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Batrachians from East Ecuador

collected 1937, 1938 by

WM. CLARKE-MACINTYRE and ROLF BLOMBERG

Determined by

L. G. ANDERSSON.

With 26 Figures in the text.

Communicated May 23rd 1945 by NILS HOLMGREN and JOHN RUNNSTRÖM.

This collection has been delivered to me for determination by the curator of the vertebral department of the Royal Museum of Natural History, Stockholm, Professor HJ. RENDAHL, to whom I beg to express my great gratitude. All the animals are collected in the neighbourhood of the rivers Rio Pastaza and Rio Napo, Eastern Ecuador, most of them by the American collector Mr. WM. CLARKE-MACINTYRE and a few by the Swedish traveller Mr. ROLF BLOMBERG. If no collector is mentioned together with the notes of the specimens, they are collected by the former.

The collection contains 220 specimens, referred to 52 species. Of these two have been described as new varieties of already known species (*Rana palmipes* Srix and *Leptodactylus pentadactylus* LAUR.) and no less than 31 as new species, one, according to my opinion, representing a new genus, *Pseudohyla*, very closely allied to the genus *Hyla*. Most of the new species belong to the great genera *Phyllobates*, *Hyla* and *Eleutherodactylus* (*Hylodes*), and it has often been with a very great hesitation that I have increased the already vast number of South-American species of these, but as I have not been able to identify them with any hitherto described species, the literature regarding which I have carefully studied, they have been described as new. At least in most cases I believe they are so.

Arkiv för zoologi. Bd 37 A. No 2.

At the request of Dr. D. MELIN I have also revised his *Bufo anderssoni* and altered its name, as being preoccupied (p. 62). Finally, I wish to express my best thanks to Miss ESTER SVENSSON for her help with the revising of my English manuscript, to Mrs ELSA FAGERLIND for the drawings and to Mr. ULF BERGSTRÖM for the photographs.

The light spots in the dark areas in some of these, not correspondent to the colour-descriptions, are due to the light at the photographing of the animals.

Fam. Microhylidae.

Engystoma ventrimaculata Nova species.

One specimen, female, 28 mm in total length, Rio Pastaza 1937. ROLF BLOMBERG.

Habit rather slender. Head as long as broad. Snout acuminate, overlapping, a little more than once and a half as long as the diameter of eye. Interorbital breadth three times the breadth of upper eyelid. The front limb considerably longer than its distance to tip of snout. First finger much shorter than second, about only half the length of this. Tips of fingers rounded, not dilated. The long third finger very narrowly margined with dermal folds, but there are no distinct traces of any web. Two rounded metacarpal tubercles and well developed subdigital ones. Hind limb short. If the length of tibia is measured off from the knee of the adpressed femur, it reaches hardly to the orbit. Toes distinctly webbed at the

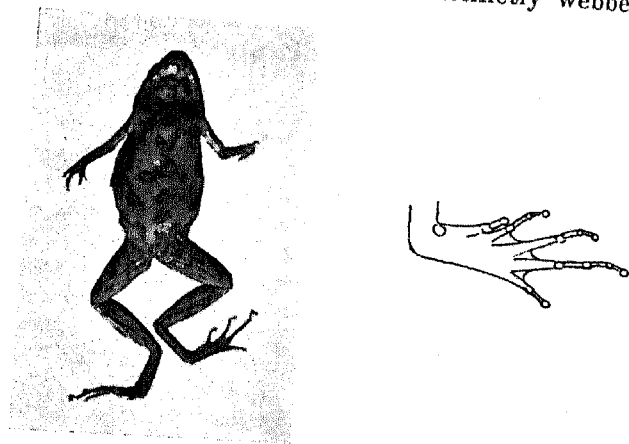


Fig. 1. Ventral view and foot of *Engystoma ventrimaculata*.

sed his *B.* bases and provided with distinct rounded disks. First toe very
 pied (p. 6) short, its tip does not reach the base of the second. A small
 Miss Est oval inner metatarsal tubercle, no outer one. Subdigital tu-
 my Engli bercles slightly prominent.

drawings a Skin perfectly smooth. An ill-defined glandular rounded
 swelling behind each orbit. Upper parts uniform chocolate
 of these, r brown. All lower surfaces except the feet pale yellowish white
 to the lig with large irregular chocolate brown spots. The feet chocolate
 brown. Thighs below with a more yellowish tint.

Measurements in mm: Total length 28, length and breadth
 of head 4, length of snout 4, diameter of eye 2.5, interorbital
 space 3.5, breadth of upper eyelid 1.1, length of fore limb 15,
 of femur 10, of tibia 11, of foot 17.

Rio Past seems to be well distinguished from most species of this genus,
 hitherto described, and somewhat related to *E. microps* Dum.
 Snout a & BIBR. from Brazil and Guiana, but it differs distinctly from
 and a half this one by its web on the toes, its quite different shape of
 three tin the snout, and the dissimilar colour.

erably long,
 much shorter

ps of finger
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he length
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Fam. Ranidae.

Rana palmipes SPix, forma *rionapensis*, Nova varietas.

One specimen 48 mm in total length, Rio Napo, 400 m,
 Oct. 1937. Male.

By the shape of the head, considerably different from that
 of the typical form, shown by the measurements below, and
 the presence of a long, very well marked oblique dermal fold
 on the flanks from the upper margin of the tympanum down
 to the groin, this specimen seems to be rather well distinguished
 from the typical form, and I have been in doubt about whether
 it is correct to refer it to this species. As, however, the cor-
 res- pondence with this in other important characteristics is
 very great, and as *R. palmipes* seems to be very variable, to
 judge from the numerous synonymic forms stated, I believe it
 most correct to regard my specimen as a form of it.

—
 —

maculata. As shown by the table below, the head is considerably
 longer than broad, and the snout distinctly longer than the
 diameter of eye and longer than the snout of the head form.
 Besides, the head is not at all »strongly depressed», loreal
 region is vertical, not oblique, and the interorbital width is
 larger than that of the upper eyelid. A short fold over tym-
 panum from eye is divided immediately behind tympanum

into an upper dorsolateral fold, reaching nearly to the vent and a lower very distinct one, obliquely crossing the side of body down to the groin. In none of the many figures of this species or of its synonyms can I see any traces of this fold, so very well marked in this specimen. Nor is it mentioned in any description of it.

The whole animal is smooth, except the hindmost part of back, on which there are very small pointed tubercles, scarcely seen with the naked eye. Upper parts uniform blackish brown, limbs lighter with distinct black cross-bars. Chin, breast and belly uniform light brownish grey, thighs and tibiae marbled with light and black below and on the sides.

Measurements of the head of this specimen and of *R. palmipes* according to BOULENGER in Proc. Amer. Acad. of Arts and Science vol. 55, 1920, p. 477.

| | Total length | Length of head | Breadth of head | Length of snout | Diameter of eye | Same measurements in % of total length | | | |
|-------------------------|--------------|----------------|-----------------|-----------------|-----------------|--|-------------|-------|------|
| | | | | | | L. of head | Br. of head | Snout | Eye |
| <i>Rana palmipes</i> ♂ | 51 mm | 20 mm | 20 mm | 7 mm | 7 mm | 39.2 | 39.2 | 13.7 | 13.7 |
| " " ♀ | 51 " | 20 " | 20 " | 7 " | 7 " | 39.2 | 39.2 | 13.7 | 13.7 |
| " " | 51 " | 20 " | 20 " | 7 " | 7 " | 39.2 | 39.2 | 13.7 | 13.7 |
| <i>R. rionapensis</i> ♂ | 48 " | 20.5 " | 18 " | 8.5 " | 6.8 " | 42.7 | 35.4 | 17.7 | 14.2 |

Fam. Brachycephalidae.

Dendrobates tinctorius SCHNEIDER.

A small specimen, 16 mm, Watershed, Rio Pastaza, 1938.

Above black, with three longitudinal light stripes, the median one bifurcates before the orbits. Beneath greyish white, with large black spots.

Dendrobates trivittatus SPIX.

One specimen, 24 mm. Pastaza 1937.

Entirely black.

Phyllobates.

In this collection there are seven specimens which by their shouldergirdle, the shape of digits and other characteristics must be referred to this genus, of which hitherto many species

are described from Ecuador, which seems to be the chief patria of this genus. Two of these specimens are too small, and one is not well preserved for any specific determination, but the other four I have endeavoured to determine, though not being able to identify them with any known species. As their colour, in this genus used as the most important distinguishing specific character, differs in a rather high degree, I must regard them as representing three new species.

A comparison of a greater number of specimens of these as well as of older species may possibly prove that the colour-variation is not such a good distinction as presumed by different authors. Thus, I believe that there must be a rather strong reduction of the many *Phyllobates*-species described.

Phyllobates intermedius Nova species.

One male specimen, 24 mm in length, Rio Pastaza, Sept. 1937.

Habit slender, head longer than broad. Snout not depressed, broad and rounded, slightly overlapping, as long as the eye, with a small knob at the symphysis of the mandible and a corresponding small notch on the upper jaw. Nostril much nearer the tip of snout than the eye. Interorbital space broader than the upper eyelid. Canthus rostralis distinct. Loreal region vertical, slightly concave. Tympanum well distinct, but its upper margin is concealed by a thick glandular fold, rather large, half the diameter of eye. Tongue oblong, narrow, entire, its posterior half free.

Fingers quite free, short, first very slightly shorter than second, disks rather large, broadly rounded or nearly truncate in front with two rounded dermal plates above. Two distinct rather large oblong metacarpal tubercles, subarticular tubercles distinct. Toes slender without web, with large disks, similar to but somewhat larger than those of fingers. Disk of 1st toe about $\frac{2}{3}$ that of 2nd; 4th toe very long, 1st, 2nd and 5th short. Subarticular tubercles well defined, two distinct round metatarsal tubercles. A distinct short tarsal fold extends from the inner metatarsal tubercle to about the middle of the tarsus. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the tip of snout.

Skin of all upper surfaces densely chagreened, under the magnifying glass minutely granular; a very low median dorsal ridge. On the hindmost part of back and upper surfaces of hind limbs the granules are somewhat larger and intermixed with some spread round tubercles, more numerous and well

marked on tibia. Lower surfaces of thighs and tibiae are bordered on each side of a thin membranaceous fold, making these parts like adhesive disks. All lower surfaces perfectly smooth. A short and thick glandular fold from behind the orbit to the axil, concealing the upper part of the tympanum. Another faint and narrow, sometimes rather indistinct glandular fold runs from the upper corner of the orbit to the groin, forming a distinct limit between the back and the sides.



Fig. 2 Dorsal view of *Phyllobates intermedius*.

Colour in alcohol: Upper part of head light brown, that of body darker brown, bordered on each side by a rather broad light brown band. A sharply limited broad blackish brown band runs from the tip of snout along the sides of head and body through the eye and tympanum to the vent, bordered above by a whitish line, formed by the lighter margin of the dorsolateral band, and below by the whitish lower parts of flanks. On these there are some well defined reddish brown spots. Upper lip margined with a broad white band from the tip of snout to the axil. Limbs light brown above with short dark cross bars. The posterior parts of femur light brown with a broad longitudinal dark brown band, extending out on the proximal part of tibia. Lower surfaces uniform whitish brown, somewhat darker on the limbs.

