The reptiles of China : turtles, crocodilians, snakes, lizards

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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.

Material examined:—I have seen, among others, specimens from the following localities: Chayuan, Tunglu, Fenshui and Fuyang, four Chekiang localities, in the Museum of Comparative Zoölogy; 1 example from Hwangtsaopa, Kweichow, and 1 from the Szechwan-Yunnan border region south of Süchow, in the U. S. National Museum.

Remarks:—Sowerby (1926, l.c.) has given a good general account of *lateralis*, but three of his statements require comment:

1. It would be very gratifying to have definite proof that as many kinds of animals as those named actually fall victim to *lateralis*.

2. Sowerby believes that *lateralis* does not occur below 2000 feet in northern China, but its presence at Peiping (Boring, Liu and Chou, 1932, p. 59, and Tchang, 1932, p. 6) certainly refutes this belief.

3. I can find no evidence that this snake "attains a length of 5 ft. and more." The largest individual among sixty-four in the American Museum is from Maitaichao and measures 998 mm. in total length, while the maximum length listed by Emelianov (1929, p. 22) is 1090, that by Maki (1931, p. 47) 991, and by Chang (1932, l.c.) 1031 mm. In short, among one hundred and eighteen measured individuals none exceeds 43 inches in total length. It would be much safer to give the length as three feet with three and a half as the maximum. It is interesting to note that Maki (1931, p. 43) states 1055 mm. to be the length of the largest *tigrina tigrina* in the Kyoto Museum.

Genus **Pseudoxenodon** Boulenger

Pseudoxenodon Boulenger, 1890, Fauna Brit. India, p. 340 (type, *P. macrops*).

All the valid forms of this genus except *stejnegeri* of Formosa, *jacobsoni* of Sumatra, and *inornatus* of Java, are included in the present work, so certainly southeastern China is the center of distribution, if not the point of origin, of the genus.

Although the relationship of *Pseudoxenodon* is obviously with *Natrix*, species of the former are distinguished from those of the latter not only by oblique scales but a characteristic type of hemipenis, specialization of feeding habits and defensive behavior as well. It must, nevertheless, be admitted that a more complete comparison of the two genera will tend to eliminate these differences and prove that a sharp line of demarcation cannot be drawn. *P. fruhstorferi* Werner, from Siam, is considered by Dr. Smith to be a synonym of *N. nigrocincta* (an opinion with which Werner, 1929, p. 29, concurs), and even

though no objection to this can be raised, examination of the type of *fruhstorferi* shows that Werner had some reasons for placing it in *Pseudoxenodon* which its somewhat oblique scales strongly suggest. It should not be forgotten that specimens of *P. macrops* from Yunnan have been more than once within the last twelve years identified as a species of *Natrix*. These facts serve to illustrate the difficulty of sharply separating *Pseudoxenodon* and *Natrix* and suggest that further comparisons are needed.

The halves of the bifurcate *Pseudoxenodon* hemipenis are of unequal length, apparently a condition resulting from the complex distal structure of the organ.

Obvious Recognition Characters for Chinese Species

Scales keeled, oblique anteriorly, in 17 or 19 rows at midbody, 15 before the vent; last two maxillary teeth greatly enlarged.

A word of warning in regard to the number of scale rows at midbody is necessary for this genus because a reduction often takes place about midway between head and vent and therefore two midbody counts might easily be secured for the same specimen by different counters.

Key for Identification of Chinese Species

I. Light brownish gray above, body and tail crossed by 15 to 24 conspicuous, black or black and gray bands, the first of which sends a narrow black stripe forward along the neck to the parietals where it joins its fellow of the opposite side..... *bambusicola*, p. 140

II. No conspicuous black cross-bands above; no black stripe extending along the neck to join its fellow on the parietals

A. A narrow, middorsal, grayish stripe bordered with black present on the tail and persisting a variable distance anterior to the vent..... *striaticaudatus*, p. 156
dorsalis, p. 143

B. No black-bordered, grayish stripe present on tail

1. Snout crossed immediately anterior to the eyes by a black band..... *fukienensis*, p. 145

2. Snout not crossed by a black band

a. Maxillary teeth 19-22; pattern more or less infused with yellow; a black nuchal spot pointed anteriorly, forked posteriorly, usually evident throughout life..... *macrops*, p. 151

b. Maxillary teeth 26-27; pattern devoid of yellow; a black, anteriorly pointed, posteriorly forked nuchal spot evident only in the young.... *karlschmidti*, p. 147

25. **Pseudoxenodon bambusicola** Vogt

Figure 32

Pseudoxenodon bambusicola Vogt, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 138.—Mell, 1922, p. 118 (type locality, mountains [of northern Kwangtung] at the Hunan-Kiangsi boundary, 600-900 meters).

—Werner, 1926, Zool. Anz., LXVII, p. 144 (*bambusicola* and *melli* considered as male and female, respectively, of a single species).

Pseudoxenodon melli Mell, 1922, l.c., Pl. IV (type locality, Lungtou, northern Kwangtung, 600 meters or over). —Vogt, 1922, p. 139 (original description of type).—Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202 (Namkao, Hainan, 300 meters).

Pseudoxenodon dorsalis melli Mell, 1930, Sitzber. Ges. Naturf. Freunde Berlin, p. 320 (Kwangsi).—Fan, 1931, Bull. Dept. Biol. Col. Sci. Sun Yatsen Univ., No. 11, p. 69 (Lohsiang, Kwangsi).

Pseudoxenodon dorsalis bambusicola Mell, 1931, Lingnan Sci. Journ., VIII, p. 205.

Description:—Upper labials 8; preoculars single; postoculars 3, rarely 2; anterior temporals 2, rarely 1; posterior temporals 2, rarely 1; scales keeled, oblique, in 19, very rarely 17 rows on the neck, 17 at midbody, and 15, very rarely 13 before the vent; ventrals in males 131-133, females 139-142; subcaudals in males 50-52, females 42-46; total length of males 340+78, 337+76, and 227+49, females 530+94, 339+59, 323+55, 264+47, and 148+26 mm.; elements of color pattern more vividly contrasted in males; dorsal bands on body and tail 15-24. (Description based on eight specimens from Fukien.)

Table XI gives the maxillary counts of three specimens in the American Museum.

TABLE XI. MAXILLARY COUNTS OF *PSEUDOXENODON BAMBUSICOLA* FROM FUKIEN

Locality	*Right Side*	*Left Side*	*Interval*	*Amer. Mus. No.*
Yenping.....	20 + 2	22 + 2	very small	33407
Yenping.....	23 + 2	22 + 2	very small	35143
Futsing Hsien.....	23 + 2	22 + 2	very small	34098

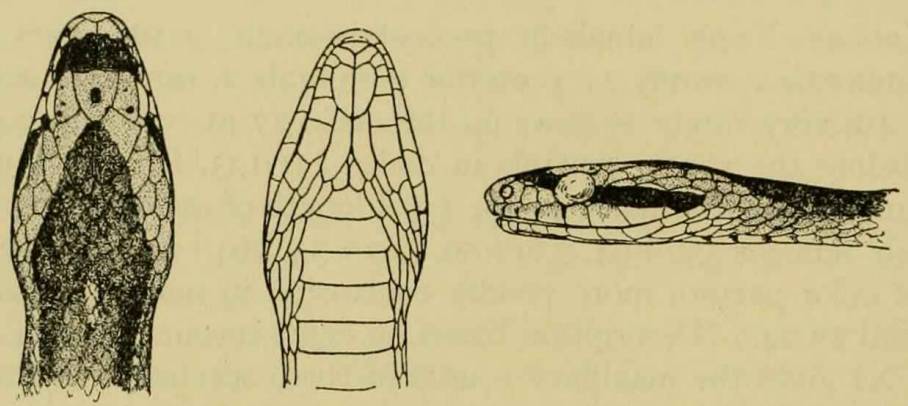
The confusion caused by Mell in treating the more uniformly colored males as *bambusicola* and the "contrasty" females as *melli* is so great that one is not surprised to find Fan (1931, p. 69) dividing a series of twenty Lohsiang "*melli*" into eleven "males" (ventrals 133-143, subcaudals 52-60) and two "females" (ventrals 138-140, subcaudals 47-52)! Schmidt (1927, p. 439, fig. 16) did not help matters by describing and figuring a "contrasty" specimen from Hainan as a "male" under the name of *melli*. This specimen has 52 subcaudals. Smith's (1923, p. 202) Hainan example has 141 ventrals and 47 subcaudals. It is also a female.

