ON A COLLECTION OF REPTILES AND BATRACHIANS FROM THE ISLAND OF HAINAN.

By MALCOLM A. SMITH, F.Z.S.

This collection was made in the months of January, February and early March 1923. It is not a large one and cannot be considered fully representative of the country visited, due I think chiefly to the fact that it was made during the cold, dry months of the year, conditions which militate strongly against the activities of reptilian and batrachian life.

Altogether 49 species were obtained, most of which are already well known. Six of them appear to be new to science.

R. Mell, in a recent article on the reptiles and batrachians of southern China,[1] includes also those species which have been recorded from Hainan. He enumerates – after excluding the marine turtles and sea snakes – 52 species from the island, to which now 21 more can be added, making, after allowing for the suppression of one species, a total of 72. These I have tabulated, grouping them in accordance with their known distribution. In the Indo-Chinese column are placed those forms which are widely distributed over a large part of the Indo-Chinese peninsula, south of Lat. 20°. N; while the Chinese species include those which have been found on the adjacent mainland, chiefly in and around the province of Kwangtung (Canton).

As I have stated already in the narrative (*antea*), the island of Hainan can be divided roughly into a lowland portion and an upland one, and this conformation of the country has a close bearing upon the distribution of the sp cies. The lowland forms are the widely distributed Indo-Chinese ones, while the upland forms belong to the Chinese fauna or are peculiar to the island.

The following species have not yet been recorded from the island :—

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1 Beitrage sur Fauna Sinica – Archiv für Naturgeschichte, 88, Jahrg. 1922, Abt. A, Heft 10, pp. 100 – 146.

LIZARDS.

TACHYDROMUS SEXLINEATUS Daud.

GEKKO SIMILIGNUM, sp. nov.

HEMIDACTYLUS GARNOTI Dum. & Bib.

TROPIDOPHORUS HAINANUS, sp. nov.

SPHENOMORPHUS INDICUS (Gray).

LEIOLOPISMA LATERALE (Say).

SNAKES.

NATRIX PERICARINATA (Blngr.).

PSEUDOXENODON MELLI Vogt.

LYCODON SUBCINCTUS Boie.

ACHALINUS MERIDIANUS, sp. nov.

BOIGA MULTIMACULATA (Boie).

AMBLYCEPHALUS MOELLENDORFFI (Bttgr.).

AMBLYCEPHALUS CARINATUS HAINANUS, subsp. nov.

BATRACHIANS.

OXYGLOSSUS LAEVIS MARTENSI Peters.

RANA KUHLI Dum. and Bib.

„ NASICA Blngr.

„ SPINULOSA, sp. nov.

„ TAIPEHENSIS Van Denburgh.

MICROHYLA ACHATINA (Boie).

„ BUTLERI Blngr.

MICRIXALUS TORRENTIS, sp. nov.

ANALYSIS OF THE SPECIES KNOWN TO INHABIT HAINAN.

	Indo-Chinese species.	Chinese species.	Hainanese species.	Total.
Chelonians ...	1	3	1	5
Lizards ...	9	1	5	15
Snakes ...	17	6	4	27
Batrachians ...	14	8	3	25
Total ...	41	18	13	72

As regards nomenclature I have followed Stejneger in most of the changes introduced by him.

The types of all the new species here described will be presented to the British Museum of Natural History.

The following localities are referred to:—

HOI-HAO, the port of the island, on the straits of Hainan.

KIUNG-CHAO, the capital, distant a few kilometres from Hoi-hao.

THE HUMMOCKS, a volcanic mass of low hills about 25 kilometres from Hoi-hao.

KA-CHEK, an important town in the south-east of the island, about 20 kilometres from the coast.

FIVE FINGER MOUNTAIN, the highest peak of a range of mountains in the south-central part of the island, altitude about 1800 metres, and covered with dense evergreen jungle. The Ka-chek river rises in this range.

TUN-FAO, a small settlement on the Ka-chek river, altitude 150 metres. Open wooded country.

KAP-HAO, the highest navigable point on the Ka-chek river, altitude 200 metres, but with hills all round rising to 600 metres. Thickly wooded country.

TIN-SI, a small Chinese town on the edge of the hilly country leading up to the Five Finger mountain range, altitude 400 metres. Open country.

NAM-KAO, KA-CHAI, ANG-MAO, localities in the neighbourhood of the Five Finger mountain; altitude from 450 to 600 metres. Open mountainous country, interspersed with wooded ravines.

CHELONIANS.