Measurements in mm: Total length 24, length of head 9.5, breadth of head 8.5, length of snout 4, diameter of eye 4, diameter of tympanum 2, forearm and hand 10, the whole fore limb 17, femur 11, tibia 12, foot 18, the whole hind limb 41.

According to the key of this genus, given by BARBOUR and NOBLE in Bull. Mus. Comp. Zool. Harvard Coll. Cambridge vol. 63, 1920, p. 401, this specimen belongs to the group which contains the species *latinasus* COPE and *sylvatica* BAKER & NOBLE. By its long hind limbs and large tympanum should be an intermediate form between these, *latinasus* having short limbs and large tympanum, *sylvatica* the contrary.

The allied than and Pe losteth fourth eye» from diame eye». nasus species Its ty adpress on the black line from the bod From large t siderabl above i only »in tion on and the of hind branace well dev nor in l By th bury BLo this spec greyish hind ma of second on the h Proba 14 mm in 1200 m, well with nearly th large (I

Though, evidently, my species must be regarded as closely allied to both these there are, however, several other characters than those mentioned by which it is distinguished from them, and I do not dare to identify it with any of these.

Peculiarly enough I find in CORE's diagnosis of *Ph. (Costethus) latinasus* the statement that »Tympanum equal one fourth extent of orbit, heel reaches the anterior border of the eye» (Proc. Ac. Philad. 1863 p. 48), a rather great difference from what is said in the key mentioned: »Tympanum one half diameter of eye, tibiotarsal articulation reaching barely to eye». It seems to me that BARBOUR's and NOBLE's *Ph. latinasus* can scarcely be the same as the type, nor can my species be identical with *latinasus* as it is diagnosed by CORE. Its tympanum is half the diameter of eye, the heel of the adpressed hind limb reaches the tip of snout, there is no web on the fingers, of which the 2nd is not shorter than 1st, the black lateral band is not interrupted by an oblique white line from the femur, and it is pale-bordered above also on the body.

From *sylvatica*, described loc. cit. p. 396, it differs by its large tympanum ($1\frac{1}{2}$ not $\frac{1}{3}$ the eye), the heel reaches considerably beyond the eye, the black lateral band is bordered above in its whole length by a whitish line not with yellow only »in the body region». There is no dark and light reticulation on the sides of body and on the hind sides of thighs, and the posterior part of back and especially the upper parts of hind limbs are distinctly tubercular. Besides, any membranaceous folds on the margins of the thighs and tibiae, so well developed in my specimen, are not recorded in *sylvatica*, nor in *latinasus*.

By the colour this species very much resembles *Ph. kingsbury* BLGR, but I cannot believe that it can be identified with this species which has the throat and breast mottled with greyish brown, short hind limbs, the heel only reaching the hind margin of orbit, the disk of first toe as large as that of second and no tubercles on the hind part of back and on the hind limbs.

Probably the two smallest specimens mentioned (12 and 14 mm in length) from San Francisco near Mera, Rio Pastaza, 1200 m, Oct. 1937 also belong to this species, corresponding well with it. Their hind limbs are long, the heel reaches nearly the tip of snout, the tympanum seems to be rather large (I am not able to get exact measurements of this in

these small specimens), and the hindmost part of back and especially the tibiae are minutely, but distinctly, tubercular. Also the colour is the same as in the type, except that the back is uniform dark brown without any darker middle area and lighter lateral bands. The blackish sides are bordered above by a fine whitish line from the nostril, and lower surfaces are uniform whitish.

Phyllobates taeniatus, nova species.

One female specimen, 20 mm in length, Rio Cosanga near Archidona, 800 m, Dec. 1937.

Habit rather stout; head scarcely longer than broad; snout broad and rounded, not depressed, slightly overlapping, a little longer than the diameter of eye. Upper jaw with a very small median notch for receiving a short rounded knob at the symphysis of the mandibular. Nostril much nearer the tip of snout than the eye. Canthus rostralis distinct, curved. Loreal region vertical, slightly concave. Interorbital space broader than the upper eyelid. Tympanum rather large, about $\frac{1}{2}$ the diameter of eye, well distinct, but its upper margin is concealed by a thick tympanic fold. Tongue long and narrow, pyriform and slightly nicked behind, its posterior half free.

Fingers short with slightly dilated tips. First finger a trifle shorter than second. A slight rudiment of web between second and third fingers. A round carpal tubercle and distinct subarticular ones. Hind limbs short. If the length of tibia is measured off from the knee of the addressed femur, it reaches the tympanum. Disks of toes small but distinct and larger than those of fingers. Subarticular tubercles slightly prominent, two metatarsal ones, a round outer and an oval inner, from which latter a distinct short curved ridge runs out on the tarsus, reaching its middle. No web on toes.

Skin smooth above and below, except on the hindmost part of back, which is sparsely and minutely tubercular. A thick fold above the tympanum to axil and a glandular dorso-lateral fold from orbit to groin, anteriorly thick, nearly papatoid-like, and lastly a fainter one from the upper posterior corner of orbit, obliquely crossing the side of body to the lower corner of groin, more or less distinct. A thin membranaceous fold along the front and hind margins of the lower surface of thighs as in *Ph. intermedius*. As the present specimen is a female, these folds are not a male character as I believed at first. Nor does that seem to be the case regarding the tubercles on the back, which are to be seen also in this female specimen.

Colour in alcohol: Upper parts light brown with four longitudinal blackish stripes on the back, an inner narrower pair and another broader dorso-lateral one. The former begins on the nape, where it forms an x-shaped connection, the front branches of which touch the upper eyelids. The long posterior ones end on each side of the vent, embracing this one. The outer pair begins behind the orbits and extends to the groin, becoming more or less broad behind. A third blackish band runs from the tip of snout below the canthus rostralis through eye and above tympanum to the axil, where it becomes broader and continues as a broad dark band along the upper parts of flanks to groin, minutely mottled with light. A light band round the snout runs along the margin of the upper jaw to



Fig. 3. Dorsal view of *Ph. taeniatus*.

the axil. The interorbital space and the forehead are designed with a short curved longitudinal streak and some small rounded spots of the same colour as the dorsal bands. A fine light line, beginning at the nostril and running above the dark canthal band and bordering the edge of the upper eyelid, crosses obliquely the dark flank downwards to the lower corner of the groin, following the lateral fold. On the head this line is scarcely distinguishable but well distinct on the sides of body. There is no light dorso-lateral line, bordering the dark flanks above as in several other species of this genus. Upper parts of limbs light brown with distinct dark brown bars. Thighs posteriorly marbled with light and brown. Lower parts of flanks and all lower surfaces uniform brownish white.

Measurements in mm. Total length 20, length of head 6.8, breadth of head 6.2, length of snout 3, diameter of eye 2.5, of tympanum 1.4, forearm and hand 8.6, the whole fore limb 12.5, femur 8, tibia 9, foot 13.5, the whole hind limb 30.5.

It seems to me that the unspotted whitish lower surfaces, the white distinct line from above the eye obliquely downwards to the groin, the dark stripes on the back, the lack of any light dorso-lateral line, the short hind limbs, and the presence of the dorso-lateral fold distinguish this specimen from every hitherto described species of this genus.

According to the key of BARBOUR and NOBLE, mentioned in the preceding, it should be referred to *Ph. vertebralis* BLGR also from Ecuador, but this species is said to have tympanum rather indistinct, the dark lateral band edged above with whitish, a fine vertebral whitish line, and no dark dorsal bands (Ann. Mag. Nat. Hist. Ser. 7, vol. 4, p. 456.) I cannot identify it with this one.

Phyllobates riocosangae Nova species.

Two specimens 21 and 19 mm in total length. Rio Cosanga near Archidona, 600 m, Dec. 1937.

Description of the larger specimen, a male. Habit rather stout. Head a little longer than broad. Snout broad and rounded, nearly truncate as long as the diameter of eye. A scarcely visible notch on the middle of the edge of the upper jaw and a corresponding small knob at the symphysis of the mandibular. Nostril at the end of the snout. Canthus rostralis distinct; loreal region vertical, slightly concave. Interorbital space broader than the upper eyelid. Tympanum half the diameter of eye, distinct, but its upper part, nearly the half, concealed by a thick tympanic fold. Tongue narrow, pyriform, rounded behind, not nicked, its posterior half free.

Fingers free, the first as long as or slightly longer than second. Disks small. A distinct round outer metacarpal tubercle and a much smaller oval inner one. Subarticular tubercles distinct. Hind limbs moderate. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the centre of eye. Disks of toes small, on the third and fourth toe distinct, but on first, second and fifth only a little broader than the rests of toes. There are no traces of web. Subarticular tubercles slightly prominent; two small metatarsal tubercles, a round outer and a short oblong inner one, from which a short fold runs out on the tarsus, ending before the middle with a protruding curved edge.

Upper surfaces of head and back chagreened, with sparsely ead rounded low tubercles on the hind part of back and the thighs and tibiae. A thick fold above tympanum to and a low narrow one from the orbit, obliquely crossing

the flanks to the groin, most distinct behind. Lower parts completely smooth.

Colour in alcohol: Upper parts of head and body blackish brown, without distinct limits merging into the black sides. A rather ill-defined light line runs round the upper margin of the snout along canthus rostralis and the edge of upper eyelid, and then, becoming broader and more distinct, it obliquely crosses the flanks along the lateral fold to the lower corner of the groin. A broad white band margins the upper jaw round the tip of snout beneath the nostril, eye and tympanum and extends to the axil. Above this white band runs a black one round the tip of snout, through the nostril, eye and tympanum, behind which it gets broader, covering the whole side of body, obliquely crossed by the white line mentioned. Above it merges into the dark of back, beneath it is sharply limited from the white belly. Fore limbs brownish white with small brown spots; hind limbs above with regular alternating light and dark brown cross-bars. Humerus and thigh both on front and hind sides with a longitudinal dark brown stripe. All lower parts whitish, all over densely sprenghed with brownish rather small spots with diffuse borders. Lower surfaces of feet uniform dark brown.

The somewhat smaller specimen, probably a female, differs in the following points. Tongue distinctly nicked, disks of fingers and toes somewhat larger, being in all digits apparently broader than the rests of digits, upper parts of skin not chagreened but, as in the larger specimen, sparsely tubercular on the hindmost part of back, upper parts brownish, not blackish, thus distinctly limited from the black sides, and lastly, the light oblique line of the flanks is narrower and is not to be seen on the head, where it is rather indistinct even in the larger specimen.

In remaining parts the two specimens are exactly alike, as also seen by the measurements, and I cannot believe that these rather unimportant differences may be any obstacle for their being referred to the same species, especially as they were caught in the same locality.