I was fortunately able to settle this whole matter to Mell's satisfaction in Berlin where he kindly showed me ten specimens collected by himself, including the types of both *melli* and *bambusicola*. These divided into two lots, six relatively uniformly colored and four "contrasty" individuals, the former all males, the latter females. It is not necessary to give additional details.

A translation of the original description of the type, a male, follows:

The rostral is visible from above. The nostril lies in the middle of the large nasal. It is

separated from the internasals by a narrow suture. The prefrontals are longer than the internasals, which are strongly narrowed toward the front. The frontal is a little longer than broad and somewhat shorter than the distance from the tip of the snout. The parietals are one and a half times as long as the frontal. The heighth and breadth of the loreal, which becomes narrower above, are equal. One pre-, 2 postoculars, 2 + 3 temporals are present. Of the 8 supralabials the 4th and 5th enter the eye. Four sublabials are in contact with the anterior



a b c

FIG. 32. *Pseudoxenodon bambusicola.* Nat. size. a. Dorsal view of head. b. Ventral view of head. c. Lateral view of head. A.M.N.H. No. 27753 from the mountains south of Nodoa, Hainan.

chin-shields, which are somewhat shorter than the posterior. The scales are disposed obliquely and weakly keeled; the outer row is smooth. Anteriorly 19, at the middle 17 and near the vent 15 scale rows are present. Ventrals 132, subcaudals 56, anal divided.

The color (alc.) is yellow-brown above, with isolated, indistinct, oblique transverse spots separated by wide interspaces. One small animal has no transverse spots. The tail has a light vertebral line and a light line on each side at the edge of the subcaudals. The characteristic ∧-shaped brown head design begins with the point on the frontal. Its branches are joined by two similarly colored parallel nuchal stripes equalling one and a half head-lengths. The internasals and prefrontals are brown. From the latter a brown stripe, interrupted by the eye, extends to the angle of the mouth. Labials yellowish white without dark margins. The ventral surface is yellowish white with isolated, brown transverse spots. Below the tail is thickly dusted with brown dots. Total length 51 cm., tail 10.5 cm.

The hemipenis is very long and deeply forked. To well beyond the point of forking, it is beset with small, slender, spine-shaped processes, barely if at all stiffened. These processes give way abruptly to a compact group of long spines, which gradually decrease in length, soon merging into calyces with spine-like scallops. The calyces in turn decrease in size, finally becoming minute. The sulcus bifurcates some distance proximal to the forking of the organ and ends in a longitudinal ridge at its tip. The sulcus lips are raised and beset with spine-shaped processes proximally, spines in the spinous region, and calyces in the calyculate area. The groups of large spines distal to the point of forking give each undissected branch of the hemipenis a bulbous appearance, and these enlarged ends do not lie exactly opposite, one being

considerably in advance of the other. (Description based on a specimen from Yenping.)

Distribution:—*P. bambusicola* is known only from the following localities:

Kwangtung: Wanszushan and Lungtou.
Hainan: Namkao and the mountains south of Nodoa.
Kwangsi: Lohsiang.
Fukien: Futsing Hsien and Yenping.

Habits and Habitat:—Mell (1922, p. 118) found this snake between 600 and 900 meters above sea-level in forests of northern Kwangtung, but it occurs at much lower altitudes in Futsing Hsien, and Smith (1923, l.c.) collected it at 300 meters on Hainan. It is an inhabitant of wooded mountains and seems to be most commonly found in bamboo groves, though this is probably to be explained by the fact that such groves in southern China are frequently kept free of undergrowth, and snakes are consequently easily seen in them. It does not occur in the Kuatun mountains where its place is taken by *P. striaticaudatus*, *karlschmidti* and *fukienensis*.

Mell (1922, l.c.) records finding frogs and lizards (*Lygosoma*) in stomachs of *bambusicola*.

I described its behavior as follows (1929, p. 404):

In handling four of these snakes I detected the following behavior: flattening of neck and part of body; inflation of same; opening of mouth half-way; drawing up or curling of lips; vibrating tail; and an apparent simulation of death by turning on back and lying motionless for some minutes. Only one specimen showed this last behavior but it "played possum" repeatedly. However, when turned on its belly it would not immediately reverse itself as some examples of the genus *Heterodon* will do. Two specimens curled the lips upward but only one vibrated the tail. None could actually be made to bite in spite of the threatening attitude, with mouth partly open.

Material examined:—I have seen the following specimens: 8 from Fukien, 1 from Hainan and 1 from an unknown locality, in the American Museum; 1 from Kwangtung (Mell collection), in the British Museum; 10 from Kwangtung (Mell collection), in the Berlin Museum; 1 from Kwangtung (Mell collection) and 1 from Lohsiang, in the Museum of Comparative Zoölogy; and 1 from Lohsiang, in the U. S. National Museum.

26. **Pseudoxenodon dorsalis** (Guenther)

Xenodon macrophthalmus Guenther, 1858, Cat. Colubr. Snakes Brit. Mus., p. 58 (part: Chekiang).
Tropidonotus dorsalis Guenther, 1864, Rept. Brit. India, p. 263 (type locality, Chekiang).
Pseudoxenodon dorsalis Boulenger, 1893, Cat. Snakes Brit. Mus., I, p. 271, Pl. XVII.

Description:—The original description of the only specimen known, a female, follows:

Head, trunk, and tail of moderate length; eye large. Scales in seventeen rows, much

imbricate, those on the neck and anterior part of the trunk disposed in very oblique rows. Ventrals 143; subcaudals 52. Anterior frontals obtusely rounded in front, more than half as large as posterior. Vertical five-sided, with the lateral margins longest and convergent, and with an obtuse hinder angle. Occipitals not twice as large as vertical. One præocular, just reaching to the upper surface of the crown; three postoculars (two of which are confluent into one on one side of the specimen). Loreal subtriangular, higher than long; eight upper labials, the fourth and fifth entering the orbit, the seventh the largest. Temporals rather irregular, two being in contact with the postoculars. Two pairs of chin-shields, the posterior of which are divergent behind, and rather longer than the anterior, which are in contact with four labials. Each maxillary is armed with twenty small teeth, the last being much larger than the preceding, from which it is scarcely separated by an interspace. Brownish grey, with a vertebral series of about twenty-five rhombic reddish spots, each occupying about four scales; the spots are confluent posteriorly, and continued on the tail as a reddish, black-edged band. An ill-defined blackish band runs along the edge of the ventral shields. Belly with subquadrangular blackish spots anteriorly, and punctulated with brown posteriorly; an indistinct arrow-shaped blotch on the crown of the head, separated by a reddish streak from a black band running from the eye to the angle of the mouth. Upper labials with a narrow black hinder edge.

Distribution:—The type and only known specimen was collected in Chekiang by Robert Fortune.

Material examined:—I have seen the type in the British Museum.

