China.' Ann. Mag. Nat. Hist., (8) XIII, p. 576.
1916. 'Description of a new Snake of the genus *Coluber* from Northern China.' Idem, (8) XVII, p. 243.

1918. 'Description of a new Lizard of the genus *Acanthosaura* from Yunnan.' Idem, (9) II, p. 162.
1921. 'Monograph of the Lacertidæ.' London, 8°, II, pp. viii+451
- GÜNTHER, ALBERT C. L. G. 1864. 'The Reptiles of British India.' London, 4°, pp. xxvii+452, 7 text figs., Pls. I-XXVI.
1892. 'List of the species of Reptiles and Fishes collected by Mr. A. E. Pratt on the Upper Yang-Tze-Kiang and in the Province of Szechwan, with description of New Species.' In Pratt, A. E., 'To the Snows of Tibet Through China.' London, 8°, p. 000.
1896. 'A report on the collections of Reptiles, Batrachians, and Fishes made by Messrs. Potanin and Berezowski in the Chinese Provinces of Kansu and Szechwan.' Ann. Mus. Zoöl. Acad. Sci. St. Petersburg, I, pp. 199-219, Pls. I-II.
- JACOT, ARTHUR, 1923. 'Shantung Herpetology.' China Journ. Sci. Arts., I, pp. 257-260.
- MELL. R. 1922. 'Beitrage zur Fauna sinica I Die Vertebraten Sudchinas; Feldlisten und Feldnoten der Säuger, Vogel, Reptilien, Batrachier.' Arch. Naturg., LXXXVIII, Abt. A, Heft 10, pp. 1-146, text fig., map, and Pls. I-IV.
- PARKER, H. W. 1925. 'Variation of the lepidosis of a snake from S. E. Asia.' Ann. Mag. Nat. Hist., (9) XV, pp. 296-298, diagram.
- 1925a. 'A collection of Reptiles and Batrachians from Tonkin.' Idem pp. 300-306.
- SCHMIDT, KARL PATTERSON. 1925. 'New Reptiles and a new Salamander from China.' Amer. Mus. Novitates, No. 157, pp. 1-5.
- 1925a. 'New Chinese Amphibians and Reptiles.' Idem, No. 175, pp. 1-3.
1927. 'The Reptiles of Hainan.' Bull. Amer. Mus. Nat. Hist., LIV, pp. 395-465, Pl. XXVII, Text Figs. 1-17.
- STANLEY, ARTHUR. 1914. 'The collection of Chinese Reptiles in the Shanghai Museum.' Journ. N. China Branch Roy. Asiatic Soc., XLV, pp. 21-31.
- STEINDACHNER, FRANZ. 1914. 'Bericht über die von Hans Sauter auf Formosa gesammelten Schlangenarten.' Denkschr. Akad. Wiss. Wien (math.-natur), XC, pp. 319-361, text figs. 1-21, Pls. I-IV.
- STEJNEGER, LEONHARD. 1907. 'The Herpetology of Japan.' Bull. U. S. Nation. Mus., No. 58, pp. xx+577, text figs. 1-409, Pls. I-XXXV.
1924. 'Herpetological Novelties from China.' Occ. Papers Boston Soc. Nat. Hist., V, pp. 119-121.
1925. 'Description of a new Scincid Lizard and a new Burrowing Frog from China.' Journ. Wash. Acad. Sci., XV, pp. 150-152.
- 1925a. 'Chinese amphibians and reptiles in the United States National Museum.' Proc. U. S. Nation. Mus., LXVI, Art. 25, pp. 1-115.
- VOGT, THEODOR. 1922. 'Zur Reptilien und Amphibien-Fauna Südchinas.' Arch. Naturg., LXXXVIII, Abt. A, Heft 10, pp. 135-146.
1924. 'Reptilien und Amphibien aus Szechwan. Osttibet, und Tschili.' Zool. Anz., LX, pp. 337-344.
- WALL, FRANK. 1903. 'A Prodomus of Snakes hitherto recorded from China, Japan, and the Loo Choo Islands; with some notes.' Proc. Zoöl. Soc. London, pp. 84-102.