There is, however, another question regarding these specimens which has troubled me. To judge from the description of *Ph. bolivianus* BLGR (Ann. nat. hist. (7) 10 1902, p. 397) they seem to correspond so well with this species that I have endeavored to identify them with it. Because of the smaller

tympanum, only $\frac{1}{2}$ not $\frac{2}{3}$ the eye, nostril at the tip of snout, the distinct cross-bars on the limbs, the tubercles on the back and in the male also on the hind limbs, the diffusely brown not black spots on the lower parts, and the different patria I have not dared to do so.

Measurements in mm. Total length 21—19, length of head 7.1—6.5, breadth of head 6.5—6.1, length of snout 3—2.8, diameter of eye 3—2.8, diameter of tympanum 1.5—1.4, forearm and hand 10—8.8, the whole fore limb 14.2—12.8, femur 8.9—8.3, tibia 9—8.6, foot 14.2—14.

Atelopus palmatus, Nova species.

Five specimens, 21—32 mm in total length, Rio Pastaza, 1000 m. Oct. 1937.

Habit slender, depressed. Head considerably longer than broad. Forehead concave, pentagonal, snout as long as or a little longer than the diameter of eye, acuminate, much projecting over the mouth, ending with a triangular glandular swelling. A small knob at the symphysis of the mandibular and a corresponding distinct notch on the upper jaw. Canthus rostralis distinct, curved, swollen, especially anteriorly. Loreal region vertical, high, slightly concave. Nostril a little nearer the tip of snout than the orbit. Interorbital space broader than the upper eyelid. Tongue elliptical, very narrow, entire and free to a great extent.

Fore limbs slender, about $\frac{3}{4}$ the total length. Fingers short and broad, with rounded, not dilated tips. First finger much shorter than second, involved in the web. Sometimes the tip is more or less free. Other fingers webbed at the base, the web extending as broad dermal folds to the tip of the second finger and more or less along the sides of 3rd and 4th. A distinct round metacarpal tubercle; subarticular tubercles slightly protruding.

Hind limbs long and slender. If the length of tibia is measured off from the knee of the adpressed femur, it reaches a little before the eye. Toes short, thickened at the tips, not dilated, entirely or nearly entirely webbed. First and second toes very short but distinct, totally involved in the web. On the third and fifth ones the web extends to or even out on their tips. On the fourth toe it reaches to the base of the penultimate phalanx and extends as broad folds to the tip. Also the outer sides of first and fifth toes are bordered by folds. Subarticular tubercles indistinct. A very small round outer metatarsal tubercle, no inner one.

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Above smooth, often very finely and densely wrinkled; tympanic region and upper eyelids with small granules, the margins of the eyelids swollen and protruding. The margin of the transparent lower eyelid golden. Sides of body and lower surfaces indistinctly areolate and wrinkled as the upper parts. Behind the orbit there is a swollen short vertical ridge forming a right angle with the protruding edge of the frontoparietal bone, which is broadly swollen, forming a kind of a low and narrow but rather distinct paratoid gland and continuing as a more or less distinct ridge along the dorso-lateral line. Besides, there is between the posterior parts of

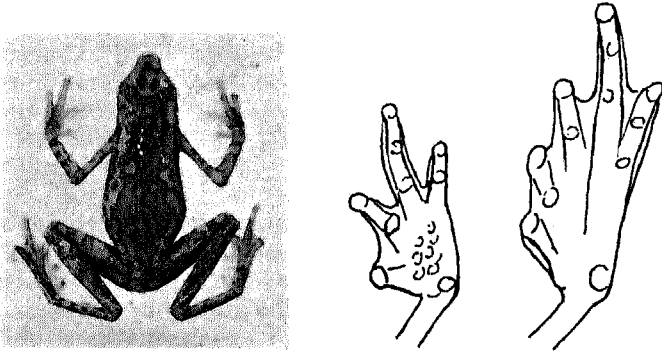


Fig. 4. Dorsal view and hand and foot of *A. palmatus*.

upper eyelids and behind them a rather large round glandular porous swelling.

Colour in alcohol of the largest specimen. Very beautiful. Upper parts of body brick red with large black-edged irregular greyish white markings. The red colour forms a broad sinuous area, beginning between orbits with a rather deep emargination, the branches of which cover the upper eyelids, and extends to the vent, gradually enlarged behind, thus occupying the whole posterior part of the back. In this red area there are several light black-edged spots and more or less deep also black-edged inlets of the light irregular dorso-lateral band which borders the red colour on each side from orbit to groin, here and there adorned with well marked reddish brown spots. Further on, outside this light band an irregular red black-edged one runs from the tip of snout through the eye, continuing to the middle of the flanks, where it is broken up into spots. Forehead light with rather large red irregular spots.

Upper parts of limbs coloured as the back. On the thighs

and tibiae the red colour forms an irregular more or less interrupted longitudinal band with light black-edged spots and inlets. On feet and arms the two colours form alternating cross-bars. Lower surfaces uniform light except outer fingers and toes, which are brownish. Inner fingers and toes colourless above and beneath.

In the main the colour of the other specimens is the same as that now described, but the light markings vary considerably in number and size, and in some the red colour changes into yellowish red.

Measurements in mm of the two largest specimens, both females, somewhat extended with large unpigmented eggs (1.5 mm in diameter): Total length 33—27, length of head 10—9, breadth of head 8—7.8, length of snout 4—3.8, diameter of eye 3.5—3.3, interorbital breadth 3.4—3, forearm and hand 16—14, hand 9—9, the whole fore limb 24—20, femur 15—13.3, tibia 15—14, foot 21—19.

I am not able to identify these specimens with any of the numerous species of this genus, described from Ecuador. The beautiful colourpattern corresponds rather well with that of *Phryniscus pulcher*, described and figured by BOULENGER in Cat. Batr. Sal. Brit. Mus., but my specimens have no black spots on the lower surfaces, which are uniform brownish or greyish white not carmin, the back is red not blackish brown, and there is no indication of any green in the light markings. Besides, *A. pulcher* is said to have only $\frac{1}{3}$ webbed toes, shorter hind limbs, no metatarsal and metacarpal tubercles, and there are no statements of any paratoid swelling and any dorso-lateral fold.

Regarding the development of the web BOULENGER's figure corresponds badly with his description. In this nothing is said about any web on the fingers, and the toes are stated to be $\frac{1}{3}$ webbed. In the figure, however, the first finger is involved in the web, and the toes seem to be much more webbed than $\frac{1}{3}$. In these cases my specimens correspond rather well with the figure, but even if this shows the more right state of things, the remaining differences seem to be great enough for distinguishing my species from *A. pulcher*.

From this same locality there are three small specimens 11—13 mm in total length), possibly youngs of this species. They correspond with this in having the frontoparietal bone with protruding edge, thickened to a kind of paratoid and

continuing as a distinct glandular dorso-lateral fold. Also the colourpattern is partly the same, a front part of a reddish dorsal area being visible of about the same shape as described in the large specimens of this species. The fingers, however, are free, the toes much less webbed, and the hind limbs are shorter. Perhaps these differences are due to the juvenile age, but the specimens are too small and undecided for any certain determination.

Atelopus carinatus Nova species.

A single specimen, 28 mm in total length, Eastern Ecuador, 1937.

Habit stout, very like *A. laevis*, as it is figured by GÜNTHER in his catalogue *Batr. Sal.* Pl. III fig. A. Head as long as broad. Snout broadly rounded, somewhat overlapping, shorter than the diameter of eye. Canthus rostralis very distinct, protruding, laterally limiting the concave median part of forehead. Loreal region vertical, concave. Nostril at the tip of snout. Interorbital space broader than the upper eyelid. Tongue elliptical, very narrow, entire and free in its posterior half.

Fore limbs short. Fingers free, short and broad with rounded, swollen, but not dilated tips. First finger well developed but distinctly shorter than second. A well developed round metacarpal tubercle, also subarticular tubercles distinct. Hind limbs short, if the length of tibia is measured off from the knee of the adpressed femur, it reaches between axil and orbit. Toes broad and short with rounded not dilated, thickened tips, three fourths webbed, the web, however, deeply emarginate. On the first toe the web reaches out on the tips; on the fourth toe it reaches the infrapenultimate phalanx but continues as broad folds to the tip, on the other toes it reaches the tips, but only as broad folds. There are dermal margins also on the outer sides of the first and fifth toes. Two small round distinct metatarsal tubercles, subarticular tubercles slightly prominent.

Upper surface of head smooth, that of body with large round flat warts. Sides of body, tympanic region and proximal part of humerus densely covered with pointed tubercles. On the dorso-lateral line a row of such tubercles forms a sharp limit between back and sides, converging behind and embracing a triangular area before the vent. The edges of the broad frontoparietal bones are protruding and elevated, forming very distinct short ridges behind the orbits. Any paratoids are not to be seen. On the anterior part of the back between the

shoulders there is an urn-shaped figure, limited by short slightly arched dermal folds, the opening of the urn behind. Anal region of the thighs coarsely tubercular. Lower surfaces under the magnifying glass very finely granular and transversely finely and densely wrinkled.

Colour in alcohol: Upper parts of head and body uniform black, limbs above blackish brown, lower surfaces of head, body and thighs light greyish brown, other lower parts of limbs dark brown.

Measurements in mm: Total length 28, length of head 9.5,



Fig. 5. Upper view of *A. carinatus*.

breadth of head 9.5, length of snout 3, diameter of eye 3.5, forearm and hand 13, the whole fore limb 19, femur 12, tibia 11, foot 18.

As mentioned above, this specimen reminds in a rather high degree of GÜNTHER's figure of *Phrynisceus (Atelopus) laevis* (*Ph. ignescens* CORNALIA). So is the case too regarding two other species also from Colombia, *A. carrikeri* RUTHVEN (Occ. pprs Mus. Zool., Mich. 28, 1916) and *A. chiriquensis* SHREEVE (Occ. pprs Boston Soc. Nat., Hist. 8, 1936, p. 269), which seem to be so closely allied to *laevis* that I dare to suspect that they are synonymous with this one. None of the differences stated between them seems to be of sufficient value for their specific distinction. RUTHVEN's description of his species shows that the presence of spiny warts on back and sides of body is a juvenile character and very variable even in the youngs, and I can find the »characteristic coloration» in *carrikeri* as also in *chiriquensis* among the many colour-variations described in *laevis*. The snout is protruding in all and longer than the

eye, nostril is not, or slightly, nearer the tip of snout than the eye, and the fingers are webbed at the base. (In *chiriquensis* the fingers are said to be »not webbed», but the figured specimen shows a rather distinct web.) Also other differences stated seem to be too small and unimportant for specifically distinguishing these three forms.

Contrary to this my specimen has the snout nearly truncate, not protruding and distinctly shorter than the eye, nostrils are situated at the outmost corners of the nearly truncate tip of snout, the fingers are quite free, and lastly, the protruding edges of the broad frontoparietal bones and the urn-like figure on the nape give it a rather characteristic appearance. It seems to be more distinct from *lacris* (*ignescens*) than the two other forms of this group, and I believe that there are sufficient reasons for describing it as a new species.

Hyloxalus bocagii ESPADA.

13 specimens, 15—26 mm in total length, Rio Pastaza, Watershed, 1937—38.

