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FOUR NEW FROGS FROM FUKIEN PROVINCE, CHINA

CLIFFORD H. POPE

In this paper I describe four new frogs collected by myself, in Fukien Province, for the Third Asiatic Expedition of The American Museum of Natural History, during 1925 and 1926.

***Megalophrys kuatunensis*, new species**

TYPE.—A. M. N. H. No. 30126; adult ♂; Kuatun, Chungang Hsien, northwest Fukien Province, China; altitude 5500-6000 feet; April-September, 1926; Clifford H. Pope.

DIAGNOSIS.—Closely allied to *boettgeri* of the same locality and *minor* of Szechwan. It differs from the former in the possession of a dark, thin, X-shaped marking occupying the middle of the back, in being dull brick-red instead of blackish, and in having distinctly smaller toe webs. *M. boettgeri* is a slightly larger species. The tibia of the new species is less than half as long as the head and body, while that of *minor* is more than half this length. The tibio-tarsal articulation, when stretched forward in *kuatunensis*, reaches as far as the center of the eye or not so far, but in *minor* it extends beyond the eye.

DESCRIPTION OF TYPE.—Tongue entire, vomerine teeth lacking. Head moderate, as broad as long; snout very short, obliquely truncate, strongly projecting beyond the mouth. Canthus rostralis angular, loreal region concave; interorbital space as broad as the upper eyelid; tympanum distinct, half the diameter of eye. Fingers slightly swollen at the ends, first and second equal. Toes slender, scarcely swollen at the tips, with barest rudiment of web; a small, oval, flat inner metatarsal tubercle; no subarticular tubercles. The tibio-tarsal articulation reaches to the center of the tympanum, while the tibia is two-fifths as long as the head and body. The skin is smooth. Length, from snout to vent, 32 mm.

The dorsum is brown, a little darker than the ventrum. There is a dark, X-shaped marking on the back and another triangular one on the head, one point of which extends onto either upper lid. In addition to these, there are a few small spots on the back. The belly is boldly spotted with dark spots, the two largest of which are light-centered and occupy a lateral position on the middle region of the belly, the next pair in size being on either side of the throat. A conspicuous spot is found midway between the arm insertions. The lips are barred, especially the lower. The limbs are barred dorsally and, except the ventral side of the thighs, spotted below the bars. A dark band extends from the tibio-tarsal articulation onto the bottom of the foot. There is a white spot on the back of the thigh.

NOTES ON PARATYPES.—The thirty-one paratypes come from the type locality (A. M. N. H. Nos. 30123–24 and 30230–58) and agree well with the type. Tadpoles were secured.

This species, though remarkably similar to *boettgeri* in body form, is easily distinguished by the X-shaped, dorsal marking, no trace of which is ever present in *boettgeri*. The type of *minor* is unique and shows no sign of a dorsal marking. I have omitted this point from the diagnosis because lack of such in *minor* may be the result of preservation.

The texture of the skin in *boettgeri* and *kuatunensis* is extremely variable, though the latter has the smoother skin in the majority of specimens.

These two species inhabit the same streams about Kuantun but *kuatunensis* is invariably found at higher altitudes. There is a marked difference in their calls.

***Hyla sanchiangensis*, new species**

TYPE.—A. M. N. H. No. 30198; adult ♂; San Chiang, Chungan Hsien, northwest Fukien Province, China; 3000–3500 feet altitude; April–May, 1926; Clifford H. Pope.

DIAGNOSIS.—A mountain form closely related to *chinensis* but differing conspicuously in coloration.

DESCRIPTION OF TYPE.—Vomerine teeth two-thirds behind line joining anterior edges of choanæ, nearer to each other than to choanæ. Diameter of tympanum two-fifths that of eye; diameter of finger pads slightly greater than that of toe pads. Tibio-tarsal articulation reaching center of eye. Fingers with small webs; toes two-thirds webbed. Skin smooth. Length, from snout to vent, 34 mm.

The back is purplish brown (leaf-green in life), the belly uniformly light. There are numerous black spots on the posterior sides, both sides of the upper legs, and the inside of the lower legs; also on the arms and around their bases. A fine black line starts at the tip of the snout, passes over the nostril, through the eye, immediately above the tympanum, and along the upper sides to join the first black spots of the posterior sides. A similar line beginning below the nostril skips the eye and skirts the tympanum, extending parallel to the first line as far as the base of the forearm where it meets the black spots of that region. In alcohol the color of the area between these two lines is not markedly different from the general color of the sides. The upper lips are weakly and irregularly bordered with black.