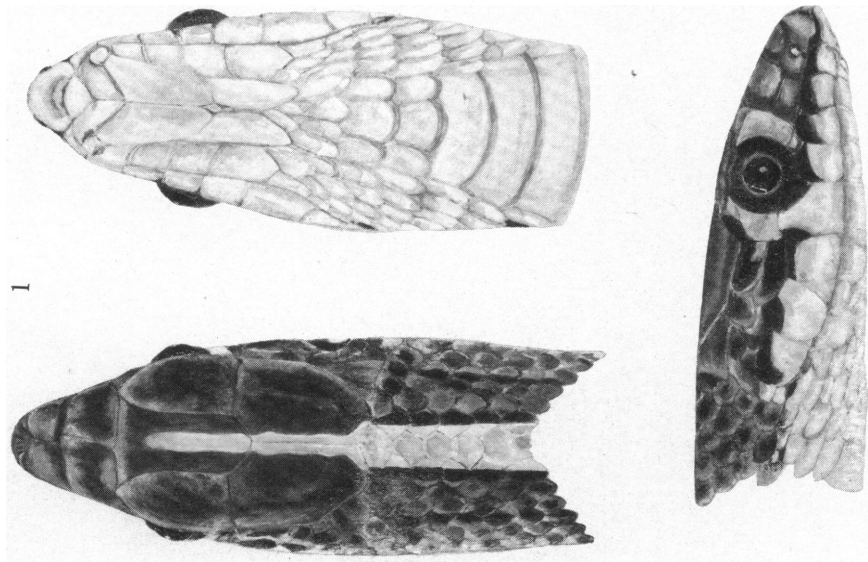


1911. 'A popular treatise on the common Indian Snakes.' Part XIV. Journ. Bombay Nat. Hist. Soc., XX, pp. 603-633, Pl. xiv, text figs., and map.
- 1911a. Idem, Part XV, pp. 933-953, Pl. xv, Pl. A, diagrams, and maps.
1923. 'Notes on a collection of Snakes from Sinlum Kaba.' Idem, XXIX pp. 466-468.
- WERNER, FRANZ. 1904. 'Über Reptilien und Batrachier aus Guatemala und China in der Zoologischen Staats-Sammlung in München, nebst einem Anhang über seltene Formen aus anderen Gebieten.' Abh. Bayer. Akad. Wiss., II Kl., XXII, pp. 343-384, text figs. Pl.
1909. 'Über neue oder seltene Reptilien des Naturhistorischen Museums in Hamburg.' I. Schlangen. Mitt. Naturh. Mus. Hamburg, XXVI, pp. 205-247.
1910. Idem (II. Eidechsen.), XXVII, pp. 1-46.
1922. 'Neue Reptilien aus Süd-China gesammelt von Dr. Handel-Mazetti.' Anz. Akad. Wiss. Wien, LIX, pp. 220-222.
1924. 'Ergebnisse der Expedition Dr. Handel-Mazetti's nach China 1914 bis 1918 auf Kosten der Akademie der Wissenschaften in Wien Über Reptilien und Amphibien aus Südchina.' Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, pp. 39-58.
- 1924a. 'Neue oder wenig bekannte Schlangen aus dem Naturhistorischen Staatsmuseum in Wien.' Sitzber. Akad. Wiss. Wien (math.-natur.), Abt. I, CXXXIII, pp. 29-56, figs. 1-9.
1926. 'Synonymisches über Schlangen von Hainan und vom chinesischen Festland.' Zool. Anz., LXVII, pp. 141-144.

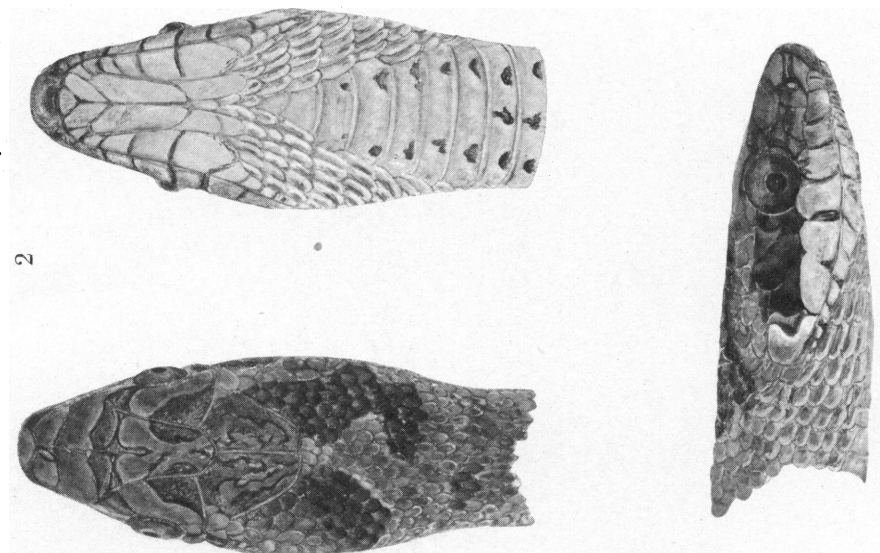
PLATE XXVIII

Fig. 1. Dorsal, ventral, and lateral view of the head of *Coluberspinalis* Peters,  
A. M. N. H. No. 28257,  $\times 4$ .