All these specimens correspond very well with the short original description of this species, except No 4, in the table below, which has the toes webbed only at the base and no or narrow fringes along their sides. Besides, the toes are

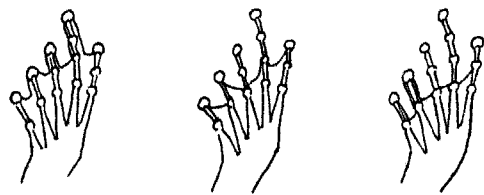


Fig. 6. Three stages of the development of the web on the foot of *H. bocagii*.

distinctly longer than in the other specimens. As, however, it is quite like the others, corresponding with them in all other respects, colour, habitus and measurements of the different parts of body (cfr the table), I cannot but think that the differences mentioned are to be regarded as individual aberrations, not qualifying it for being specifically distinguished from the other specimens, which have the toes shorter and more or less entirely webbed. Even among them there is a rather great variation of the development of the web, which is more or less incised. On the 1st and 5th toes and on the outer sides of the 2nd and sometimes also of the 3rd it

extends generally to or out on the disks. In other cases the penultimate phalanges are only fringed to more or less extent by dermal borders, generally broad and distinct, but sometimes rather narrow or absent, in which case the feet can scarcely be said to be «nearly entirely webbed». On the 4th toe the web never extends further than to the base of the infrapenultimate phalanx. The greatest development of the web is to be found in the smallest specimen (15 mm). Perhaps the web wears off by age.

Thus, it seems to me that the different development of the web cannot be regarded as a good specific character for distinguishing this species from closely allied, and I dare to doubt whether *Hylorobus fuliginosus* Esr. may be a valid species. Its habitat is the same as that of *H. bocagii*, and it is said to differ from this only »in its half-webbed toes and granular upper surfaces». I am strengthened in this opinion by the fact that also this latter character varies in these specimens. They are generally smooth, but at least one of them has small, but distinct round tubercles on the hind part of back.

Measurements in mm.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-----------------------|------|------|------|-----|-----|-----|-----|------|-----|------|------|------|
| Total length . . . | 19 | 21 | 22 | 23 | 24 | 24 | 24 | 25 | 26 | 26 | 26 | 28 |
| Length of head . . . | 7.8 | 8 | 8.5 | 8.5 | 9.2 | 9.3 | 9 | 9.5 | 10 | 10 | 10 | 10 |
| Breadth » . . . | 7 | 8 | 8 | 8 | 8.6 | 8.3 | 8.7 | 9 | 8.5 | 10 | 9 | 9.5 |
| Length of snout . . . | 3.5 | 4 | 4 | 4 | 4 | 4 | 4 | 3.5 | 4 | 4 | 4 | 4 |
| Diameter of eye . . . | 3.8 | 4.3 | 4.2 | 4.2 | 4 | 4 | 4.4 | 3.8 | 4.2 | 4.2 | 4.3 | 4.6 |
| Length of femur . . . | 9 | 10.8 | 10.2 | 10 | 11 | 11 | 11 | 12 | 12 | 13 | 12.5 | 13 |
| » » tibia . . . | 9 | 10.5 | 10.2 | 10 | 11 | 11 | 11 | 12 | 11 | 12.5 | 12 | 12.5 |
| » » foot . . . | 14.5 | 16 | 15 | 18 | 15 | 16 | 17 | 16.5 | 17 | 18 | 17.2 | 18 |

Fam. Leptodactylidae.

Ceratotyla cristata Nova species.

One specimen, female, Rio Pastaza, Watershed, 1938.

Tongue large, rounded, nearly squarish. Vomerine teeth in two long V-shaped ridges before and between the large choanae, converging behind to the posterior borders of these. The anterior part of these ridges, or that before the choanae, is dilated and furnished with some more obtuse and stronger teeth than those between the choanae on the compressed anterior part, the hindmost section of which is much lower than the part before. Two long, very distinct toothed trans-

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teeth.

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orbital space

Nostrils
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snout. The
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verse palatine ridges, mesially separated, the median teeth of which are much larger than the lateral ones. On each side of the mandibular symphysis there is a strong and claw-like tooth.

Head much depressed, strongly ossified, forming a very broad triangular helmet, quite like that of *C. bubalis* ESPADA, as figured in Cat., Batr., Sal. Brit. Mus. p. 457. Between the orbits strong osseous ridges form a pentagonal area, the front angle of which begins immediately behind the nostrils and whose short hind border is formed by the elevated osseous hind margin of the helmet. This margin is moderately arched, having its lateral processes strongly diverging. The distance between them is slightly shorter than their distance from the

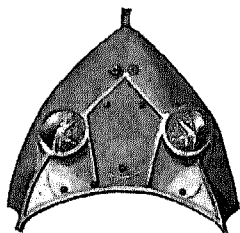


Fig. 7. Upper view of head of *C. cristata*.

tip of snout and about three times the width of the interorbital space.

Nostrils near each other on the upper ridge of the broad roof-like forehead, about halfway between orbit and tip of snout. The distance between them is less than half their distance to tip of snout and $\frac{1}{4}$ the width of the interorbital space. No canthus rostralis. Loreal region broad, gently sloping towards the margin of the upper jaw. Snout nearly twice as long as the diameter of eye, triangularly pointed and provided with a rather long and broad depressed dermal appendage, ending in two short obtuse points.

Upper surface of head very finely chagreened with a few small pointed tubercles. On the warty rounded upper eyelid there are two rather long finger-like triangular papillae, the longest of them placed on about the middle of the eyelid near its margin. Its broad base is connected with some short other tubercles, forming together with them a short dermal denticulated fold transversely across the eyelid. The other papilla, which is about half the length of the first, is single and placed a short space behind this fold. In the pentagonal area between the orbits there are an anterior pair of short conical

tubercles and a single posterior one, and in each postorbital region a similar one near the hind edge of the helmet. Besides, a short dermal flap, ending in a very short finger-like appendage, terminates the lateral processes of the helmet. Tympanum distinct, large, oval, high and narrow, nearly as high as the orbital diameter.

First finger considerably longer than second, opposite to the others. Disks large and rounded, twice as broad as the penultimate phalanx. Outer fingers distinctly webbed at the base, all narrowly fringed to the tips. Hind limb long, the length of tibia, measured off from the knee of the adpressed femur, marks a point considerably beyond the snout. Toes halfwebbed. On the 1st, 5th, inner and outer sides of 2nd and outer side of 3rd the web reaches the base of the penultimate phalanx, on the 4th toe and on the inner side of the 3rd the base of the infrapenultimate one. In all toes the membrane continues as more or less broad dermal folds to the disks. A well developed dermal fold extends also along the outer side of the 5th toe. Disks well developed, somewhat smaller than those of fingers. A distinct inner oblong metatarsal tubercle, no distinct outer one.

Skin of back and head chagreened or, seen by the magnifying glass, minutely granular with a few small conical tubercles, two on the left side of the back, one on the right, and a single one before the vent. As in *Ceratomyza johnstoni* NOBLE there is on the middle of the back a short median crest of six long compressed tubercles, formed by the raised neural spines of the tebrae. Fore limbs covered with small spiny tubercles, forming a denticulated fold or ridge along the outer side of forearm, continuing as a fold along the outer finger. Similar small and distantly placed pointed tubercles are to be seen also on the hind limbs, partly on their anterior margins, partly placed in transverse rows across them. As these latter tubercles and the skin between them are black, these rows appear as somewhat raised black folds, crossing the limbs, four on each of femur, tibia, tarsus, and to some extent also on the fore limb. Sides of body and lower surfaces, except tibia and tarsus, covered with minute granules, on the foot intermixed with spread pointed tubercles, rather small, except two larger ones, placed one behind the other mesially on the posterior part of the throat. There is a small triangular dermal flap on the heel.

Colour in alcohol: Upper surfaces of head and body uniform reddish brown, those of limbs lighter brown and, as coloured, barred with very distinct narrow blackish stripes on each of femur, tibia and tarsus. Throat and breast

purplish brown, marbled with light grey. Posterior parts of belly and lower parts of flanks and limbs marbled with dirty grey and dark purplish brown. The two larger tubercles on the throat whitish, sharply contrasting to the dark surrounding parts. Anal region of thighs and lower surfaces of tarsus and outer parts of the feet black. In each ovary there are four large unpigmented eggs and a few small ones.

Measurements in mm. Total length 62, length of head, measured from the posterior margin of tympanum 28, breadth of head 30, length of snout 13.5, diameter of eye 7.2, of tympanum 6.3, width of interorbital space 10, of upper eyelid 6, distance between nostrils 2.5, their distance to tip of snout 6, to orbits 6.5, length of the appendage on snout 3, distance between the lateral bony processes of the helmet 27, their distance to tip of snout 32, length of forearm and hand 32, of hand 21, femur 36, tibia 36.5, foot 50. Breadth of disks on fingers 2.6, on toes 2.3.

As already stated, by the shape of the head this species resembles in a high degree *C. bubalus* ESPADA, but it is well distinguished from this by the shape of the tongue, by the bifid, rather broad appendage on the snout, the two rather long papillae on the upper eyelid, the dorsal crest, the basal web on the fingers, a more developed web on the toes and longer hind limbs. By the singular dorsal crest and many other important characters, however, it corresponds still more with *C. johnstoni* from Colombia, described by NOBLE in Bull. Amer. Mus. Nat. Hist. Bd 37, 1917, Pl. 43, but it seems to be well distinguished even from this, which differs in the following points: The dermal flap on the snout is short, pointed and compressed, and there is no dermal flap on the extremities of the helmet. The distance between the nostrils is equal to their distance from tip of snout and more than half the distance from orbit. Skin of head and back is distinctly, belly and sides of body coarsely, granular and provided with a number of thickly-set low tubercles. Hind limbs are shorter and the web on the toes somewhat less developed («the first toe is barely webbed, and on the fourth toe the web reaches to point about half the length of proximal phalanx»), and, to judge from NOBLE's figure, the disks are smaller. The shape of the upper eyelid seems to be somewhat different, which is also the case regarding the colour. In my specimen the sides of body are not ashy and not reticulated with straw colour, their upper parts being uniform dark reddish brown as the back and the lower parts dirty grey, marbled or reticulated

with reddish brown, and lastly the cross-bars on limbs are said to be ashy in *C. johnstoni*, not black as in my specimen.

Of species of this genus, hitherto described, *C. proboscidea* ESPADA seems to be the only which has a *bifid* appendage on the snout as this one, but according to the figure in NORDEN Amphibia, Anura I p. 360 the appendage in *proboscidea* is longer and differently shaped than in my specimen. It is also said to be compressed and denticulated at the base. Besides, the upper eyelid is produced into a horn-like dermal appendage very dissimilar to the papillae in my specimen, and, to judge from the very insufficient description and figure of *C. proboscidea*, it differs in having the tongue longer than broad, the helmet only slightly curved, no dorsal crest, no dermal appendages on the osseous extremities of the helmet, and the toes only $\frac{1}{3}$ webbed.

Ceratophrys testudo Nova species.