1. OCADIA SINENSIS (Gray).
   3 examples. Hoi-hao.
   The flesh of this fresh-water tortoise is eaten by the Hainanese and the specimens mentioned above were bought in the market. One was kept alive for some time; it fed entirely upon vegetable matter, refusing all animal food. In April it laid 3 eggs; they were perfect ovals about 40 × 25 mm. in size, with the usual hard, calcareous shell.

LIZARDS.

2. HEMIDACTYLUS FRENATUS D. and B.
   Hoi-hao and Ka-chek.

3. HEMIDACTYLUS GARNOTI D. and B.
   1 ♀, from Ang-mao, which I refer to this species.

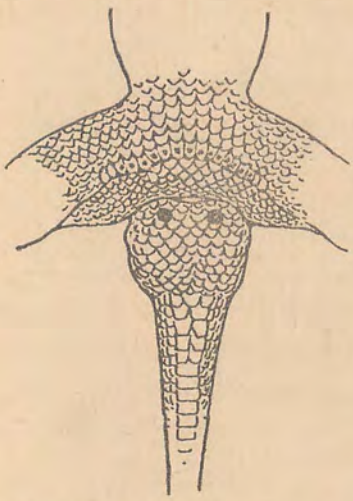
4. GEKKO SIMILIGNUM, sp. nov.

Text fig. 3.

Type male, author's number 7035, collected at Ang-mao, alt. 600 m., near the Five Finger mountain.

Description of the type. Head moderate, oviform, snout rounded. Rostral oblong, twice as broad as high, two internasals above it with a shield interposed between them; nostril bordered by the rostral, first labial, internasal and two small shields. Distance between the eye and the nostril once and a quarter in distance between the eye and the ear opening; diameter of the eye half the distance between the eye and the tip of the snout; ear opening oval, its longest diameter equal to two-fifths the diameter of the eye.

13 and 14 upper and 10 and 11 lower labials; symphysial small, triangular, scarcely projecting between the first pair of chin-



Text fig. 3. *Gekko similignum*, praeanal pores.

shields which are about twice as long as broad; several enlarged scales on either side behind in contact with the lower labials.

Upper surface of head and body covered with small granules, those on the snout largest; back with about 10 irregularly disposed longitudinal rows of enlarged, rounded tubercles. Throat covered with small, round, flat granules, belly with larger, cycloid, imbricate scales.

Fingers one-third webbed, toes a little more, the 4th finger and toe with 12 to 14 undivided lamellae beneath them. 17 praeanal pores in an almost straight line and 3 or 4 rows of enlarged scales anterior to them; no enlarged femoral scales.

Base of tail much swollen with a single large tubercle on either side; then suddenly tapering, flattened transversely but without definite lateral edge; upper surface covered with small, flat, scales and pairs of median tubercles on the basal part; lower surface with larger scales, those of the median row transversely dilated.

Colour. Grey above, speckled with darker, below whitish; tail alternately banded with grey and brown.

A female caught with the type specimen resembles it except for the absence of the praeanal pores.

Gekko similignum is allied to *G. japonicus* (D. and B.), and also to *G. palmatus* Blngr. from Tonkin of which only the female at present is known. The specimens were caught beneath the bark of a fallen tree, and in colouration almost exactly resembled the wood on which they were resting.

Measurements of *G. similignum* in mm.

Number	...	7034	7035
Sex	...	♀	♂
Head and body		57	53
Tail	...	60	65

5. DRACO WHITEHEADI Blngr.

Draco whiteheadi, Blngr., P. Z. S., 1899, p. 956.

1 ♀, immature, from the foot of the Five Finger mountain.

With only one specimen available for examination, and that an immature female, I have placed it under *D. whiteheadi*, although I cannot find any character by which to distinguish it from *D. maculatus* (Gray), a common species throughout Siam and Indo-China.

In the present specimen the snout is as long as the diameter of the orbit, the forelimb reaches the tip of the snout and the hind-limb reaches the axilla. In life the parachute above was dull yellow with indistinct black bars, below yellow with a few large black spots. Inside of wattles with a buff spot. From snout to vent 54 mm., tail 77.

In 36 examples of *D. maculatus* in my collection from Siam and Indo-China I find the snout is shorter than the orbit in 21, equal to it in 14, and longer than it in one. When more specimens of *D. whiteheadi* are available for examination I strongly suspect it will turn out to be a form of *D. maculatus*, differing only in the colour of the gular pouch of the male.

6. CALOTES VERSICOLOR (Daud.).

Specimens from Ka-chek and Tun-fao; 45 – 50 scales round the middle of the body.