Remarks:—Before visiting the British Museum I was convinced that *dorsalis* would prove to be very closely allied to some other Chinese form but a direct comparison of the type with other members of the genus convinced me that I was dealing with a distinct species, or merely a hybrid. Although I am loath to explain away puzzling specimens by calling them hybrids, I must admit that, in the present case, this explanation is a tempting one because of the remarkable way in which the type of *dorsalis* combines the characters of typical *karlschmidti* with those of *striaticaudatus*.

The following comparison of the three forms illustrates this point:

1. The type of *dorsalis* has a lineate tail like that of *striaticaudatus* but dorsal blotches like those of *karlschmidti*.

2. The side of the head of *dorsalis* has a distinct, black, postorbital stripe like juvenile *striaticaudatus*.

3. The head of the type suggests *karlschmidti* in its large eye, deep snout, and general proportions, while its frontal, prefrontals and internasals are decidedly like those of *striaticaudatus*.

4. The ventral and subcaudal counts rather align it with *striaticaudatus* but there is really little choice in these characters.

Rather than attempt to solve prematurely a difficult problem, I am merely assigning *dorsalis* to an isolated place in the genus until additional material from Chekiang becomes available. I am convinced that more new forms await discovery in China, so there is no harm in postponing a final analysis of the

genus. The suggestion that *dorsalis* may be a hybrid is only a remote possibility and should not be taken too seriously.

Mell (1931, p. 205) has attempted to reduce *bambusicola* and *striaticaudatus* to the rank of subspecies of *dorsalis*, but, until *dorsalis* is more thoroughly understood, such a procedure is of course unwise. Moreover, *bambusicola* and *striaticaudatus* can never be treated as subspecies of the same form because they are more distinct than most species commonly recognized as such by herpetologists.

It is impossible to say just where Werner's (1909, p. 214) two specimens of "*dorsalis*" belong. The question is of little importance anyway because one of them is from an unknown locality, while Canton is given as the origin of the other. This is doubtless a "blanket" locality.

27. **Pseudoxenodon fukienensis** Pope

Figure 33

Pseudoxenodon fukienensis Pope, 1928, Amer. Mus. Novitates, No. 320, p. 2 (type locality, Chungan Hsien, Fukien); 1929, Bull. Amer. Mus. Nat. Hist., LVIII, p. 407, fig. 5 (amplified description).
Pseudoxenodon (sinensis?) fukienensis Mell, 1931, Lingnan Sci. Journ., VIII, p. 204.

Description:—Upper labials 8, very rarely 7; preoculars single; postoculars 3, rarely 4; anterior temporals 2; posterior temporals 2, rarely 3; scales keeled, oblique, in 19 rows on the neck, 17 near midbody and 15 before the vent; ventrals in males 137-143, females 147-148; subcaudals in males 61-65, females 54-57; middorsal light spots 25-29+11-16. (Description based on the fourteen paratypes.)

The three largest among the twelve known males measure 493+152, 480+132 and 478+138 (type), the only known females 535+125, 502+120 and 182+44 mm.

Table XII gives the maxillary counts of the type and two paratypes.

TABLE XII. MAXILLARY COUNTS OF *PSEUDOXENODON FUKIENENSIS*

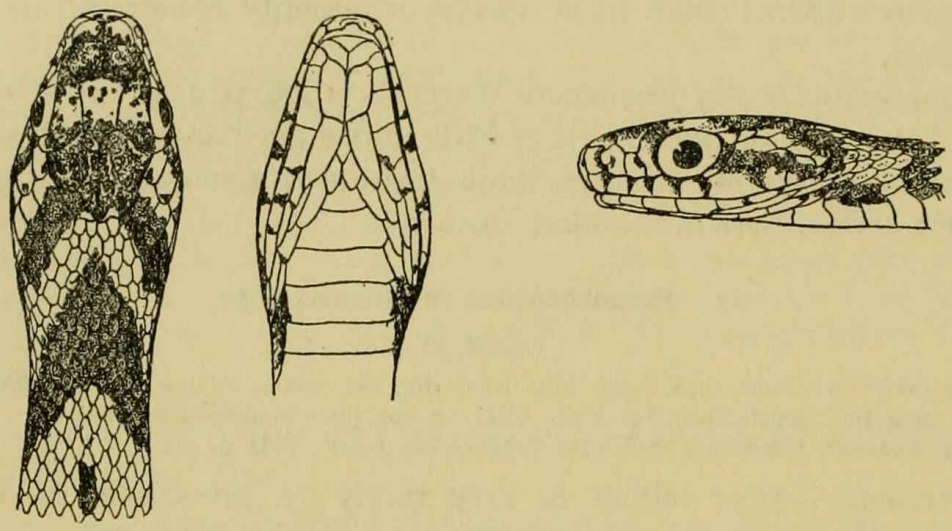
Locality	*Right Side*	*Left Side*	*Interval*	*Amer. Mus. No.*
Chungan Hsien.....	22 + 2	22 + 2	small	type
Chungan Hsien.....	21 + 2	21 + 2	small	34643
Chungan Hsien.....	21 + 2	21 + 2	small	34652

There is no real ontogenetic color change in this species, but the colors of the young are very distinct and noticeably more contrasted than those of the adult.

In the mature males, the keels of the scales in the cloacal region have poorly developed knobs.

The original description of the type, a male, follows:

Rostral broader than deep, just visible from above; internasals shorter than prefrontals; frontal much longer than broad, as long as its distance from end of snout, slightly shorter than parietals, which are as long as their distance from internasals. Loreal deeper than long; preoculars 1-1; postoculars 3-3; both anterior and posterior temporals 2-2; upper labials 8-8, fourth and fifth entering eye. Four pairs of lower labials in contact with anterior chin-shields.



a b c

FIG. 33. *Pseudoxenodon fukienensis.* Type. x 2. a. Dorsal view of head and neck. b. Ventral view of head. c. Lateral view of head.

Scale formula 19-17-15, the reduction from 19 to 15 taking place so abruptly at midbody that the section covered by 17 rows is equal only to width of some 20 ventral plates; at midbody all scale rows keeled. Ventrals 138; anal divided; subcaudals 62; total length 616 mm., 0.22 occupied by tail.

Fundamentally, the dorsal color pattern is strikingly like that of the other Pseudoxenodons, but actually it is distinct because of the different values of the component parts. The rather faint, middorsal light spots, 36 in number, are black-bordered before and behind, and from side to side cover 3 or 4 scale widths, while longitudinally they cover the length of a scale. The lateral black spots fall opposite the central light ones and are about twice as large. There is a purplish tinge to the ground color along the sides that is lacking down the middle of the back. On the tail only the light spots, 15 in number, predominate, for there the rest of the pattern is obscure. The ventrum has the usual dark speckling which is almost lacking on the first score of ventral plates. . . . The speckling is proportionately less concentrated laterally, but the individual spots tend to run together along the base of each plate, and, posteriorly, across the center. The greatest profusion of speckles is reached before the anus, for behind it they are only moderately profuse and almost lacking along the juncture of the divided subcaudal plates. The top of the head is black except for a gray interocular band and a gray temporal stripe irregular in outline extending from the eye to a little above the angle of the mouth. The side of the head between the eye and nasal opening is also gray, as is the rostral plate. At the sutures between each of the first 5 upper labials is a wedge-shaped, black spot directed downward. A postocular stripe, just below the temporal one described above, borders the sixth and crosses the last 2 upper labials, sending a point down-

ward at the suture between the sixth and seventh. There is a very conspicuous V-shaped, black band across the neck whose apex reaches almost to the parietals.