The type, taken during the breeding season, has conspicuous dark nuptial pads on the inner fingers and large grayish vocal sacs just anterior to the insertion of the foreleg.

NOTES ON PARATYPES.—The twenty-nine paratypes (A. M. N. H. Nos. 30171–97 and 30199–200) come from the type locality and agree with the type in every essential. A series of tadpoles was also secured.

The conspicuous black markings of this species distinguish it at a glance from *arborea immaculata* of the Yangtze Valley, *simplex* of the extreme South, and Vogts' *albotæniata* of "South China." *H. annectans*

of Yunnan possesses the strong tuberculated fold from the eye to the base of the upper arm of which no sign is present in the new species, while *bambusicola* (*monticola*) of Szechwan has many red-centered ocelli on the back. *H. chinensis* entirely lacks the black spots on the forearm as well as the fine parallel lines described above, and possesses a sharply differentiated reddish-brown (in alcohol) triangle outlined in black covering the tympanum and ending just above the base of the forearm.

• ***Rana chunganensis*, new species**

TYPE.—A. M. N. H. No. 30479; adult ♂; Kuatun, northwest Chungan Hsien, Fukien Province, China; 4500–5000 feet altitude; August, 1926; Clifford H. Pope.

DIAGNOSIS.—A *Hylorana* with well-formed digital pads bearing distinct crescentric grooves separating the upper from the lower surfaces. The pads are not twice as broad as the narrowest part of the corresponding penultimate phalanx. There is a weakly developed dorso-lateral fold. Sexual dimorphism is extremely marked, the male being much smaller in size and lighter in dorsal coloration than the female. The male moreover possesses a pair of prominent external vocal sacs, a humeral gland, and a pad on the first finger.

DESCRIPTION OF TYPE.—Vomerine teeth in oblique series, their anterior edges on a line with centers of choanæ.

Head longer than broad, depressed; snout projecting beyond mouth, slightly longer than eye; canthus rostralis obtuse; loreal region feebly oblique, concave; nostril barely nearer tip of snout than eye; distance between nostrils equal to inter-orbital width; tympanum distinct, three-fifths diameter of eye, separated from eye by a distance equal to half diameter of tympanum.

Fingers long and slender, their tips bearing pads with distinct crescentric grooves separating the upper from the lower surface; first finger barely as long as second, a pad on its inner side. Subarticular tubercles well developed. Toes with pads similar in form and size to those of fingers; webbed to base of pads on all but longest toe where webbing reaches only to last subarticular tubercle; latter well developed as on fingers; outer metatarsals separated nearly to base. Inner metatarsal tubercle oval, feebly prominent, no outer tubercle.

Hind limb long and slender, tibio-tarsal articulation reaching to end of snout; heels strongly overlapping; tibia contained 1.7 times in length of head and body.

Dorso-lateral fold feeble, especially posteriorly; a glandular fold from below tympanum to shoulder. Skin smooth.

The color is reddish brown above but light beneath. The back is covered with dark speckles. A black stripe extends from the tip of the snout to the eye and from behind the eye to the base of the thigh. Posterior to the eye its upper border is the dorso-lateral fold. The stripe is widest from the eye to above the insertion of the forelimb, posterior to which it rapidly narrows. The tympanum is included in this stripe. A narrow white stripe extends from below the nostril to the shoulder. It passes just under the eye and tympanum. The limbs are barred dorsally.

There is a large, external vocal sac on each side extending from below the eye to the base of the forelimb and an oval gland on the inner arm.

The type measures 39 mm. from snout to vent.

NOTES ON PARATYPES.—Ninety-two paratypes come from the type locality (Nos. 28832, 30139–41, 30395–478 and 30480–83), three from Yenping (Nos. 28419 and 30820–21). All the males agree well with the type. An adult female measures 58 mm. from snout to vent. A large series of tadpoles was secured.

This species seems to be related to *humeralis*, and *oatesii* of Burma, and *miopus* of Siam, which form a group in Boulenger's *Hylorana* key. It resembles these in the possession of the humeral gland but differs in the comparative length of the first two fingers as well as many minor points.