One specimen, a male, Rio Pastaza, Watershead, 1937.

Body depressed, short and broad, nearly circular. Head bony, very large and elevated, forwards and laterally abruptly sloping towards the margin of the upper jaw with four pairs of bony ridges. A rather low parallel one from nostrils to the tip of snout, bordering a rather deep furrow on the middle of the snout, two more distinctly protruding ones from the hind margin of the orbit, diverging on each side of tympanum, the anterior ridge running to the articulation of the mouth, the posterior to the axil, and lastly a semilunar one, bordering the orbits behind. No vomerine teeth. Nostrils near each other on the upper surface of the forehead, a little nearer the eye than the tip of snout. No canthus rostralis; loreal region broad and oblique, not concave. Interorbital space concave, as broad as the upper eyelid. This is not produced into a horn but provided with a flattened finger-like tubercle on the middle of its outer margin, a little longer than the width of the upper eyelid, concave on its outer surface. Eye small, its diameter somewhat smaller than half its distance from the tip of snout, which is broadly rounded, not pointed. Tympanum rather indistinct, minutely granular as surrounding parts of the skin, about $\frac{3}{4}$ the eye.

First finger shorter than second, third long, outer fingers slightly fringed. The tips of fingers rounded, not dilated. A very large broad lobate outer metacarpal tubercle and a moderate oblong inner one. A row of rather large triangular tubercles along the outer side of the forearm. Toes short and

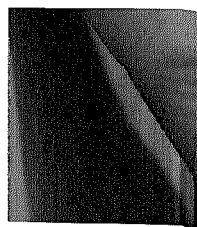
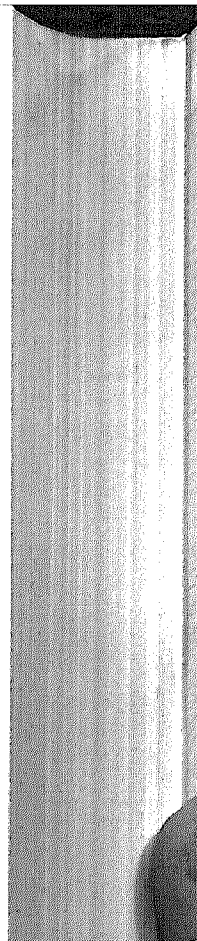
narrow, rounded at the tips, half webbed. On the inner side of 2nd and outer side of 3rd toes the web reaches the base of the penultimate phalanx, on the 1st and outer side of 2nd it reaches the middle of this phalanx, and on 4th toe and on inner side of the 3rd three phalanges are free from web, except a narrow rim along their sides. The 5th toe lastly is webbed to the tip. A large shovel-shaped inner metatarsal tubercle, no outer one, but there is a row of triangular tubercles along the outer side of tarsus, continuing as a dermal fold along the outer toe. Hind limbs short, the length of



Fig. 8. Dorsal view of *C. testudo*.

tibia measured off from the knee of the adpressed femur does not reach the eye.

The middle part off the back is bordered by two dermal folds, beginning behind the orbits, approaching each other on the middle of the back, where they diverge, and, approaching again, finally unite above the vent, as figured in *C. appendiculata* by BOULENGER in Cat. Batr. Sal. Brit. Mus. Pl. 15 fig. 1, but differently from this and some other species, the folds do not touch the upper eyelids, beginning behind them. Their anterior and middle parts are formed by three pairs of raised triangular dermal flaps, connected or slightly separated at the bases, each with a triangular compressed and striated large tubercle close to its outside. The posterior parts of the folds are very low, but even these are formed by dermal flaps, though very small. Between the orbital papillae two stripes of low oblong tubercles run near each other across the eyelids and the interorbital space, diverging on the middle of the latter, by this forming a four-pointed star, which is not ossified but covered with soft granular skin. Sides of back and



flanks with rather large triangular papillae, more or less connected into short longitudinal folds. Lower surfaces very finely granular.

Colour in alcohol: The ossified head, the middle of the back between the folds and the upper parts of the limbs brown, the head with faint pairs of blackedged dark brown bands, viz. one pair on the forehead from nostrils to tip of snout along the outer sides of the bony ridges, and three oblique pairs on the loreal region to the margin of the upper jaw, one pair from nostrils, two pairs from orbits. Sides of back and flanks dark brown with blackish markings, viz. three pairs of spots on the tubercles at the anterior flaps of the folds and aside them, a band along the posterior ones of these, two or three longitudinal stripes along the lateral rows of papillae, and besides very distinct transverse bands on the limbs. Chin and breast purplish brown, belly and lower surfaces of limbs greyish white with some brownish spots on the sides of belly. Lower surfaces of tarsus and feet dark brown, the distal part of the membrane between the outer toes, however, colourless.

Measurements in mm. Total length 32, length of head 15, breadth of head 22, length of snout 10, diameter of orbit 4.5, of tympanum 3, length of forearm and hand 16, of hand 10, of femur 13.2, of tibia 11.5, of foot 17.5.

By its bony head, the two remarkable, very distinct folds on the back, which do not continue as triangular horns on the upper eyelids as in *C. appendiculata* GTHR and *C. boiei* WIED, but are quite separated from these, which instead are provided with a rather long finger-like tentacle, by the total want of vomerine teeth, and some other characters, this species seems to be well distinguished from all species of this genus, hitherto known. Perhaps it is most closely related to *C. calcarata* BLAN from Colombia, which is also characterized by a bony head and very indistinct vomerine teeth, but as it differs from this by want of a horn on the upper eyelids, presence of folds on the back, a short first finger etc., I cannot identify it with this.

Syrrhopus coeruleus Nova species.

Five specimens, 18—31 mm in total length, Eastern Ecuador 17—1938.

Description of the two largest specimens, a female 31 mm, male 25 mm.

Habit stout, very like that of *Hyla arborea*. Head somewhat broader than long. Snout subacuminate, somewhat longer than the diameter of eye. Nostril near the tip of snout. Interorbital space as broad as the upper eyelid. Canthus rostralis distinct, loreal region nearly vertical, slightly concave. Tympanum distinct, about $\frac{1}{3}$ the diameter of eye. Tongue broad, heart-shaped in the female, rather narrow and oval in the male, in both slightly nicked behind. Vomerine teeth lack.

Fingers and toes without web. Their disks of about the same size, large, broad and rounded. The branches of the T-shaped distal bony phalanges long. First finger shorter than sec-



Fig. 9. Dorsal view of *S. coeruleus*.

ond. Subarticular tubercles of fingers as well as of toes distinctly prominent, two large metacarpal tubercles, the outer bifurcate in front, and two rounded metatarsal ones, the outer much smaller than the inner. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the front of the orbit.

In both specimens the upper surfaces of the head and body, in somewhat less degree also those of the limbs, are covered with small round tubercles. Belly, flanks and lower surfaces of thighs coarsely granular. There are two more or less distinct pairs of dermal folds, both beginning behind the orbits, one extending on the back to above the vent, where it unites, forming about the same curved lines as the dermal folds in *Ceratophrys testudo*, described above, though very much fainter. The other pair runs along the upper part of the flanks to the groin, ending aside the other. In the female this pair is not so well marked in contrary to the case in the male, in which the lateral folds are more distinct than the dorsal ones.

The male has a large outer vocal sac and a strong fold across the breast and another across the hind part of belly, extending forwards out on the sides, thus forming a kind of subventral adhesive disk. As a kind of corresponding to this there is in the female a rather well developed dermal fold, running along the limit between flanks and belly from the lower part of axil to the groin.

Colour in alcohol. In the female: All upper parts and sides of head and body, under surface of tarsus and palmar parts of feet beautifully bluish olive, chin olive, belly light with a faint bluish olive tint; other lower surfaces brownish white. Hind parts of thighs marbled with light and brown. The male resembles the female, but the bluish colour on the back and limbs is somewhat marbled with brown, and under surfaces are uniform greyish white.

The three other specimens, 24, 24, 18 mm in total length, the two larger males, the smallest probably female, lack tympanum (visible, however, on one side in one of the males) and are less tubercular, especially on the anterior parts. The tongue is oval and entire behind. All are uniform bluish olive above, lower surfaces of the smallest specimen is densely marbled with dark brown, that of the males greyish white, in one minutely dotted with dark. The absence of tympanum left out of consideration, these specimens are so strikingly like the type-specimens that there cannot be any doubt that all belong to the same species.

The descriptions of the species of this genus are generally too short to give any exact idea of them, but it seems to me that the most important distinguishing characters of my species are the stout habit, the remarkable colour, the tubercular upper and granular lower parts, the short 1st finger, the ridges

Measurements in mm.

| | | | | | |
|----------------------------|-----|------|-----|------|------|
| Total length | 31 | 25 | 24 | 24 | 18 |
| Length of head | 11 | 9 | 8.5 | 9 | 8.5 |
| Breadth of head | 12 | 9.2 | 9.2 | 9 | 6.9 |
| Length of snout | 5 | 4 | 4 | 4 | 3 |
| Diameter of eye | 4.3 | 3.8 | 4 | 3.5 | 3 |
| " of tympanum | 1.5 | 1.2 | 0.8 | — | — |
| Forearm and hand | 18 | 12.5 | 11 | 12.3 | 8 |
| Hand | 9 | 8 | 7 | 7.8 | 5.2 |
| Fore limb | 21 | 18.5 | 15 | 16.3 | 11 |
| Femur | 15 | 11 | 11 | 12 | 8 |
| Tibia | 15 | 12 | 11 | 12.5 | 8.5 |
| Foot | 22 | 18 | 17 | 17 | 12 |
| Hind limb | 52 | 41 | 39 | 41.5 | 28.5 |

or folds on the back and sides and the large disks. Perhaps it is most closely allied to *S. chalcus* PERS and *S. arcuatus* BLGR from the adjacent localities Colombia and W. Ecuador. but I cannot identify it with any of those. According to the figures (Nieden, Das Tierreich Liefr. 46, p. 402 and BLGR Proc. Zool. Soc. pl. 14, fig. 3. London 1898) these species are much more slender than my specimens, the colour is quite different, the snout is rounded, the loreal region oblique etc.

Syrhophus calcaratus Nova species.

One specimen, Rio Casanga near Archidona, 800 m, Dec., 1937. 21 mm in length.

Habit rather slender. Head about as long as broad. Snout as long as the diameter of orbit, the tip acuminate, not overlapping. Canthus rostralis swollen, curved, loreal region nearly vertical, slightly concave. Nostrils near the tip of snout, swollen. Interorbital space as broad as the upper eyelid. Tongue rather narrow, oval, pointed behind. No vomerine teeth. Tympanum distinct, small, $\frac{1}{3}$ the diameter of eye.

Fingers short, quite free, first distinctly shorter than second. Disk of first finger slightly broader than the phalanx behind it, disks of other fingers rather large, larger than half the width of tympanum, rounded. Toes without web and fringes, disks distinct, but a little smaller than those of fingers, truncate in front. A distinct oblong inner metatarsal tubercle, no outer one. If the length of tibia is measured off from the knee of the adpressed femur, it reaches between the orbit and nostril.