The hemipenis is forked opposite the eleventh subcaudal plate but extends to the sixteenth to seventeenth. The organ is spinous proximally, the spines being small and uniform to the point of forking. They increase in length beyond this point, but are soon supplanted by much larger, thicker ones. These large spines in turn decrease in length very rapidly, soon attaining a marked degree of uniformity. After this, they gradually decrease in size to the tip of the organ. Following the rapid decrease in length, the spines become arranged in more or less connected rows across the hemipenis, suggesting calyces in appearance. The sulcus divides some distance proximal to the point of forking, finally ending in a longitudinal ridge near the tip of the organ. The lips of the sulcus are generally spinous. The groups of large spines distal to the point of forking give each undissected branch of the hemipenis a slightly bulbous appearance, and these enlarged ends do not lie exactly opposite, one being slightly in advance of the other. (Description based on the type.)

Distribution:—*P. fukienensis* is known only from the type locality, in northwestern Fukien.

Habits and Habitat:—This species was found only in the high, forested mountains about Kuatun and Sanchiang where it was not rare (Pope, 1929, p. 409).

Frog remains were found in the stomach of one individual (Pope, 1929, l.c.).

One female held 3 well-developed, elongate eggs, a superficial examination of which failed to reveal embryos, a fact that may be taken as an indication of oviparity. One egg measured 47 x 13 mm. (Pope, 1929, l.c.)

When annoyed, *fukienensis* flattens its neck but makes only feeble attempts to bite (Pope, 1929, l.c.).

Material examined:—The only known specimens, 15 in number, were collected by me for the American Museum.

28. **Pseudoxenodon karlschmidti karlschmidti** Pope

Figure 34

Pseudoxenodon dorsalis Schmidt, 1927, Bull. Amer. Mus. Nat. Hist., LIV, p. 520 (Yenping, Fukien) (not of Guenther, 1864).

Pseudoxenodon karlschmidti Pope, 1928, Amer. Mus. Novitates, No. 320, p. 3 (type locality, Chungan Hsien, Fukien); 1929, Bull. Amer. Mus. Nat. Hist., LVIII, p. 410, figs. 6 and 7 (amplified description).

Description:—Upper labials 8, very rarely 7; preoculars single; postoculars 3; anterior temporals 2; posterior temporals 2, very rarely 3; scales keeled, oblique, in 19 rows on the neck, 17 near midbody, and 15 before the

vent; ventrals in males 144-151, females 149-153; subcaudals in three males 58-60, in three females 54-56; middorsal light spots 20-25+8-10. (Description based on the seven paratypes.)

The measurements of the eight known specimens follow: males, 625+131+, 290+68, 255+60, and 209+47 mm.; females, 653+143 (type), 540+120, 254+54, and 199+44 mm.

Table XIII gives the maxillary counts of the type and two paratypes.

TABLE XIII. MAXILLARY COUNTS OF *PSEUDOXENODON KARLSCHMIDTI KARLSCHMIDTI*

Locality	*Right Side*	*Left Side*	*Interval*	*Amer. Mus. No.*
Chungan Hsien.....	26 + 2	26 + 2	very small	type
Chungan Hsien.....	26 + 2	26 + 2	very small	34659
Chungan Hsien.....	27 + 2	26 + 2	very small or absent	34660

In the mature male, the keels of the scales in the cloacal region have poorly developed knobs.

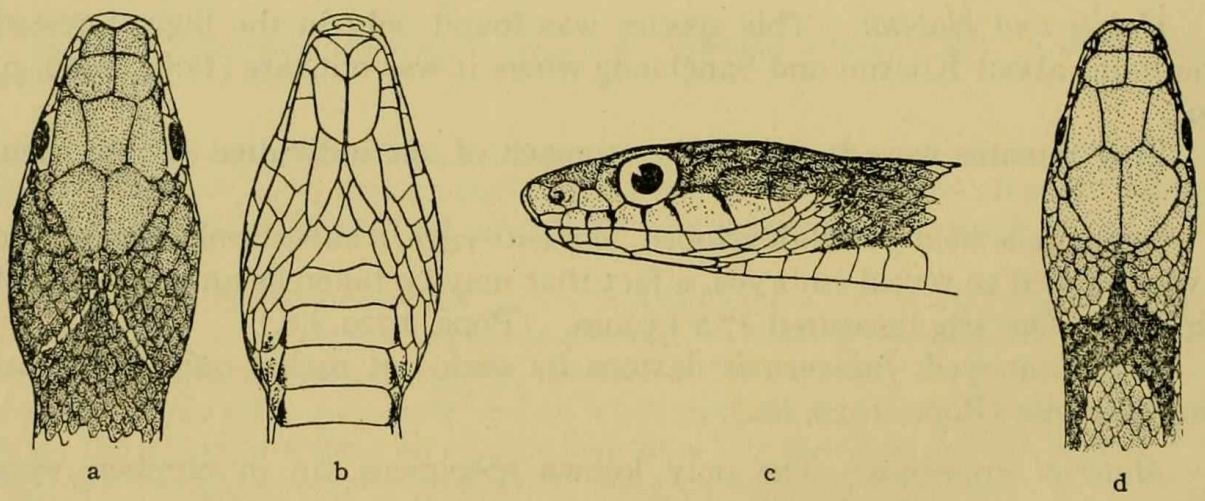


FIG. 34. *Pseudoxenodon karlschmidti karlschmidti.* Type x 2 and paratype x 4. a. Dorsal view of head of type. b. Ventral view of head of type. c. Lateral view of head of type. d. Dorsal view of head of juvenile paratype.

The original description of the type, a female, follows:

Rostral broader than deep, just visible from above; internasals much shorter than prefrontals; frontal much longer than broad, barely as long as its distance from end of snout, just as long as parietals, which are much less than twice as broad in front as behind. Loreal deeper than long; preoculars 1-1; postoculars 3-3; anterior temporals 2-2; posterior 2-3. Upper labials 8-8, fourth and fifth entering orbit; lower labials 9-10; four in contact with anterior chin-shields on one side, 5 on other. Scales reduced from maximum of 19 to minimum of 15 at midbody, consequently, count of 17 extends along a distance equal to width of only some

six ventrals. Ventrals 154; anal divided; subcaudals 56; total length 796 mm., 0.18 taken up by tail.

The ground color of the dorsum is blackish gray. Down the middle of the back are 24 light gray spots. From side to side each spot covers the width of 4 to 6 scales, but longitudinally only the length of one. Some of these spots lie obliquely and all are surrounded by scales part black and part gray. Anteriorly on either side is a very indistinct row of darkish spots made up of black-bordered scales. These darkish spots for the most part alternate with the middorsal spots. The majority of the dorsal scales have minute traces of black. The light, middorsal row of spots extends on to the tail where there are 5 distinct and 2 indistinct ones. There the black borders are very indistinct. Beginning about 20 plates from the chin-shields, the ventrals are speckled with black more and more profusely toward the tail under which the speckling is so profuse that the subcaudals appear black. Laterally the speckles are concentrated along the tips of the ventrals to form a line, while in general they are gathered along the bases of the scales. The tips of even the first 20 plates are black. The ventral surface of the head is immaculate. The temporal region is darker than the dorsal surface of the head but there is no distinct postocular band. All but the last 2 upper labials on either side are narrowly bordered with black behind.

This species has a juvenile color pattern generally more vivid than and somewhat distinct from that of the adult. In the juvenile, the black bars at either end of the light middorsal spots are very evident and the top of the head is reddish brown instead of blackish gray as in the adult. On the neck there is a strong, black spot with a point projecting forward to the tips of the parietals, and a lateral posterior projection on either side of the neck. This blotch is entirely lacking in the larger adult. (Pope, 1929, p. 411.)

Unfortunately, the hemipenis of this form cannot be described in detail because it is badly damaged in the only adult male. The organ belongs, however, to the same general type as that of *striaticaudatus*, differing, nevertheless, in some minor, and two major details as follows:

1. The spines of the group beginning just distal to the point of forking are much more slender in *karlschmidti* than in *striaticaudatus*.