7. TACHYDROMUS SEXLINEATUS Daud.
Three specimens were caught in long grass near Tin-si.

8. TROPIDOPHORUS HAINANUS M. A. Smith.
A description of this new species appears in P. Z. S., 1923. (A Review of the Lizards of the Genus Tropidophorus on the Asiatic Mainland).

9. MABUYA MULTIFASCIATA (Kuhl).
6 examples from Hoi-hao, Nam-kao and the foot of the Five Finger mountain.
30 and 32 scales round the body, dorsals strongly tricarinate.

10. SPHENOMORPHUS INDICUS (Gray).
1 example from near the Five Finger mountain.
35 scales round the body; frontal in contact with the first three supraoculars; no postnasal.

11. LEIOLOPISMA LATERALE (Say).
13 examples from Hoi-hao, the "Hummocks," Ka-chek, Tin-si, Ang-mao, Tun-fao and the Five Finger mountain.
The praefrontals are in good contact in 8 examples, not or just touching in 4, well separated in one. 30 and 32 scales round the middle of the body; 2 or 3 very small auricular lobules are present in four of the specimens.

12. EUMECES CHINENSIS (Gray).
1 example from the "Hummocks."
The specimen has 22 scales round the middle of the body. Colour uniform olive brownish above with small reddish blotches along the sides of the neck and upper part of the flanks; below whitish. From snout to vent 93 mm.

SNAKES.

13. TYPHLOPS BRAMINUS (Daud.).
Many examples from Hoi-hao and Ka-chai.

14. ACHALINUS MERIDIANUS, sp. nov.
Type female, unique, author's number 7040, collected at Nam-kao, alt. 300 m., in Jan. 1923.
Description of the type. Maxillary teeth 29. Rostral as broad as high, narrow above, its upper margin pointed and penetrating slightly between the internasals, just visible from above; suture between the internasals nearly twice the length of that between the praefrontals; frontal broader than long, shorter than its distance to

the rostral, half the length of the large parietals, 4 times the breadth of the supraoculars; nostril large, in the anterior of the two nasal shields, the posterior of which is hollowed out; loreal large, longer than high, no prae- and no postocular; temporals 2 + 2, only the upper anterior touching the eye; an elongated shield occupying the postero-lateral border of the parietal. Six supralabials, 1st very small, 6th as long as the 3rd, 4th, and 5th together, 4th and 5th touching the eye. Mental hollowed out, only a broad V-edge remaining; 5 infralabials 4th largest, first three in contact with the 1st pair of chin-shields; two pairs of large chin-shields.

Scales in 23 rows throughout, each with a single strong keel; scales of the outer row considerably larger than the others; ventrals 147, anal single, subcaudals 77.

Greyish brown above, uniform; below yellowish white, the colour extending on to the posterior supralabials.

Four or five species of *Achalinus* have now been defined, all very closely allied to each other. None of them quite agrees with the present new form, which is the most southerly record for the genus.

The dentition of the species which compose this genus appears to be extremely variable, more so in fact than the scales characters which separate them. Boulenger gives the number of maxillary teeth as 22 to 25, Stejneger states 14 to 16 for the Japanese form, while I find about 29 in my specimen.

15. NATRIX STOLATA (Linn.).

Specimens from Hoi-hao and Ka-chek.

Neck and anterior part of body of the Ka-chek specimens orange yellow in life.

16. NATRIX CHRYSARGA (Schleg.).

1 example, Kap-hao.

V. 154; C. 83; 8 supralabials, 4th and 5th touching the eye.

17. NATRIX PISCATOR (Schneid.).

Examples from Hoi-hao and Ka-chek.

18. NATRIX PERICARINATA.

Tropidonotus pericarinatus Blngr., P. Z. S., 1899, p. 163, pl. xvii, fig. 2.

1 ♀, Kap-hao, Ka-chek river.

Previously known from the mountains of N. W. Fokien, S. China. My specimen agrees well with the description; it has two praeoculars on one side, one on the other; 19 scale rows at neck and midbody, reducing to 17 posteriorly, the outer row keeled only on the anterior part of the body; v. 139; c. 79. The colour is as in the type

specimen except that the olive hue of the supralabials does not terminate at the 4th shield, but pales gradually. There are 33 light edged, black bars on either side of the body, those on the tail being scarcely distinct. The specimen has 30 maxillary teeth, the posterior ones being gradually enlarged.

This snake was caught among rocks beside a mountain torrent at 300 metres altitude. *Natrix aequifasciata* Barbour from central Hainan (Proc. New Eng. Club, 1909, iv, p. 66) appears to be closely related to it.