Upper surface of head, upper eyelids and tympanic region finely tubercular, back and upper parts of limbs nearly smooth. Heel with a very short conical tubercle. Chin and breast smooth, belly faintly, anal parts of thighs distinctly, granular. A crescent fold above tympanum to axil, a faint fold across the breast and distinct discoidal folds along the lower parts of sides of body.

Colour in alcohol: Upper parts pale brown with dark brown markings. The snout, upper eyelids, a broad X-shaped spot on the front part of back, its front branches touching the upper eyelids, some spots on the hind part of back, anteriorly and posteriorly on the sides of body, and well marked cross-bars on the limbs dark brown. Lower surfaces light brownish grey, chin and breast very minutely punctulated with dark. A dark band along the canthus rostralis and dark bands across the upper lip.

Measurements in mm. Total length 21, length of head breadth of head 8, length of snout and diameter of eye diameter of tympanum 1.3, fore arm and hand 9, femur tibia 11, foot 14.5, width of disk on 3rd finger 0.8.

In habit this specimen reminds of *S. areolatus* BLGR as is figured in Proc. Zool. Soc. London, 1898, v. 38, pl. 14 fig. but it seems to differ from this species by the acuminate snout, the very small disk on the inner finger, the discoid folds and by the colour. Besides, according to BOULENGER's diagnosis (loc. cit. p. 122) *S. areolatus* has the tympanum feebly distinct, the tibio-tarsal articulation reaching only to eye and the »skin areolate or coarsely granulate above and beneath», and no short »spur» is stated. I can identify no specimen neither with *S. areolatus* nor with the other South American species, *S. chalcus* PRDS, from Colombia.

Eleutherodactylus gollmeri PETERS.

Syn. *Hylodes güntneri* STEINDACHNER.

21 specimens collected by WM. CLARKE-MACINTYRE: 9 from Rio Casanga near Archidona 800 m Dec. 1937, 2 from Ambitagu 1200 m, Sept. 1937, 4 only labelled Rio Napo, 4 Rio Pastaza Watershed, and 2 only labelled Eastern Ecuador. Beside these 2, collected by ROLF BLOMBERG, Rio Pastaza.

The measurements given below show a great correspondence between these specimens and also between them and the type in all external points. Some more remarkable variations or aberrations may be noted. The lower surfaces are quite smooth in all except in five specimens from Rio Casanga, the four smallest ones and one of the largest (no. 2), which have the belly granular, a peculiar difference, as this character is always used as one of the most important for distinguishing the species of this genus. As this peculiarity is to be found also in the small specimen of *E. ventrimarmoratus* in this collection (p. 32), I have asked myself whether the granulation of the belly is a juvenile character, which disappears with age, but in special cases can remain in the adults. It is impossible specifically to distinguish the two largest specimens (no. 1 and 2 in the table), the former with smooth, the latter with granular belly. Both are from the same locality and completely alike in colour and habit. The table shows a quite striking correspondence between them.

A look at the table shows also a rather great variation

Measurements in mm. Total length 21, length of head 8, breadth of head 8, length of snout and diameter of eye 3.8, diameter of tympanum 1.3, fore arm and hand 9, femur 9.8, tibia 11, foot 14.5, width of disk on 3rd finger 0.8.

In habit this specimen reminds of *S. areolatus* BLGR as it is figured in Proc. Zool. Soc. London, 1898, v. 38, pl. 14 fig. 3 but it seems to differ from this species by the acuminate snout, the very small disk on the inner finger, the discoidal folds and by the colour. Besides, according to BOULENGER's diagnosis (loc. cit. p. 122) *S. areolatus* has the tympanum feebly distinct, the tibio-tarsal articulation reaching only the eye and the skin areolate or coarsely granulate above and beneath, and no short »spur» is stated. I can identify my specimen neither with *S. areolatus* nor with the other South American species, *S. chalcus* PTRS, from Colombia.

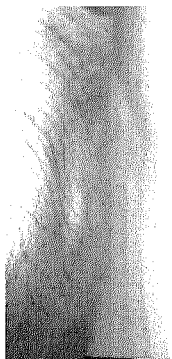
Eleutherodactylus gollmeri PETERS.

Syn. *Hylodes güntheri* STEINDACHNER.

21 specimens collected by WM. CLARKE-MACINTYRE: 9 from Rio Casanga near Archidona 800 m Dec. 1937, 2 from Ambitagu 1200 m, Sept. 1937, 4 only labelled Rio Napo, 4 Rio Pastaza Watershed, and 2 only labelled Eastern Ecuador. Beside these 2, collected by ROLF BLONBERG, Rio Pastaza.

The measurements given below show a great correspondence between these specimens and also between them and the type in all external points. Some more remarkable variations or aberrations may be noted. The lower surfaces are quite smooth in all except in five specimens from Rio Casanga, the four smallest ones and one of the largest (no. 2), which have the belly granular, a peculiar difference, as this character is always used as one of the most important for distinguishing the species of this genus. As this peculiarity is to be found also in the small specimen of *E. ventrimarmoratus* in this collection (p. 32), I have asked myself whether the granulation of the belly is a juvenile character, which disappears with age but in special cases can remain in the adults. It is impossible specifically to distinguish the two largest specimens (no. 1 and 2 in the table), the former with smooth, the latter with granular belly. Both are from the same locality and completely alike in colour and habit. The table shows a quite striking correspondence between them.

A look at the table shows also a rather great variation



of the breadth of the disks, especially seen by the comparison between this and the diameter of tympanum. In some cases this variation can be caused by the difficulty to get exact measurements in tenths of a millimetre of these small parts, but it has struck me that often the small disks are to be found in specimens with a rather aberrant colour-pattern of angle-shaped dark bands on the back as in *E. achatinus* BLGR (sp. no. 4, 4a, 4b, 7). If that were constant, there would possibly be some reasons for establishing a distinct form of *E. golmeri*, characterized by small disks and chevron-shaped dark bands on the back, but it is not the case. Specimen 8 for instance, which lacks every trace of these bands, has very small disks, and in the partly barred specimen 9 the disks are rather large. Also this variation seems to be individual.

The two specimens, collected by Mr BLOMBERG on the same locality and which are of quite the same size, give a good instance of the different shape of the skin and the great variation of the colour, recorded in all descriptions of this species and well conspicuous also in the other specimens in this collection. One is smooth, only finely chagreened, and olive brown with dark angle-shaped bands on the back and distinct oblique dark bands on the flanks, reminding of the colour-pattern in *E. achatinus*. A broad white band extends along the upper lip to the axil below the black canthal band, a narrow rim of the upper jaw, however, being dark. Hind parts of thighs are uniform brownish without the usual marbling of white and blackish. The other specimen is minutely tubercular on the head, back and sides and bluish grey above with indistinct black markings, the hindmost of these indicating angle-shaped cross-bars. Thighs beautifully marbled with black and white behind and in front, and there are no dark bands on the flanks, which instead are marbled with dark and white, and no white band on the upper lip, which is uniform dark brown. Besides, in the former specimen there is a very slight rudiment of web only between the two outer toes and no fringes along the sides of toes, in the latter there is a very distinct web at the base of all toes and distinct fringes along their sides. In contrary to statements regarding this species, most of the other specimens lack every trace of web and dermal fringes on the toes. The largest development of these I find in the specimen just mentioned (no. 4b).

All nine specimens from Rio Casanga differ from the others by distinct black spots in the groin both on thighs and flanks, not mentioned in the descriptions of this species. STEINBACHNER, however, states in *Hylodes güntneri* (Reise Novara) "ein intensiv brauner Fleck, der sich zuweilen zu einer Binde ver-

längert über den Schenkel zu den Lenden». I think that band has broken up into spots in these specimens. A matter of fact, in one of the largest specimens these spots are united into a band, at least on the thighs, and in other specimens they are often arranged in the manner that if united, they would form a longitudinal band »über Wurzel der Schenkel zu den Lenden.»

The lack of the marbling of white and black posterior on thighs, stated in one of BLOMBERG's specimens, is to be seen also in three specimens from Rio Napo (no 5, 6, 9) and in three small ones from Watershed, Rio Pastaza.

Beside the 9 specimens from Rio Casanga, mentioned in the foregoing, there are in this collection three specimens from the same place but probably caught in another locality. They are preserved in a separate jar and have more or less broken fingers and toes and peculiar balls or muffs of entangled hairs fixed on some of the other digits. The shape of the hairs speak for their origin from bats, having as the hairs of these animals regular wreaths of small hooks on their shaft. As far as I can understand, the frogs must have lived in the holes of bats, where some of the hooked hairs of these animals have fastened to the toes, after which more and more hairs have got entangled, forming the peculiar muffs. I suppose these have caused the frogs great trouble. Trying to get rid of them, they have at the same time broken some of the tips

In the following table the specimens 1—3 and 10 are from Rio Casanga, 4 and 11 from Ambitagua, Rio Pastaza, 5—7 and 9 from Rio Napo, 8 and 12 from Watershed, Rio Pastaza, 13 and 14 only labelled Eastern Ecuador, 4 a and 4 b Rio Pastaza (BLOMBERG's specimens). The type is from Brazil.

Eleutherodactylus ventrimarmoratus BLGR.

One specimen, Ambitagua, Rio Pastaza, 400 m, Sept. 1937, 35 mm in total length.

In this collection there are three specimens from the same locality, characterized by a beautiful colour-pattern of distinctly marked black sinuous and angle-shaped bands on the whitish belly. By this they are very like each other, but in other respects they differ in so high a degree that they cannot be considered as belonging to the same species. As far as I can

| | 1 | 2 | 3 | 4 | 4a | 4b | 5 | 6 | 7 | 8 | 9 | Type | 10 | 11 | 12 | 13 | 14 |
|-----------------------------------|-------|-------|-----|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| Total length | 54 | 53 | 49 | 45 | 45 | 45 | 43 | 43 | 43 | 42 | 41 | 40 | 33 | 31 | 27 | 27 | 25 |
| Length of head | 19.5 | 20 | 17 | 17.5 | 18 | 18 | 16.1 | 16.7 | 17 | 16.6 | 15 | 15 | 13 | 12.4 | 11 | 11.4 | 10.5 |
| Breadth » | 19.5 | 20 | 17 | 18 | 17.5 | 17.4 | 16 | 16.2 | 17 | 15.5 | 14 | 15.5 | 12 | 12 | 9 | 10 | 10 |
| Length of snout | 10.2 | 10 | 9 | 8.5 | 8.8 | 8.5 | 8.8 | 9 | 8.4 | 8 | 7.5 | — | 7 | 6 | 5.2 | 5.8 | 5 |
| Diameter of eye | 7 | 7 | 6 | 6 | 6.4 | 6.8 | 6.1 | 6 | 6 | 5.8 | 5.5 | — | 4 | 4.3 | 4 | 4.2 | 3.6 |
| » tympanum | 3.6 | 3.5 | 3 | 3 | 3 | 3 | 3 | 2.8 | 3 | 3 | 2.8 | — | 2.2 | 2.2 | 2 | 2.1 | 1.8 |
| Fore limb | 37.3 | 36.5 | 35 | 29.5 | 31 | 30.5 | 26 | 26.5 | 26.1 | 25 | 25 | 25 | 20.5 | 20 | 16.2 | 17 | 16 |
| Hand | 15.5 | 15 | 14 | 12 | 12 | 12.5 | 11 | 12 | 11.1 | 10.2 | 11 | 10 | 9.5 | 8.2 | 7.2 | 7 | 6.8 |
| Tibia | 36.8 | 36 | 30 | 27 | 29 | 26.5 | 25 | 25 | 27.2 | 25 | 24 | — | 21.5 | 18.8 | 16 | 17 | 16 |
| Foot | 47.5 | 46 | 38 | 37 | 39 | 35.5 | 33.6 | 33.8 | 35 | 33 | 32 | 32 | 27 | 24 | 21.5 | 22 | 20 |
| Hind limb | 115.3 | 114.0 | 94 | 89 | 94 | 87 | 82.6 | 80.8 | 87.2 | 81 | 77 | 75 | 65 | 57.8 | 50.5 | 54 | 49.0 |
| Breadth of the disk on 3rd finger | 3 | 2.6 | 2.5 | 1.8 | 1.6 | 1.8 | 2.3 | 2.1 | 1.8 | 1.7 | 2 | — | 1.4 | 1.2 | 1.1 | 1.1 | 1.1 |