2. In *karlschmidti*, the region proximal to the point of forking is beset with relatively few, short, papilla-like processes, only the more distal of which are tipped by minute spines, one spine to each process. This region in *striaticaudatus* bears very numerous, small spines.

Distribution:—This form is known only from the type locality and Yenping, both in Fukien.

Habits and Habitat:—P. karlschmidti karlschmidti was collected by me only in the high, forested mountains about Kuatun and Sanchiang. Caldwell probably secured his specimen in the Yenping mountains.

Remains of frogs were found in the stomachs of two Chungan Hsien specimens.

Material examined:—I have seen the type, 6 paratypes and a Yenping specimen, all in the American Museum. The latter was erroneously considered a paratype by me in 1929 (l.c.).

29. **Pseudoxenodon karlschmidti sinii** Fan

Pseudoxenodon macrops Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 117 (600-1000 meters at the following Kwangtung localities: Lofaoshan; Lungtou; Chayuanshan; Wanszushan; Chiufeng) (not of Blyth, 1854).

Tropidonotus tigrinus niger Vogt, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 138 (part).

Pseudoxenodon sinii Fan, May 1931, Bull. Dept. Biol. Col. Sci. Sun Yatsen Univ., No. 11, p. 72, fig. 3 (type locality, Lohsiang, Kwangsi).

Pseudoxenodon angusticeps sikiangensis Mell, July 1931, Lingnan Sci. Journ., VIII, p. 204 (type locality, Kwangtung).

Description:—The present form differs from the typical one chiefly in ventral and subcaudal counts as shown by the following figures for Fan's (1931, pp. 74 and 75) Yaoshan specimens: ventrals in males 157-162, females 154-158; subcaudals in males 67-70, females 64-66. Mell's counts for *sikiangensis* (ventrals 153-159; subcaudals 56-65) reduce the gap somewhat, a fact not surprising in view of the geographical relationship of Kwangtung to Kwangsi and Fukien.

The maxillary teeth of Mell's Chiufeng juvenile are not easily counted but there appear to be 26 or 27+2 on one, 25 or 26+2 on the other side.

The original description of the type, a male, follows:

Rostral broader than deep, visible from above; internasals five sixths as long as and broadly in contact with the prefrontals; the latter also touching postnasal, loreal, preocular, supraocular and frontal; frontal longer than broad, longer than the internasal and interprefrontal sutures together, as long as interparietal suture; parietals very narrow behind, much less than half [as] wide [as] in front. Nasal divided; nostrils round, on posterior portion of anterior nasal; loreal higher than long; preocular 1-1; postoculars 3-3; temporals 2 + 3-2 + 3; supralabials 8-8, fourth and fifth entering eye; lower labials 10-10, first five in contact with the anterior pair of chin-shields, which is shorter than the posterior pair. Scales in 21-19-17-15 rows, all keeled except the outmost row; 162 ventrals; anal divided; subcaudals 66 pairs.

In formalin, general colour is dark bluish gray above, bluish white below, speckled with dark seal brown on the posterior [part]. Upper head bluish olive, labial region pale 'flesh colour.' An oblique whitish line directed downward and backward on either side of the nape. 22 roundish light bluish gray spots along the mid-dorsal line on back and 9 on tail. Each spot covers two or three scale lengths long and four to seven scale rows wide; bordered by indistinct dark bands before and behind. The bordering being totally wanting on tail. A lateral series of more or less indistinct dark olive brown spots on either side of the body just below the mid-dorsal spots; alternating with these is still another series of more faint spots, which are only traceable on anterior body. Front third of the trunk with ventrals marked by squarish dark chocolate brown spots. Ventrals all densely powdered with dark purplish brown on their angles, forming a well-defined lateral line. Total length, 555 mm.; snout to vent, 432; vent to tip of tail, 123.

Fan (1931, p. 73) describes a juvenile male paratype from the type locality as follows:

. . . dusky brown above, darker medially, with 25 bluish white spots across the back. Each spot covers two or three scale lengths long and five to seven scale rows wide, bordered

distinctly by black brown on both ends; the bordering being nearly as broad as the spots themselves, heavier on posterior body, whereas they are accompanied by two alternating series of lateral black spots on both sides; the lateral spots as well as the borderings are totally lost on the tail, where they are only represented by 8 bright median spots. A very distinct inverted U-shaped spot with a pointed apex resting behind the interparietal suture. A slender short black streak on either side of neck accompanying.

Distribution:—This form is known only from the following localities:

Kwangsi: Lohsiang; Kuchen.
Kwangtung: Lofaoshan; Lungtou; Chayuanshan; Wanszushan; Chiufeng.

Habits and Habitat:—Mell (1922, p. 117) gives the vertical range of this subspecies in Kwangtung as 600-1000 meters and records it from forested mountainous country. Fan's material was presumably taken in a similar type of country.

Material examined:—I have seen a juvenile male collected by Mell in extreme northern Kwangtung at Chiufeng, north of Lokchong.

Remarks:—The structure of the hemipenis and the presence of 26 teeth on one maxilla of Mell's Chiufeng example show beyond a doubt that its alliance is with *karlschmidti* and not with *macrops* as believed by Mell. There are other characters that substantiate this conclusion. Moreover, Fan (1931, p. 72) remarks on the similarity of the pattern of his Lohsiang material to that of *karlschmidti*.

30. **Pseudoxenodon macrops** (Blyth)

Tropidonotus macrophthalmus Guenther, 1892, in Pratt's Snows of Tibet, p. 241 (Kiating, Szechwan); 1896, Ann. Mus. Zool. Acad. Sci. St. Pétersbourg, I, p. 206 (Tatsienlu, Hsikang).

Pseudoxenodon macrops Mocquard, 1897, Bull. Mus. Hist. Nat., Paris, III, p. 215 (Tseku, Yunnan).—Werner, 1924, Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, p. 46 (between Yungning, Yungpeh and Likiang, Yunnan).—Schmidt, 1927, Bull. Amer. Mus. Nat. Hist., LIV, p. 519 (Tengyueh, Yunnan).—Chang, 1932, Contr. Biol. Lab. Sci. Soc. China, (Zool. Series) VIII, p. 46, fig. 13 (Yenchinghsi, Opien Hsien, Szechwan, 1040 meters).

Pseudoxenodon sinensis Boulenger, 1904, Ann. Mag. Nat. Hist., (7) XIII, p. 134 (part).—Barbour, 1912, Mem. Mus. Comp. Zool., XL, p. 131 (part: Laolingkung, Hsikang, 10,300 feet).—Chang, 1932, Contr. Biol. Lab. Sci. Soc. China, (Zool. Series) VIII, p. 49, fig. 14 (Hungchuangping of Mt. Omei, Szechwan, 1300 meters).

Tropidonotus handeli Werner, 1922, Anz. Akad. Wiss. Wien, LIX, p. 221 (type locality, Likiang, Yunnan); 1924, Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, p. 45 (amplified description).

Tropidonotus tigrinus niger Vogt, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 138 (part).—Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 116 (part: Yunnan).

Tropidonotus tigrinus Vogt, 1924, Zool. Anz., LX, p. 339 (part: Washan, Szechwan); 1927, LXIX, p. 283 (part).

Pseudoxenodon macrops sinensis Stejneger, 1925, Proc. U. S. Nat. Mus., LXVI, Art. 25, p. 76 (Wenchwan, Szechwan).

Natrix handeli Schmidt, 1927, Bull. Amer. Mus. Nat. Hist., LIV, p. 514, fig. 10 (Likiang, Yunnan).

Description:—(See *P. macrops macrops* and *macrops sinensis*.)

In adult males from Szechwan, the keels of the scales in the cloacal region have knobs.