19. PSEUDOXENODON MELLI.

Pseudoxenodon melli Vogt, Archiv für Naturgesch, 1922, 10 heft, p. 139; A. Mell., idem, p. 118, Taf. iv, fig. 3.

1 ♀, Nam-kao, near Tin-si, alt. 300 m.

This very handsome snake has been recently described from the mountains of Kwang-tung (Canton). My specimen agrees well with the description, the only point of difference being the anterior chin-shields, which are as long as the posterior and are in contact with 5 infralabials.

The curiously shaped black mark upon the nape was outlined with yellow in life. There is a well marked line of black spots along the outer side of the ventrals, most distinct anteriorly.

Total length 500 mm., tail 80; ventrals 141; caudals 47.

The maxillary teeth number 25 and 26, the last two being abruptly enlarged but not separated from the others by any interval. The species thus connects *Natrix* with *Pseudoxenodon*, having the dentition of the former but the scale characters of the latter, in which genus it should undoubtedly be placed.

20. LYCODON SUBCINCTUS Boie.

1 example, imm., Ka-chek (No. 7050); presented by Dr. Whelply.

Ventrals 199; caudals 78; 3rd to 5th labials touching the eye. The supraocular and postocular shields are fused together on the right side.

Purplish black above with a white occipital blotch, and 13 white bars on the body and 13 on the tail; below white.

This specimen marks a further extension northwards of the range of the species. Mocquard records it from Indo-China but omits to state the locality.

21. PTYAS KORROS (Schleg.).

1 example, Hoi-hao. Ventrals, 165.

22. PTYAS MUCOSUS (Linn.).

Ka-chek.

23. HOLARCHUS VIOLACEUS (Cantor).

2 ♂, Ka-chek; presented by Dr. Whelply.

Scales 17. 17. 13; ventrals 165; caudals 35.

„ 17. 17. 15; ventrals 164; caudals 42.

Colour light brown above with an indistinct network of narrow cross-bars; head without markings; belly and tail whitish, uniform.

24. BOIGA MULTIMACULATA (Boie).

1 example, Ka-chek; presented by Dr. Whelply.

25. ENHYDRIS PLUMBEA (Boie).

1 ♂, Hoi-hao.

Supralabials, ventrals and outer three rows of scales margined with grey.

26. ENHYDRIS CHINENSIS (Gray).

Hoi-hao, 2 examples.

(7070) ♀. Sc. 23. 23. 19; ventrals 138; caudals 41.

(7069) ♀. Sc. 23. 23. 19; ventrals 140; caudals 40.

7 supralabials; posterior chin shields separated by two scales.

Grey above with small scattered dark spots, which are collected on the nape into a vertebral line. Upper lip, 2nd row of scales and adjacent edges of 1st and 3rd rows yellowish-white (pale rose in life in one example). Ventrals and adjacent edges of 1st row of scales yellowish-white margined with grey.

27. ENHYDRIS BENNETTI (Gray).

Hoi-hao, 3 examples.

(7066) ♀. Sc. 21. 21. 15; ventrals 156; caudals 48.

(7067) ♀. Sc. 21. 21. 15; ventrals 157; caudals 48.

(7068) juv. Sc. 21. 21. 16; ventrals 158; caudals 50.

7 supralabials; posterior chin-shields in contact in one example, separated by two scales in two.

Grey above with largish dark spots more or less alternating and a dark vertebral line on the neck and fore-part of the body. Upper lip, 2nd and 3rd rows of scales in the anterior part of the body, the 2nd only in the posterior part of the body, yellowish-white. Ventrals and first row of scales yellowish-white margined with grey, the edging being a little more boldly defined than in *E. chinensis*.

Both *E. chinensis* and *E. bennetti* are said to have 8 supralabials. I do not consider that any of my specimens have, the 8th shield in them being small, in character like the adjacent neck scales and only partly in contact with the margin of the lip.

The general resemblance between the two species is remarkable.

28. AMBLYCEPHALUS MOELLENDORFFI (Boettg.)
2 ♂, Ka-chai. Ventrals 140, 142; caudals 52, 54.

29. AMBLYCEPHALUS CARINATUS Boie.

This snake is one of those interesting species which inhabits the Indo-Chinese region and the Malay Archipelago, but not the intermediate Malay Peninsula. The northern form has been recorded from Lower Burma, Indo-China and Siam, extending as far south as Patani, Lat. 7°. N. Hainan therefore marks a considerable extension of its range northwards.