Measurements in percentage.

| | 1 | 2 | 3 | 4 | 4a | 4b | 5 | 6 | 7 | 8 | 9 | Type | 10 | 11 | 12 | 13 | 14 |
|-----------------------------|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | <i>In % of total length.</i> | | | | | | | | | | | | | | | | |
| Length of head | 36.1 | 37.7 | 37.5 | 38.9 | 40 | 38.7 | 37.2 | 37.7 | 39.5 | 39.5 | 39.5 | 37.5 | 39.4 | 40.0 | 40.8 | 42.2 | 42 |
| Breadth » | 36.1 | 37.7 | 34.7 | 40 | 38.9 | 38.7 | 37.2 | 37.7 | 39.5 | 36.9 | 34.1 | 38.7 | 36.4 | 38.9 | 33.3 | 37.0 | 40 |
| Length of snout | 18.9 | 18.9 | 18.4 | 18.9 | 19.6 | 18.9 | 20.5 | 21.9 | 19.5 | 19.0 | 18.3 | — | 21.2 | 19.4 | 19.3 | 21.5 | 20 |
| Diameter eye | 13.0 | 13.2 | 12.0 | 13.3 | 14.2 | 15.1 | 14.2 | 13.9 | 13.9 | 13.8 | 13.4 | — | 14.2 | 13.9 | 14.1 | 15.6 | 14.4 |
| » tympanum | 6.3 | 6.6 | 6.1 | 6.7 | 6.7 | 6.7 | 6.9 | 6.5 | 6.9 | 7.1 | 6.8 | — | 6.7 | 7.1 | 7.4 | 7.8 | 7.2 |
| Fore limb | 69.1 | 67.8 | 71.4 | 65.6 | 68.9 | 67.8 | 60.5 | 61.9 | 60.7 | 59.5 | 61.0 | 62.5 | 62.1 | 64.5 | 60.9 | 62.9 | 64.2 |
| Hand | 28.7 | 28.3 | 28.6 | 26.7 | 26.7 | 27.8 | 25.6 | 27.9 | 25.8 | 24.3 | 26.8 | 25.0 | 28.8 | 26.8 | 26.7 | 25.9 | 27.2 |
| Tibia | 68.2 | 67.9 | 61.2 | 60.0 | 64.4 | 58.9 | 58.1 | 58.1 | 63.3 | 59.5 | 58.5 | — | 65.2 | 60.6 | 59.3 | 62.9 | 64.0 |
| Foot | 87.9 | 86.8 | 77.5 | 82.2 | 86.7 | 78.9 | 78.1 | 78.6 | 83.7 | 78.6 | 78.0 | 80.0 | 81.2 | 77.4 | 79.6 | 81.5 | 80.0 |
| Hind limb | 213 | 215 | 194 | 197 | 209 | 193 | 192 | 186 | 202 | 193 | 188 | 187 | 197 | 186 | 185 | 200 | 196 |
| Breadth of disk on 3 finger | 5.6 | 4.9 | 5.1 | 4.0 | 3.6 | 4.0 | 5.3 | 4.9 | 4.2 | 4.0 | 4.9 | — | 4.2 | 3.9 | 4.1 | 4.1 | 4.4 |
| Tympanum in % eye | 51.4 | 50.0 | 50.0 | 50.0 | 46.9 | 44.1 | 49.2 | 46.7 | 50.0 | 51.7 | 50.9 | — | 54.0 | 51.5 | 50 | 50 | 50 |
| Disk in % tympanum | 83.3 | 81.3 | 83.3 | 60 | 57.3 | 60 | 76.7 | 75.0 | 60 | 56.7 | 71.4 | — | 63.6 | 54.5 | 55.0 | 52.4 | 61.1 |

see, two of them represent a new species (*E. ventrivittatus*), but the third I have determined as *E. ventrimarmoratus* BLGR, though it differs from the description of this in having not only the under surfaces and sides but even the upper parts totally smooth, and possibly in a different marking on the back. *E. ventrimarmoratus* is said to have symmetrical blackish markings, forming a large X on the back (BLGR. Ann. Mag. Nat. Hist. ser. 8 v. 10, p. 187). In this specimen there is a very large semi-lunate black spot on one side of the back but only a few rests of a corresponding figure on the other. If, however, this should be restored, and partly in contact with its fellow, there would be formed a kind of a large X-shaped figure, which would possibly show a likeness of that in *E. ventrimarmoratus*. Measurements see p. 34.

Eleutherodactylus ventrivittatus Nova species.

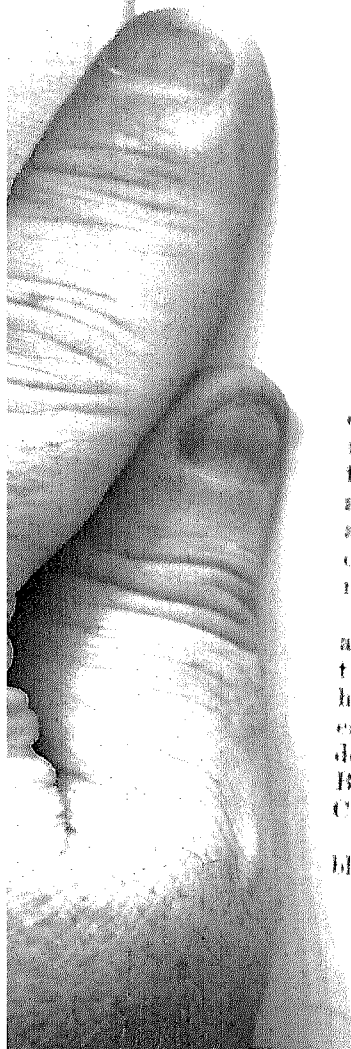
Two specimens, Ambitagua, Rio Pastaza, Sept. 1937, 24 mm in length.

Habit rather slender. Head as long as broad. Tongue oval, rather narrow, slightly nicked. Vomerine teeth in two oblique series diverging behind, immediately behind the choanae. Snout subacuminate, slightly overlapping, about as long as the diameter of eye. Canthus rostralis distinct, loreal region slightly concave, nearly vertical. Nostril near the tip of snout. Interorbital space broader than the upper eyelid. Tympanum hidden.

Fingers long and slender, first much shorter than second, disks large, sharply set off from the narrow penultimate phalanx, nearly half the diameter of eye. No web, nor any dermal folds on the fingers and toes. Disks of toes nearly as large as those of fingers. An oblong inner metatarsal tubercle and a small round outer one. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the front margin of eye.

The upper surface of head and the back, except the median and posterior part of back in one of the specimens, minutely tubercular, the tubercles in some degree tending to form a hardly distinguishable median ridge. Sides of head and body, especially the tympanic region with somewhat larger and more densely placed tubercles. Upper surfaces of limbs smooth. Belly minutely, lower parts of thighs rather coarsely, granular. Chin and breast smooth.

Above reddish or greyish brown. In the reddish specimen a black dorso-lateral band runs from the black upper eyelid to



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the groin, branching into separate tongues, which form black arched cross-bars on the whitish flanks. Between and behind the orbits there is a rather evanished dark squarish spot, the four corners of which run out into fine points, the former of which extend to the black eyelids, the posterior to the black postorbital bands. Besides, a dark line extends from the front margin of the spot, cleft in front into two branches to the nostrils. In the greyish specimen the dark markings are partly reduced. Only the postorbital part of the dorso-lateral band is to be seen, but the arched cross-bars on the flanks are very distinct, and the dark figure on the head is represented

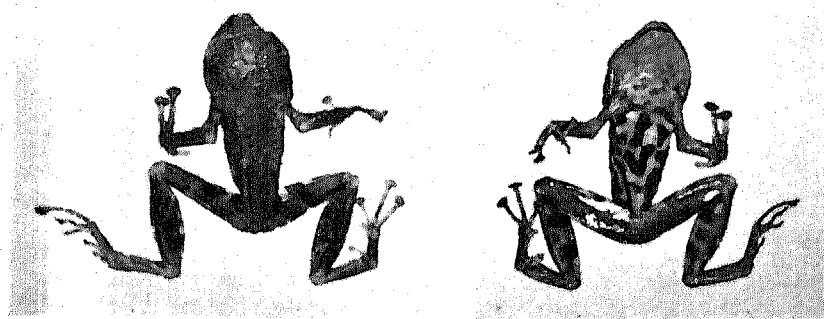


Fig. 10. Dorsal and ventral views of *E. ventrivittatus*.

only by a distinct band between the orbits and a pair of longitudinal spots at the nostrils. Limbs above of the colour of the upper parts with broad black cross-bars, especially distinct on the front and upper parts of the thighs. Belly whitish with sharply marked irregular sinuous and angle-shaped bands and spots. Breast and chin uniform light yellowish brown or spotted with reddish brown (in the reddish brown specimen). Limbs below dark brown.

By the beautiful colour-pattern on belly these specimens remind, as mentioned, of the specimen determined as *E. ventrimarmoratus* BLGR (p. 30), with which it has many other corresponding characters. It differs, however, from this in the condition of the skin, which is quite smooth in the *ventrimarmoratus*-specimen, tubercular and granular in these. Besides, in the former the tongue is large and nearly circular, the head broader than long, loreal region oblique, the snout broad and rounded, the hind limbs somewhat shorter, the disks smaller and no regular dark cross-bars on the flanks. I can possibly identify my *ventrimarmoratus*-specimen with BOULENGER's species, but these specimens I do not dare to refer to it.

By the condition of the skin, the lack of tympanum, the shape of tongue etc. these specimens also correspond with *E. rhymperi* BLGR (Ann. Nat. Sci. Ser. 5 v. 9 p. 465), but this is said to have considerably shorter hind limbs and different colour-pattern. Any distinct bands on the whitish flanks and belly are not stated. To judge from the figure (loc. cit.) *E. rhymperi* also has the head and interorbital space mesially furrowed, the back more coarsely tubercular and disks on fingers and toes considerably smaller.