The hemipenis is forked opposite the eleventh subcaudal plate but extends

to the fifteenth to sixteenth. The organ is spinous proximally, the spines being small and nearly uniform in size. These small spines persist to just beyond the point of forking, where they are supplanted by large, very thick ones, each surmounted by a slightly curved, sharp tip. These large spines in turn rapidly decrease in length and increase in number until a certain degree of uniformity is reached. After this, they gradually decrease in size to the tip of the organ. The sulcus divides some distance proximal to the point of forking, finally ending in a longitudinal ridge near the tip of the organ. The lips of the sulcus are generally spinous. The groups of large spines distal to the point of forking give each undissected branch of the hemipenis a slightly bulbous appearance, and these enlarged ends do not lie exactly opposite, one being slightly in advance of the other. (Description based on a specimen from Tengyueh.)

Habits and Habitat:—The stomach of a specimen in the American Museum from Tengyueh contains the remains of a polypedatid frog almost certainly of the genus *Polypedates*.

Material examined:—I have examined the type of *Tropidonotus handeli*, in the Naturhistorisches Museum, Vienna, and that of *Tropidonotus tigrinus niger*, from Yunnan, in the Berlin Museum. Through the generosity of Dr. Stejneger, I was also allowed to study the Szechwan specimens listed in Table XIV and preserved in the U. S. National Museum. Neither of these has been previously recorded in the literature.

TABLE XIV. VENTRAL, SUBCAUDAL AND UPPER LABIAL COUNTS OF *PSEUDOXENODON MACROPS*

U. S. Nat. Mus. No.	*Locality*	*Sex*	*Ventrals*	*Subcaudals*	*Upper Labials*	*Labials Entering Orbit*
76259	Yachow	♂	155	65	7	3-4
76260	Yachow	♂	163	69	8	4-5

Remarks:—The above synonymy refers to records based on material that cannot with absolute certainty be placed under either one of the two subspecies of *macrops*. The difficulty in placing this material is entirely due to lack of sufficient data, not to lack of material and records. Unless the sex, upper labial and ventral counts are given, it is impossible to allocate any particular individual. It is also advantageous to know which labials enter the orbit.

In spite of the fact that many figures are available, it is impossible to get all the necessary data on more than a very few individuals from Szechwan and western Yunnan. If it were not for the surprising sexual difference in ventral counts (Schmidt, 1927, p. 520), there would be no difficulty. I simply cannot

arrive at final conclusions through a study of the literature as it stands today but can only conclude that *macrops sinensis* and *macrops macrops* intergrade in western Yunnan and parts of Szechwan and Hsikang. In order to make the matter as clear as possible and still remain on firm ground, I have given three sets of synonymy which not only summarize the literature but give the localities from which *macrops* has been recorded in China.

It is only fair to remark, however, that the actual sexual difference in ventral counts referred to just above is not as great as indicated by Schmidt's figures. This fact is proved by four Yunnanfu males in the Museum of Comparative Zoölogy with 145, 147, 148 and 152 ventrals.

31. **Pseudoxenodon macrops macrops** (Blyth)

Tropidonotus macrops Blyth, 1854, Journ. Asiat. Soc. Bengal, XXIII, p. 296 (type locality, Darjeeling, Bengal).
Tropidonotus angusticeps Blyth, 1854, Journ. Asiat. Soc. Bengal, XXIII, p. 295 (type localities given as Assam and Arakan, but later restricted to Arakan by Sclater because of inclusion of two species).
Xenodon macrophthalmus Guenther, 1858, Cat. Colubr. Snakes Brit. Mus., p. 58 (part: all but Chekiang).
Tropidonotus macrophthalmus Guenther, 1864, Rept. Brit. India, p. 262, Pl. XXII.
Tropidonotus Sikkimensis Anderson, 1871, Journ. Asiat. Soc. Bengal, XL, pt. 2, p. 17 (type locality, Darjeeling, Bengal).
Pseudoxenodon macrops Boulenger, 1890, Fauna Brit. India, p. 340.—Stejneger, 1925, Proc. U. S. Nat. Mus., LXVI, Art. 25, p. 74 (fifty miles west of Tatsienlu, Hsikang).

Description:—The typical form of *macrops* has a decidedly higher ventral count than *sinensis*. There are 8 upper labials, the 4th and 5th entering the orbit, in *macrops macrops*, while in *sinensis*, they are reduced to 7, with the 3rd and 4th touching the eye.

Among fifty-seven specimens from the Darjeeling region, the largest individual, a male, measured 1283 mm. in total length (Wall, 1909, p. 341). In this same reference, Wall describes the variation in color exhibited by his large series from this region.

The original description, apparently based on three specimens, follows:

Eye very large; the vertical shield broad, and posterior frontals twice as large as the anterior. Prevailing hue of the upper-parts a dull vinaceous, many of the scales margined with black, and some with yellow: a series of yellow spots (about 50 in number) continued along the spine to the extremity of the tail, with a row of black spots on either side. Head and neck plumbeous, diverging on the nape where the first of the series of yellow spots is placed; a slight whitish V-like mark on occiput. Lower parts yellowish-white, with specks and powdering of dusky; more prevalent towards and upon the tail. Seventeen ranges of scales: scutæ 164-6; scutellæ 130-46 pairs. Length of largest specimen 31 in., of which tail 6¼ in. Two specimens closely resemble, but a third presents some differences of colour. The row of yellow spots is wanting along the spine, also the dark band on the nape, and the pale V-like occipital mark: the under-parts also are more uniformly whitish. Scutæ 168; scutellæ 124 pairs only.

Blyth's counts for "scutellæ" must refer to the total number of *halves* of subcaudals, i.e., twice the number of subcaudals as normally counted.

Distribution:—*P. macrops macrops* is distributed from Nepal eastward through Assam. From Assam it ranges southward to the Southern Shan States and Tenasserim. It has also been found at Ngoi-Tio, northern Tongking. Although, as discussed elsewhere, its distribution in Yunnan and that part of western China lying north of Yunnan is not clearly understood, this subspecies is known to occur in eastern Hsikang and may be expected in southern Yunnan as well.

Habits and Habitat:—Annandale (1912, pp. 49 and 53) states that this snake is of common occurrence in the Darjeeling district up to 5000 feet. Wall (1909, pp. 337 and 341) confirms this statement but indicates that *macrops* is not rare up to approximately 6000 feet in this same region.

Wall (1909, p. 341) records finding a frog in the stomach of a specimen from the Darjeeling district and I have found the same in another Darjeeling example.

Venning (1911, p. 772) reports a gravid female taken in the Chin Hills May 20. It held 6 eggs in which the embryos were undeveloped, the largest egg measuring 12.6 x 38.1 mm.

The behavior of a captive specimen is described by Wall (1909, l.c.) as follows:

> One brought to me by Dr. Seal had been encountered in his garden, and when disturbed struck fiercely at him with erect, and flattened neck. The degree to which this snake flattens its neck is very marked, being more pronounced, I think, than in any of the *Tropidonoti* with which I am acquainted.

32. **Pseudoxenodon macrops sinensis** Boulenger

Figure 35

Pseudoxenodon sinensis Boulenger, 1904, Ann. Mag. Nat. Hist., (7) XIII, p. 134 (type locality, Yunnanfu) (? part).—Barbour, 1912, Mem. Mus. Comp. Zool., XL, p. 131 (part: Yunnanfu).—Schmidt, 1927, Bull. Amer. Mus. Nat. Hist., LIV, p. 520 (twenty-two specimens recorded from near Yunnanfu but one of these, No. 17401, was actually collected "six days north" of that city).—Pope, 1929, Bull. Amer. Mus. Nat. Hist., LVIII, p. 413, fig. 8 (Hsinkai, Yunnan).