The type locality of the species is Java, and the form from the Malay Archipelago appears to have fewer ventral and subcaudal shields than the one from the Indo-Chinese region. For the range of variation in the typical form I quote De Rooij (Rept. Indo-Aust. Archip. II. p. 278), while that of the northern form is drawn up from 14 specimens examined by me. The difference is as follows:—

	Ventrals	Subcaudals.
Malay Archipelago	161 – 189	53 – 80.
Indo-Chinese region	166 – 200	68 – 100.

In other characters of scalation and colouration the two appear to be identical.

The northern form may therefore be known as:—

AMBLYCEPHALUS CARINATUS HAINANUS, subsp. nov.

Type male, author's number 7045, collected on the Five Finger mountain, at 1300 m. altitude in Jan. 1922.

LIST OF SPECIMENS EXAMINED.

No.	Sex	Locality.	Ventrals.	Caudals.	Collector
7045	♂	Hainan (Type).	194	93	M. A. Smith
7044	♀	,,	191	82	,,
5731	♂	Huey Sapan, French Laos.	184	100	Native coll.
3054	♀	Sré Umbel, Cambodia.	168	74	,, ,,
2030	♀	Me Wang, N. Siam.	190	72	,, ,,
2849	♀	,, ,,	185	68	N. C. Braham
	juv.	Lat Bua Kao, E. Siam.	173	74	Native coll.
1720	♂	Nong Khor, S. E. Siam.	179	77	P. A. R. Barron.
4440	♂	Klong Tun Sai, Peninsular Siam.	200	82	Native coll.
4441	♂	,, ,,	180	95	,, ,,
1722	♂	Bangnara, Patani	183	82	C. J. Aagaard.
1725	♂	,, ,,	182	87	,, ,,
		,, ,,	190	75	,, ,,
2808	♂	Siam.	167	75	Native coll.

30. TRIMERESURUS GRAMINEUS (Shaw).

5 examples. Hoi-hao, Ka-chek, Five Finger mountain.

21 rows of scales. Verdant green above uniform, the outer row of scales white or greenish white. Below white or greenish white, end of tail rusty red.

BATRACHIANS.

31. OXYGLOSSUS LIMA (Gravenh.).

Examples from near Ka-chek.

32. OXYGLOSSUS LÆVIS MARTENSI Peters.

Examples from Tun-fao, Ka-chek river; also from the Five Finger mountain at 1000 metres altitude.

33. RANA TIGERINA PANTHERINA Fitz.

Rana tigrina var. *pantherina*, Blngr., Rec. Ind. Mus., 1920, xx. p. 21.

One specimen from Tun-fao, Ka-chek river.

34. RANA LIMNOCHARIS Wiegm.

"Hummocks," Ka-chek and Ka-chai.

Specimens were caught on the Five Finger mountain at 1000 metres elevation.

35. RANA KUHLI Dum. and Bib.

Specimens from Tun-fao and the Five Finger mountain. Fairly common in both localities.

36. RANA GUENTHERI.

Rana guentheri, Blngr., Rec. Ind. Mus., 1920, xx. p. 133.

1 ♀, Tun-fao, Ka-chek river.

37. RANA NASICA.

Rana nasica, Blngr., Rec. Ind. Mus. 1920, xx, p. 171.

1 ♂, from the Five Finger mountain which I refer to this species It has a patch of vomerine teeth on one side only and the snout is considerably longer than the diameter of the eye. The tibio-tarsal articulation reaches distinctly beyond the tip of the snout.

The specimen is larger than any of the four recorded by Boulenger from the Man-son mountains, Tonkin.

Snout to vent, 64; length of head, 21; breadth of head, 19; snout 9; eye 7; fore-limb 42; hand 17; leg 111; tibia 38, foot 30 mm.

38. RANA TAIPEHENSIS.

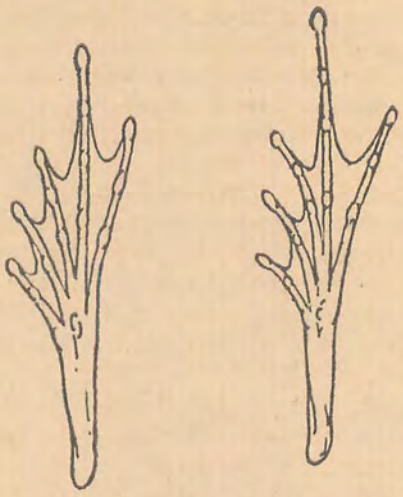
Text-fig. 4.

Rana taipehensis, Van Denburgh, Proc. Cal. Acad. Sc., 1909, iii. p. 56.