Rana fukienensis, new species

TYPE.—A. M. N. H. No. 29182; adult ♀; Futsing Hsien, northeastern Fukien Province, China; August–October, 1925; Clifford H. Pope.

DIAGNOSIS.—A species combining the characters of *nigromaculata* and *plancyi*. Its relation to *plancyi* is shown through the white stripe along the back of the thighs so characteristic of that species, and the lack of an external vocal sac in the males, while in general habitus and coloration it strongly suggests *nigromaculata*.

DESCRIPTION OF TYPE.—Vomerine teeth in two rounded groups between the choanae, their distance from the latter about equal to the distance between them; nostrils distinctly nearer the tip of the snout than the eye; toes fully webbed; tips of digits tapering, rounded, not at all expanded or grooved; subarticular tubercles distinct but small; inner metatarsal tubercle medium, its length half that of the fifth toe; an indistinct outer tubercle, no tarsal fold; an inconspicuous dorso-lateral fold. The skin is generally smooth but in the posterior region of the back finely granular.

The color of the back in alcohol is grayish olive with a faint mid-dorsal longitudinal stripe from the tip of the snout to the vent. The ventrum is light with very faint gray mottling more distinct on the thighs. There are a few black spots on the posterior region of the back and irregular bars across the tibia. A distinct white band extends along the back of the thighs above which the thighs are boldly mottled. A black band starts at the base of the thigh and extends forward along the side. It breaks into spots before reaching the insertion of the arm but is continued as a band along the posterior side of the arm to the palm. There is another black line from the shoulder to the angle of the jaw.

The length of the tibia (39 mm.) is 0.54 that of the distance from the snout to the vent (72 mm.)

NOTES ON PARATYPES.—There are fifteen paratypes from the type locality (A. M. N. H. Nos. 29183–89 and 29420–27), and four from Chungan Hsien (A. M. N. H. Nos. 28946–49), all collected in 1925. In addition, a juvenile paratype (A. M. N. H. No. 30001) was collected the following year in Chungan Hsien. The paratypes with one exception agree in every essential with the type. The American Museum contains a large series from Horisha, Formosa, previously identified as *plancyi*. They agree well with the new species except that their bellies are lighter and less mottled.

R. fukienensis seems to be intermediate between *plancyi* and *nigromaculata*. It may readily be told from *plancyi* by:

(1) Its much shorter and lower metatarsal tubercle. This tubercle is only one-half the length of the fifth toe, but in *plancyi* it is three-fourths this length. In *plancyi*

it is set at a distinct angle to the line of the first toe, while in *fukienensis* it is almost parallel. This difference is very constant.

(2) Its distinctly greater leg length. The length of the tibia in *plancyi* is contained two and one-third to two and a half times in the length from the snout to the vent, the tibio-tarsal articulation barely reaching the tympanum, while in *fukienensis* the tibia is one-half as long as the body and head, and the tibio-tarsal articulation reaches the center of the eye.

(3) The dorso-lateral ridges. In *plancyi* these are uniformly broad, low and often flaring; in *fukienensis* either narrow or broad, high or low, and nearly or perfectly parallel.

(4) Coloration. *R. plancyi* lacks the mid-dorsal stripe, which though often faint, is nearly always present in *fukienensis*. The thighs, above the light stripe possessed by both species, are much more boldly mottled in *fukienensis*, while *plancyi* has an immaculate belly contrasted with the more or less faintly mottled belly of mainland *fukienensis*.

It may be readily told from *nigromaculata* by:

(1) The smaller metatarsal tubercle which in *nigromaculata* rivals that of *plancyi* in size.

(2) The lack of glandular ridges between the dorso-lateral folds. These ridges are very conspicuous in *nigromaculata*. The juvenile specimen (No. 30001) forms the only exception among the large series of paratypes.

(3) The apparent lack of a well-developed external vocal sac. All of the larger paratypes are females and the general scarcity of males makes the confirmation of this point desirable.

(4) Coloration. The light stripe along the thighs so characteristic of *plancyi* and *fukienensis* is never found in *nigromaculata* which also seldom shows traces of the black lateral stripe very conspicuous in *fukienensis* and present at least posteriorly in *plancyi*.

In addition, there are minor differences of color, and certainly a comparative examination of living specimens would reveal still more striking contrasts.