Description:—Upper labials 7, scarcely ever 8, normally 3rd and 4th to eye; preoculars single; postoculars 3; anterior temporals 2; posterior temporals 2 or 3, rarely 1; scales keeled, oblique, in 19 rows at midbody, 15 before the vent; ventrals in eight males 138-146, in fourteen females 149-162; subcaudals in seven males 60-68, in fourteen females 57-66. Color extremely variable but usually much like that of juvenile *karlschmidti karlschmidti;* occasional melanistic specimens so dark that only the light middorsal spots remain obvious and even these may almost disappear. (Description based on twenty-one specimens from near Yunnanfu, the type locality, and one from "six days north" of this city.)

Eight upper labials do not occur a single time among nine additional

specimens from Yunnanfu examined by me, five in the Museum of Comparative Zoölogy, and four in the British Museum. In spite of the numerous puzzling specimens found in Szechwan and western Yunnan, as discussed elsewhere, the counts just given prove beyond any doubt the existence of a pure culture of *sinensis* in eastern Yunnan.

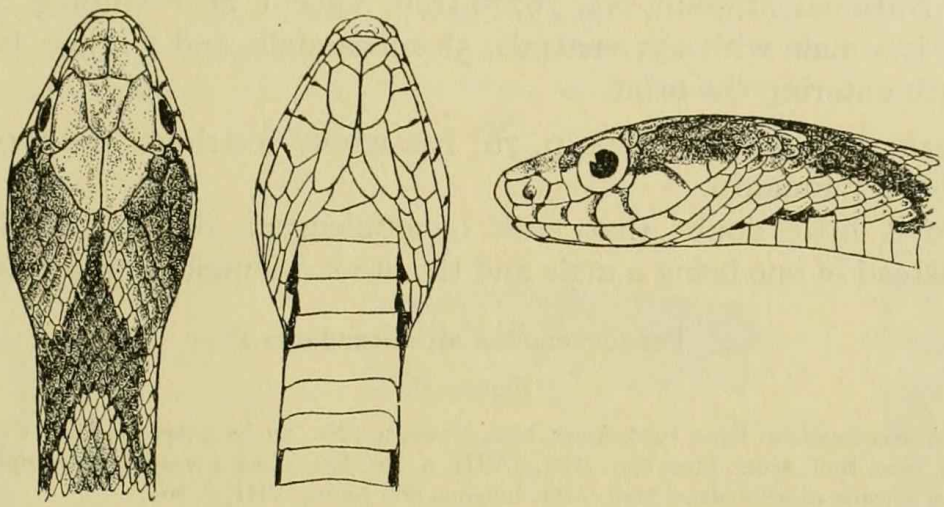


FIG. 35. *Pseudoxenodon macrops sinensis.* x 2. a. Dorsal view of head. b. Ventral view of head. c. Lateral view of head. A.M.N.H. No. 12791 from near Yunnanfu.

Table XV gives the maxillary counts of two specimens in the American Museum.

TABLE XV. MAXILLARY COUNTS OF *PSEUDOXENODON MACROPS SINENSIS* FROM YUNNAN

Locality	*Right Side*	*Left Side*	*Interval*	*Amer. Mus. No.*
near Yunnanfu.....	21 + 2	22 + 2	very small	12791
near Yunnanfu.....	19 + 2	19 + 2	not appreciable	17401

Distribution:—Yunnanfu may be taken as the center of the range of *sinensis.* Material from Tungchwan is also quite typical. Its range undoubtedly extends northward into Szechwan and westward in Yunnan but, as yet, cannot be defined with accuracy. It is a safe guess that *sinensis* occurs chiefly on the Yunnan plateau.

Habits and Habitat:—The presence of *P. macrops sinensis* on the Yunnan plateau is indication of its preference for altitudes approximating 6000 feet.

The stomach of one Yunnanfu specimen in the American Museum contains the remains of a tree toad (*Hyla*), that of another, from the same locality, the legs of a brevicipitid toad.

Mell (1929, pp. 252, 256 and 257) includes *sinensis* among the snakes that, when annoyed, bring bright colors into sudden view by rearing and flattening horizontally the anterior part of the body.

Material examined:—I have seen, in addition to others, the 2 Yunnanfu specimens upon which Boulenger, in part, based his original description.

U. S. National Museum No. 79720 from Yaochi, near Muping, Szechwan, 8600 feet, is a male with 133 ventrals, 58 subcaudals, and 7 upper labials, the 3rd and 4th entering the orbit.

Remarks:—Stejneger (1925, p. 76) has wisely restricted the type locality of *sinensis* to Yunnanfu.

There is little doubt that both of Boulenger's original specimens are female, instead of one being a male and the other a female, as recorded by him.

33. **Pseudoxenodon striaticaudatus** Pope

Figure 36

Pseudoxenodon striaticaudatus Pope, 1928, Amer. Mus. Novitates, No. 320, p. 4 (type locality, Chungan Hsien, Fukien); 1929, Bull. Amer. Mus. Nat. Hist., LVIII, p. 405, figs. 3 and 4 (amplified description).
Pseudoxenodon dorsalis striaticaudatus Mell, 1931, Lingnan Sci. Journ., VIII, p. 205.

Description:—Upper labials 8, occasionally 7; preoculars 1, rarely 2; postoculars 3, very rarely 4; anterior temporals 2, very rarely 1; posterior temporals 2, very rarely 1; scales keeled, oblique, in 19 or 17 rows on the neck, 17 near midbody, and 15 before the vent; ventrals in nine males 140-144, in eleven females 146-153; subcaudals in eight males 59-64, in ten females 52-62. (Description based on the twenty paratypes.)

The four largest among the nine known males measure 676+172, 625+148, 620+162, and 575+151 mm., while the measurements of the four largest of the twelve known females are 635+141 (type), 614+138, 571+142 and 550+131 mm. In this species, the males apparently attain the greater size, a fact worthy of special note. (Pope, 1929, pp. 362 and 406.)

Table XVI gives the maxillary counts of the type and two paratypes.

TABLE XVI. MAXILLARY COUNTS OF *PSEUDOXENODON STRIATICAUDATUS*

Locality	*Right Side*	*Left Side*	*Interval*	*Amer. Mus. No.*
Chungan Hsien.....	23 + 2	23 + 2	small	type
Chungan Hsien.....	22 + 2	22 + 2	small	34674
Chungan Hsien.....	21 + 2	21 + 2	small	34675

In the adult male, the keels of the scales in the cloacal region may or may not have knobs. The knobs at best are very poorly developed.

The original description of the type, a female, follows:

Rostral much broader than deep, just visible from above; internasals slightly shorter than prefrontals; frontal longer than broad, as long as its distance from the rostral, shorter than the parietals which are twice as broad in front as behind. Loreal deeper than long; preoculars 1-1; postoculars 3-3; both anterior and posterior temporals 2-2. Upper labials 8-8, fourth and fifth entering eye; lower labials 9-10, four in contact with anterior chin-shields on one side, 5 on the other. Nineteen rows of scales on neck, 17 from neck to midbody, 15 from middle of body to anus; at midbody all but 3 rows on either side feebly keeled. Ventrals 148; anal divided; subcaudals 55. Total length 776 mm., tail 0.18 of total.