Rana erythraea (in part), Blngr., Rec. Ind. Mus., 1920, xx, p. 153.

I found this frog extremely common in several swiftly flowing streams near the Five Finger mountain; specimens were also obtained at the "Hummocks."

In life the adults were bright green upon the back, greenish or brownish on the sides, with the dorso-lateral fold of a pale golden colour. Below pure white. The largest specimen, a female with



A B

Text fig. 4. A. Foot of *Rana erythraea*.
B. Foot of *Rana taipehensis*.

ripe ova, measures 37 mm., from snout to vent, and several smaller females have eggs also.

These frogs agree well with Van Denburgh's Formosan species, which differs from *Rana erythraea* in the shorter web to the toes and smaller size. My specimens also have a longer foot – longer than the tibia – but of this character Van Denburgh makes no mention.

Boulenger considers *R. taipehensis* to be a young *erythraea*, in which species the web of the toes in juveniles is sometimes shorter than in adults. In none of my large series of *R. erythraea* from Siam and Indo-China is this membrane quite so short as in my Hainanese frogs, and none has the longer foot. For the present I prefer to regard *R. taipehensis* as distinct from *erythraea*.

To *taipehensis* also I refer 8 specimens taken by me at Sui Kat (alt. 1000 m.) and Dalat (alt. 1600 m.) on the Langbian plateau, S. Annam.

39. RANA MACRODACTYLA (Günth.).
Two examples from near Ka-chek.

40. RANA (HYLARANA) SPINULOSA, sp. nov.
Type male, author's number 6889, collected at Tun-fao, Ka-chek river, altitude 200 metres, in January 1923.

Description of type. Vomerine teeth in oblique series commencing between the choanae and extending posterior to them, the distance between them equal to their distance from the choanae. Head a little longer than broad, somewhat depressed; snout obtusely pointed, projecting strongly beyond the mouth, longer than the eye; canthus rostralis distinct, loreal region nearly vertical, concave; nostril equidistant from the eye and the end of the snout; distance between the nostrils greater than the interorbital width, which is equal to that of the upper eyelid; tympanum very distinct, 3/5 the diameter of the eye, distant from the eye half its own diameter.

Fingers moderately long, the tips swollen into very small discs the outer two of which bear an indistinct marginal groove separating the upper and lower portions; first longer than the second which is 2/3 the length of the third; subarticular tubercles large and prominent. Hind limb moderately slender, the tibiotarsal articulation reaching to the nostril; tibia half the length of the head and body, as long as the foot; heels overlapping when the limbs are folded at right angles to the body. Toes with small discs which are larger than those of the fingers and all of which bear well marked marginal grooves; three-quarters webbed, the membrane reaching the disc of the 5th toe only, two phalanges of the 4th toe free on the outside, three on the inner; outer metatarsals separated nearly to the base; subarticular tubercles prominent, an oval, inner metatarsal tubercle half the length of the inner toe; a small, round, prominent, outer metatarsal tubercle.

Skin above with numerous warts, the largest of which bear pale, horny spinules; a moderately broad and prominent glandular dorso-lateral fold from the eye to the hip, broken up posteriorly, and also having spinules; posterior half of upper eyelid and upper surface of hind limb warty, and a fringe of minute spinules along the outer side of the fifth toe; lower parts quite smooth.

Light brown above with darker mottlings; limbs with well-defined dark cross-bars; below yellowish white; upper lip and the two glandules behind it whitish.

Vocal sacs feebly distinct; an oval gland on the inner side of the arm and a pale velvety nuptial pad on the first finger.

Variation. 11 ♂ and 8 ♀ examined, numbers 6882 – 6900. The males do not shew much variation from the type. The tibiotarsal ariculation reaches to the anterior border of the eye in some, to the tip of the snout in others. The females are considerably larger

than the males and have broader heads, their warts have no spinules and the fringe along the outer toe is less distinct or absent. Their eggs are pigmented and from 1½ to 2 mm. in diameter. Some of the specimens are greyish-brown in colour, and the under parts may be thickly speckled with grey.

Rana spinulosa is very closely allied to *R. nigrovittata* (Blyth), from which it has no doubt been derived. The distinction between the species is clearer in the males than in the females. They differ in the narrower head, the longer and more projecting snout, the spinous-warty skin of the upper parts, the fringe of spicules along the 5th toe, the scantier web to the toes and the smaller size. Adult males of *R. nigrovittata* from the Indo-Chinese peninsula, of which I have examined many, are fully as large as the females; in this new species the difference between the sexes is very marked.