Fig. 2. Dorsal, ventral, and lateral views of head of *Elaphe dione* (Pallas),  
A. M. N. H. No. 28258,  $\times 2$ .



1



2

PLATE XXIX

Fig. 1. *Eremias przewalskii* Stranch, A. M. N. H. Nos. 31510, ♀, 31512, ♂, and 31508, juv. To show pattern variation with age and sex.

Fig. 2. *Japalura splendida* Barbour and Dunn, A. M. N. H. No. 23552, ♀, 23553 and 23558, ♂. To show pattern variation with sex.

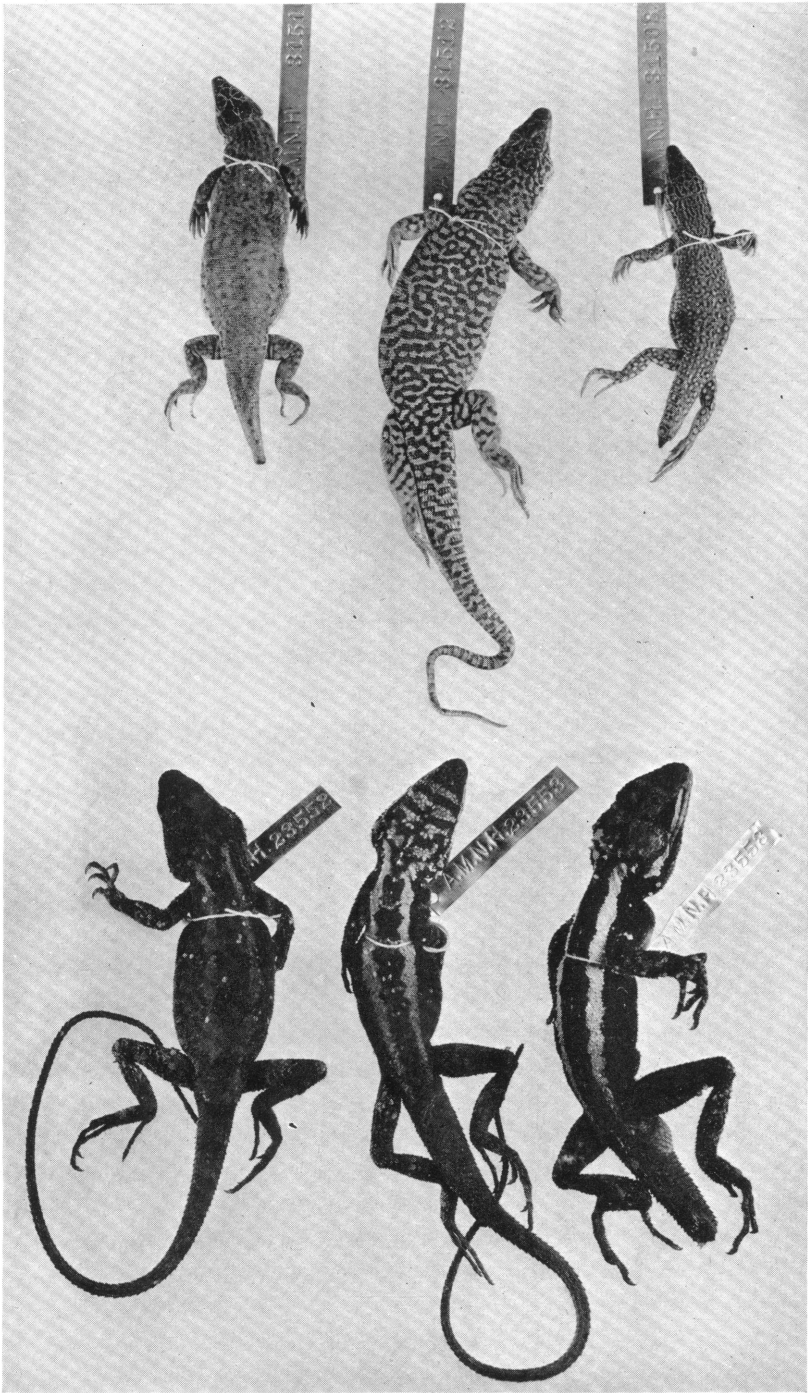
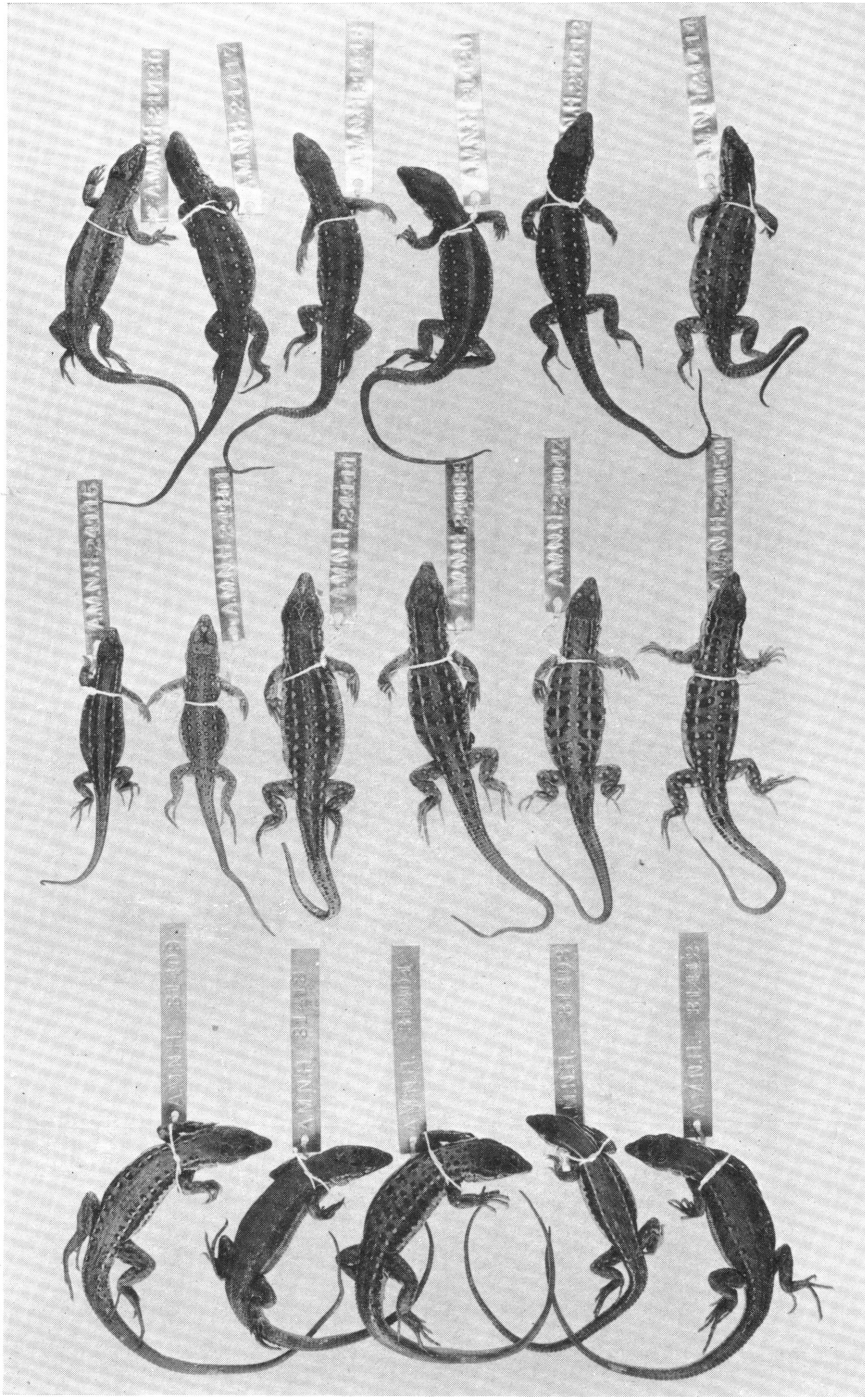


PLATE XXX

Fig. 1. *Eremias argus* Peters, A. M. N. H. Nos. 21430, 21417, 21418, 21420, 21412, 21414. Pattern variation.

Fig. 2. *Eremias barbouri*, new species, A. M. N. H. Nos. 24115, 24101, 24111, 24089, 24047, 24050. Pattern variation.

Fig. 3. *Eremias brenchleyi* Gunther, A. M. N. H. Nos. 31409, 31413, 31404, 31408, 31412. Pattern variation.



1

2

3