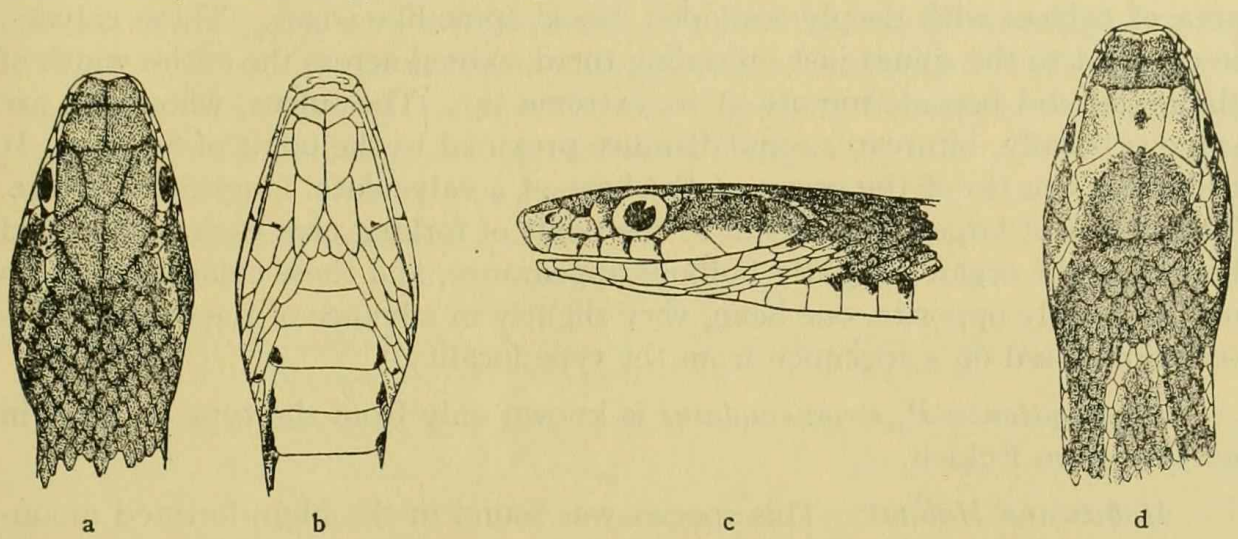


FIG. 36. *Pseudoxenodon striaticaudatus*. Type x 2 and paratype x 4. a. Dorsal view of head of type. b. Ventral view of head of type. c. Lateral view of head of type. d. Dorsal view of head of juvenile paratype.

The dorsum is an obscure, intricate mixture of black and gray, blending on the neck to give a uniformly dark appearance but arranged along the midregion to form indistinct, black-bordered, diamond-shaped spots reaching to the second scale row on either side. Most of the scales not entering this pattern are gray, many others are gray but bordered with black, while a few are entirely black. From a point a tail's length anterior to the anus a black-bordered, middorsal, light gray stripe extends to tip of tail. This is the most conspicuous marking on the dorsum. The light ventrum is profusely spotted with black. The spots run together laterally to form a black band and centrally are most numerous along the anterior edge of each plate. The spots are varied in size and shape and hazy in outline. They are present only on the tips of the first few ventrals. There is a dark line from behind the eye to the angle of the mouth while all but the last 2 upper labials are black-bordered posteriorly. The ventral surface of the head is milky white.

The color pattern is vivid in the juveniles but essentially the same as in the adult, the difference being in the much greater intensity of the black parts of the pattern in the young. In the adult there is a strong tendency for the darker blotches to blend with the gray ground color, each scale losing much of its black. The contrast is greatest on the neck where the young are vividly barred, the adult almost uniformly gray. There is a faint, reddish interocular bar in the smallest examples. Only the upper labial sutures below and anterior

to the eye are black, there being less black on the lip in this species than in *karlschmidti*. (Pope, 1929, p. 407.)

The hemipenis is forked opposite the fourteenth to fifteenth subcaudal plates but extends to the nineteenth. Proximally, it is spinous, the spines being small, uniform in size, and not very stiff. These small spines persist about to the point of forking, beyond which they are soon supplanted by much larger, curved spines, set in a compact mass along both sides of the sulcus, and gradually decreasing in size distally until they, in turn, are supplanted by an area of calyces with deeply scalloped, thick, spine-like edges. These calyces, in contrast to the spines just preceding them, extend across the entire width of the organ and become minute at its extreme tip. The sulcus, whose lips are spinous basally, bifurcates some distance proximal to the point of forking. It ends near the tip of the organ at the base of a calyculate, longitudinal ridge. The groups of large spines distal to the point of forking give each undissected branch of the organ a slightly bulbous appearance, and these enlarged ends do not lie exactly opposite, one being very slightly in advance of the other. (Description based on a specimen from the type locality.)

Distribution:—*P. striaticaudatus* is known only from the type locality, in northwestern Fukien.

Habits and Habitat:—This species was found in the high, forested mountains about Kuatun and Sanchiang where it was not rare.

Material examined:—The only known specimens, 21 in number, were collected by me in Chungan Hsien.

Remarks:—The present species is obviously very closely allied to *stejnegeri* Barbour, 1908, p. 317, described from Mt. Arizan, central Formosa. In fact, when the ventral and subcaudal counts of the two forms are compared regardless of sex, the overlapping is so great that some would unite them, but, when sex is taken into consideration, the difference in ventral counts is marked, as shown by Table XVII.

TABLE XVII. COMPARISON OF VENTRAL AND SUBCAUDAL COUNTS OF *PSEUDOXENODON STRIATICAUDATUS* AND *P. STEJNEGERI*

Species	*Ventrals*		*Subcaudals*	
	♂	♀	♂	♀
striaticaudatus.....	140-144	146-153	59-64	52-62
stejnegeri.....	150-158	157-162	58-74	55-64

The *stejnegeri* counts are based on the type specimen in addition to the

material recorded by Steindachner (1913, pp. 329-330) and Maki (1931, pp. 52-53).

Although Maki has given the most recent account of *stejnegeri*, the data in his description, key and tables, respectively, do not agree and, moreover, it is impossible to tell which specimens the numbers in his first table represent. It is due to these inconsistencies that the comparison of the forms under discussion cannot be carried further.

I believe that only one valid form of *Pseudoxenodon* has been proved to exist on Formosa, *sauteri* Steindachner, 1913, p. 329, being unworthy of recognition. This conclusion was arrived at only after examination of Steindachner's original material in the Naturhistorisches Museum, Vienna, and the type of *stejnegeri* in the Museum of Comparative Zoölogy.

Mell's (1931, p. 205) treatment of the present form as a subspecies of *dorsalis* is discussed under *dorsalis*.

Genus **Helicops** Wagler

Helicops Wagler, 1828, Descr. Icon. Amphib., pt. 1, text to Pl. VII (Col.) (type, *Coluber carinicaudus*).
Atretium Cope, 1861, Proc. Acad. Nat. Sci. Phila., XIII, p. 299 (type, *A. schistosum*).

As now understood, this genus has a wide distribution with one species in Yunnan, one in India and Ceylon, another in Africa, and several in the New World ranging from Mexico southward through Central America into South America. In *schistosus* (Indian) and *bicolor* (African), the penial spines arise from within calyces but such is not the case in either *angulatus*, *leopardinus*, *modestus*, *polylepis* or *trivittatus*, all of the New World. This would indicate that the New World species are possibly not congeneric with those from the Old World, were it not for the fact that also in *yunnanensis* the spines apparently do not arise from within the calyces. As explained below, the cotype of *yunnanensis* examined by me has been so long preserved that the spines have lost their stiffness and it is even conceivable that other details of structure cannot be clearly made out now, and because of this it will be well to await examination of fresh material before drawing final conclusions. It would likewise be well to collate hemipenes of additional New World forms of *Helicops*. In case the African and Asiatic species in question warrant generic separation, the name *Atretium* Cope is applicable to them.

Obvious Recognition Characters for the Chinese Species

Color uniform dark olive-brown above, yellow below.

34. **Helicops yunnanensis** (Anderson)

Figure 37

Atretium schistosum var. *yunnanensis* Anderson, 1879, Zool. Res. W. Yunnan, p. 822 (type localities, Muangla in the Chanta valley, and Husa, Yunnan, 2000 and 4500 feet).
Helicops schistosus Sclater, 1891, List Snakes Ind. Mus., p. 44 (part: Yunnan).