This frog was common in many of the streams in the neighbourhood of the Five Finger mountain, and many more could have been collected. It was abundant in a small stream, scarcely one metre across, besides which we were camped one night, and the males kept up a continuous croaking. The noise was a harsh note like that of a small bird when it is angry, and quite different from that of *R. nigrovittata* which I know well.

MEASUREMENTS OF *R. spinulosa* in mm.

Number ..	6889	6884	6891	6890	6886	6887	6897	6898
Snout to vent ..	39	41	42	37	58	54	58	53
Length of head ..	15	16	16	15	19	20	19.5	19
Breadth of head ..	14	15	14	13	19	18	20.5	19
Snout ..	7	7	7	6.5	8	8	8	8
Eye ..	5	5	5	4.5	6.5	6	6	6
Tympanum ..	3	3	3.5	3	5	4.5	5	4
Forelimb ..	25	25	24	23	34	31	35	32
Hand (to tip of 3rd finger)	11	11	11	10	14	14	15	13
Hindlimb ..	62	64	60	63	92	83	92	88
Tibia ..	20	21	20	21	31	27	30	29
Foot ..	20	21	20	20	29	25	30	28
Sex ..	♂	♂	♂	♂	♀	♀	♀	♀

41. RANA HAINANENSIS.

Staurois hainanensis Blngr., P.Z.S., 1899, p. 958, pl. lxvii, fig. 2.
Rana hainanensis, Blngr., Ann. Mag. Nat. Hist., May 1918, p. 373; —id., Rec. Ind. Mus., 1920, xx, p. 222.

I refer 8 specimens taken on the lower slopes of the Five Finger mountain to this species with slight hesitation. They differ from the description – drawn up from a single female – in having an

indistinct tympanum,* from 1/4 to 1/6 the diameter of the eye, and in having the skin of the back, both in the young and adults, coarsely granulate, with larger, rounded, smooth warts.

In my largest example, a female, the tibio-tarsal articulation reaches only to the nostril.

Colour in life. Blackish above, mottled with pale green; below whitish, the throat with darker markings; interdigital membranes dark grey. Juveniles are paler than the adults and have a larger proportion of green upon the back.

The male is without secondary sexual characters.

Most of my specimens were obtained after dark by hunting up the streams with a lantern, when they were to be found climbing about on the precipitous walls of rock in the vicinity of waterfalls.

Tadpoles agreeing with Boulenger's description were also found, and, a few weeks later, I obtained a young example of this frog and a further series of larvae on the Peak at Hong Kong.

MEASUREMENTS OF *Rana hainanensis* in mm.

No.	6904	6908	6902	6901
Snout to vent	60	73	48	56
Length of head	22	26	17	20
Breadth of head	26	29	19	24
Eye	8	8.5	7	8
Tympanum	1.75	2	1.5	2
Forelimb	42	48	30	38
Hindlimb	106	112	74	94
Tibia	37	38	28	33
Foot	30	31	17	25
Sex	♂	♀	♂	♀

42. MICRIXALUS TORRENTIS, sp. nov.

Type female, author's number 6941, collected on the Five Finger mountain at 1000 metres altitude in Jan. 1923.

Description of type. No vomerine teeth; choanae small, almost hidden beneath the overhanging margin of the jaw; tongue large, deeply notched behind, no papilla.

Head broader than long, somewhat depressed; snout short obtusely pointed, projecting beyond the mouth, as long as the eye; canthus rostralis sharply defined, loreal region feebly oblique, concave; nostril equidistant from the eye and the end of the snout; distance between the nostrils greater than the interorbital width, which is equal to that of the upper eyelid; tympanum very distinct, half the diameter of the eye, and distant from it by less than its own diameter.

* In having a normally small, indistinct, tympanum this frog is in agreement with the other members of its group.

Fingers long and slender, first shorter than the second which is three-quarters the length of the third; discs large, as large as the tympanum, a little broader than long, with a marginal groove dividing the upper from the lower portion.

Hind limb rather slender, the tibiotarsal articulation reaching to beyond the tip of the snout, tibia five times as long as broad, heels feebly overlapping when the legs are folded at right angles to the body. Discs of the toes smaller than those of the fingers, and having a similar marginal groove; toes nearly fully webbed, the membrane reaching the discs of all except the fourth, one phalanx of which is free; outer metatarsals separated nearly to the base; subarticular tubercles well developed; an oval, inner metatarsal tubercle, one-third the length of the inner toe, and very small, but quite distinct, rounded, outer one.

Skin of the back and sides with numerous large, rounded, smooth warts; skin of the throat smooth, of the belly coarsely granular. A strong glandular fold from the eye to the shoulder.

Pale olive-grey above with indistinct darker markings; below whitish finely speckled with grey; limbs with narrow, dark cross-bars.

Male without secondary sexual characters. Eggs of the female large, unpigmented, 2.5 mm. in diameter.

Omosternum entire, nasals large and widely separated, terminal phalanges with a T-shaped expansion, the transverse limb as long as the horizontal.

Ten specimens taken in the same locality do not differ much from the type. The tibio-tarsal articulation does not reach to the tip of the snout in some; in some a feeble tarsal fold is present. Two examples have the back marked with large black blotches. All of them were caught on the lower slopes of the Five Finger mountain, at between 600 and 1200 metres elevation, hiding beneath the stones and rocks beside the streams.

I have placed this frog provisionally under the Indian genus *Micrixalus*, from which it differs in the larger and distinct tympanum, but agrees in osteological characters (omosternal style not forked at the base, nasals widely separated, terminal phalanges T-shaped) and in the formation of the digital discs. It is quite distinct from *Rana hainanensis*, the only toothless *Rana* admitted by Boulenger to the genus, and which, belonging clearly to the group defined by him under *Ranae formosae* (Rec. Ind. Mus., 1920, xx, p.130) leads to *Staurois* Cope. In these frogs the outer metatarsals are separated to the base by the very broad web to the toes, and the under surfaces of the very large digital discs have a more or less distinct ridge and groove corresponding to the horizontal limb of the T-shaped terminal phalanx. In all the

species of *Micrixalus* examined by me the under surfaces of the digital discs are smooth, as they are also in the *Ranae chalconotae* group (p.129) from which *Micrixalus torrentis* may have been derived.

A species of *Micrixalus* has recently been described by E. H. Taylor from the Philippines (Philipp. Journ. Sc., 1922, Vol. 21, p. 267) and he has kindly sent me two examples. The digital discs of this frog, however, differ entirely from those of *Micrixalus*, in having no marginal grooves separating their upper and lower portions, and it cannot therefore be included in that genus.

MEASUREMENTS OF *M. torrentis* in mm.

No.	6941	6938	6939	6942.
Sex.	♀	♀	♂	♂
Snout to vent	37	37	29	30.
Breadth of head	12	12	10	10
Snout	5.5	5	4.5	4
Eye	4	4.5	4	3
Tympanum	2	2.5	2	1.75
Arm	24	23	19	20
Hand (to tip of 3rd finger)	11	10	9	9
Leg	61	63	51	53
Tibia	22	20	18	18
Foot	21	18	16	16

43. RHACOPHORUS LEUCOMYSTAX (Gravenh.).
Common at low elevations.

44. RHACOPHORUS OXYCEPHALUS.
Rhacophorus oxycephalus Blngr., P. Z. S. 1899, p. 959., pl. lxvii., fig. 3.
5 ♂, 3 ♀. Kap-hao, Kachek river, 600 m.; Ang Mao, 500 m.; foot of the Five Finger mountain, 700 to 800 m.
The largest male measures 34 mm., from snout to vent, the largest female 59 mm. The males agree well with Boulenger's description, but the females differ slightly in that the discs of the outer two fingers are a little larger than the tympanum, and the web between these two fingers is fully one-third instead of being only a distinct rudiment.

45. MICROHYLA PULCHRA.
Engystoma pulchrum, Hallowell, Proc. Ac. Philad., 1860, p. 506.
Microhyla hainanensis, Barbour, Bull. Mus. Comp. Zool. 1908, li (12) p. 322.
5 examples; Hoi-hao, Ka-chek, Nam-kao.

I cannot find anything in these specimens or in the description of *M. hainanensis* to separate Barbour's frog from *M. pulchra*. The habit of body is the same and the scattered tubercles and black spots on either side of the vent on which he bases separation can be found in many examples from Indo-China and Siam.

Nam-kao whence came one of my specimens is not far from Mt. Wuchi, the type locality of *M. hainanensis*.

46. MICROHYLA ORNATA (Dum. and Bib.).
Specimens from Kiung-chao.

47. MICROHYLA ACHATINA (Boie).
5 exam les ; Tun-fao, Ka-chek river.
These specimens are bigger than any I have seen before, the largest measuring 28 mm., from snout to vent.

48. MICROHYLA BUTLERI Blngr.
Specimens from Kiung-chao and the "Hummocks."
Some of the specimens were found living within a small cave in complete darkness.

49. BUFO MELANOSTICUS Schneid.
Common everywhere in the lowlands.