Measurements

| | in mm | | | in % of the total length | | |
|--|-----------------------------|---------------------------|------|-----------------------------|---------------------------|------|
| | <i>E. ventrimar-moratus</i> | <i>E. ventri-vittatus</i> | | <i>E. ventrimar-moratus</i> | <i>E. ventri-vittatus</i> | |
| Total length | 35 | 24 | 24 | | | |
| Length of head | 13.5 | 9 | 9 | 38.6 | 37.5 | 37.5 |
| Breadth of head | 14.5 | 9 | 9 | 41.4 | 37.5 | 37.5 |
| Length of snout | 6 | 4.3 | 4.4 | 17.1 | 17.9 | 18.3 |
| Diameter of eye | 5 | 4.2 | 4 | 14.3 | 17.5 | 16.7 |
| Length of arm and fore-arm | 19 | 13 | 12 | 54.3 | 54.2 | 50 |
| " of femur | 16 | 12.5 | 12 | 45.7 | 52.1 | 50 |
| " of tibia | 17.2 | 12 | 12 | 49.1 | 50 | 50 |
| " of foot | 24.8 | 17.8 | 17.2 | 70.9 | 74.2 | 71.7 |
| Breadth of disk on fourth finger | 2 | 1.8 | 1.5 | 140 | 45 | 42.9 |

Eleutherodaetylus buckleyi BLGR.

Five specimens, four from Ambitagua, Rio Pastaza 400—1200 m, 1937; one only labelled Eastern Ecuador 1937. All females, 25—44 mm in total length.

The two smallest specimens and one of the three larger ones (41 mm, see the table) are uniform blackish above. In the other larger specimens (40 and 44 mm) the black colour has faded, especially on the head, which is light brown. Other upper parts of these specimens are reddish brown with some rests of the vanished black colour, viz. a streak across the interorbital space, a short somewhat arched longitudinal band behind the orbits, an angle-shaped one on the middle of the back, rather faint cross-bars on the limbs, and, in one of the

¹ In % the diameter of eye.

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specimens, small blackish dots on the hind part of back and on the flanks.

Lower parts are dark light brown, uniform in two specimens (one of the smaller and one of the larger ones) in the three others marbled with dark. In none of the specimens there are any traces of the very distinct black lightedged median dorsal band, shown in BOULENGER's figure, but not mentioned in his description (Cat. Batr. Sal. Brit. Mus. p. 217, Pl. 14, fig. 5).

The prominent edges of the fronto-parietal bones distinct, continuing as distinct ridges out on the occiput, bordering a distinct broad concavity, extending from the tip of snout to the middle of back. The dorso-lateral ridges, very well marked in the figure mentioned, but not recorded in the description, are very distinct in one of the larger specimens (the light one, 40 mm), but more or less indistinct in the others. A distinct discoidal fold is to be seen in all specimens, except the largest one, which is distended with large eggs. In the light specimen (40 mm) these folds are very well developed, reminding of low fin-folds on the sides of body. In this specimen tympanum is hardly visible in one side.

Measurement in mm of the larger specimens.

| | | | |
|---|------|------|------|
| Total length | 44 | 41 | 40 |
| Length of head | 15 | 13.5 | 13 |
| Breadth of head | 16 | 15 | 15.5 |
| Length of snout | 6.2 | 5.8 | 5.7 |
| Diameter of eye | 6 | 5.2 | 5.2 |
| Interorbital breadth | 6.3 | 5.5 | 5 |
| Width of upper eyelid | 3.5 | 2.8 | 3.3 |
| Diameter of tympanum | 2 | 1.8 | 1.7 |
| Fore arm with hand | 23.3 | 21 | 20.2 |
| Femur | 18 | 18 | 18 |
| Tibia | 19 | 19 | 20 |
| Foot | 31 | 30.5 | 31 |
| Breadth of disk on 3rd finger | 2.1 | 1.8 | 1.7 |

Eleutherodactylus bufonius Nova species.

One specimen. Rio Pastaza, Watershed, 41 mm, 1938.

Habit stout, Bufo-like. Body broader than head, about as broad as half the total length. Head broader than long. Canthus rostralis distinct, rounded, loreal region oblique, slightly concave. Nostril near the tip of snout. Snout longer than orbit, subacuminate, not overlapping. Interorbital space slightly broader than upper eyelid. Tympanum distinct, small,

about $\frac{2}{5}$ the diameter of eye. Tongue large, nearly circular, nicked behind. Vomerine teeth in two small patches behind the level of choanae (one rounded, the other only a very short narrow crest). First finger distinctly shorter than second. Disks of fingers moderate, rounded, smaller than tympanum, those of toes of about the same size. A rather distinct rudiment of web at the bases of the toes and well distinguishable dermal folds along their sides as well as along the inner sides of second and third fingers. A large oblong inner and a small but well distinct outer metatarsal tubercle. If the length of



Fig. 11. *E. bufonius*.

tibia is measured off from the knee of the adpressed femur, it reaches midway between eye and nostril.

All upper parts and sides of head and body densely covered with small granules and numerous larger round or oblong pointed tubercles, the latter placed in more or less distinct longitudinal rows. Upper eyelid also tubercular and with a rather thick longitudinal fold near the outer margin, parallel with this. There is also a faint fold over the tympanum. Belly and lower surfaces of thighs granular. Chin and throat smooth.

Colour in alcohol: All upper parts and sides of head and body uniform blackish brown. Groin light with two or three very distinct broad black vertical bars, running obliquely from the back to the belly. Margin of the upper lip light with broad black transverse bars. Upper parts of limbs with blackish bars, rather indistinct in the dark ground colour. Thighs anteriorly and tibiae posteriorly beautifully marbled with black and white. Under surfaces and lower parts of flanks brownish

grey, irregular dark dots forming a network on the belly, under parts of limbs blackish.

Measurements in mm: Total length 41, length of head 15, breadth of head 17, length of snout 7, diameter of eye 5.8 that of tympanum 2.2, length of fore arm 26, of hand 12, of tibia 20.1, of foot 27.5 of hind limb 68.1, width of disk on 3rd finger 1.8.

Among the great lot of species of this genus, known from Ecuador and adjacent countries, this seems to be most closely allied to *E. glandulosus* BLGR. According to the description of this one my species differs from it in having the vomerine teeth placed at a certain distance from the choanae, not commencing at the inner posterior edge of those, a larger tympanum, head distinctly broader than long, rudiment of web and dermal folds on the toes, somewhat shorter hind limbs, belly very distinctly (not slightly) granular, no whitish bars across the thighs and the posterior parts of these uniform blackish without any white spots. Besides, there is no statement regarding *glandulosus* of any light area in the groin, crossed by distinct black vertical bars.

In Zoologischer Anzeiger v. 47 p. 302 WERNER describes *E. fassiltianus* from Colombia, different from *E. bogotensis* PTRS »durch den stark runzeligen, zum Teil warzigen Oberseite». As my specimen chiefly differs from *bogotensis* just in having a very rough upper surface, I have been inclined to identify it with WERNER's species. The rather short description of this one makes, however, such an identification rather uncertain, and I do not dare to make it, especially as *fassiltianus* is said to have tympanum $\frac{1}{2}$ the diameter of eye, interorbital space twice as broad as upper eyelid and »Oberarm, Vorder- und Hinterseite des Oberschenkels, Hinter- und Unterseite des Unterschenkels und Vorderseite des Tarsus pigmentlos».

Eleutherodactylus pastazensis Nova species.

Two specimens, Rio Pastaza, December 1937, 31 and 23 mm in total length. The large specimen from Yanguilla, the small one from mount Tungura, 1840 m above the sea-level.

Description of the large specimen. Habit rather stout. Head a little broader than long, tongue broadly oval, distinctly nicked behind. Vomerine teeth very distinct in two long oblique series behind the choanae near their hind margins. Snout subacuminate, not overlapping, slightly longer than the diameter of orbit. Canthus rostralis distinct, straight, rounded; loreal region concave, nearly vertical. Nostril twice as far from orbit as from

tip of snout. Interorbital space broader than the upper eyelid. Tympanum distinct, small, $\frac{1}{3}$ the eye. Fingers and toes rather short with large rounded disks, as large as the tympanum. First finger shorter than second, toes with a very slight rudiment of web, which extends as narrow folds along the basal halves of the toes. A distinct oval inner metatarsal tubercle and a very small outer one. No tarsal fold. If the length of tibia is measured off from the knee of the adpressed femur it reaches the front margin of the eye.

Upper parts chagreened with minute round tubercles, rather sparsely spread but more numerous on the posterior part



Fig. 12. Dorsal view of *E. pastazensis*.

back, on the forehead and on the upper eyelids. There is a low median ridge from tip of snout to vent, composed by a row of low and very narrow longitudinal, more or less adjoining tubercles, of which some on the head are larger than the others, round and conical. A low, broadly rounded lateral ridge separates the back from the sides. These are dense but minutely tubercular, the tubercles forming a regular short ridge, obliquely crossing the sides. A thick glandular fold above and immediately behind the tympanum. From behind the ear a distinct dermal fold runs obliquely along the sides downwards to the lower angle of the groin, bordering a posterior part of a discoidal ventral area. Belly and lower and hind surfaces of thighs coarsely granular. Chin and throat smooth. A faint dermal fold across the breast.

Colour in alcohol: Head above, especially the upper eyelids dark olive, this colour extending out on the neck, in the

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smaller specimen forming a squarish median spot, indistinct in the larger one. In both a very narrow black line crosses the interorbital space between the anterior margins of the orbits. Back and upper parts of flanks and limbs greyish brown, densely marbled with small irregular blackish dots and short lines. No transverse bars on the limbs. All lower surfaces and anterior and posterior parts of limbs uniform light brownish grey.

The smaller specimen differs from the large one in having a narrower tongue, a little longer hind limbs and a somewhat different colour pattern. Head and back are more light brownish grey, and the dark colour is represented by more distinct markings. Beside the narrow streak between the orbits, and the faint oblong squarish spot on the nape, already mentioned, there is a distinct arched line on each side of the front part of back, and more or less marked rests of three possibly angular cross-bars on the hind part of it. In habit and more important characters, however, the two specimens correspond so well that there cannot be any doubt about their being identical. (Confr. the table below).

Measurements in

| | mm | | % of total length | |
|---------------------------------|------|------|-------------------|------|
| | | | | |
| Total length | 31 | 23 | 31 | 23 |
| Length of head | 11.5 | 8.4 | 37.1 | 36.5 |
| Breadth of " | 12.2 | 9 | 39.4 | 39.1 |
| Length of snout | 5.2 | 4 | 16.8 | 17.4 |
| Diameter of eye | 4.6 | 3.8 | 16.1 | 16.5 |
| " of tympanum | 1.6 | 1.1 | — | — |
| Length of thigh | 14 | 11 | 45.2 | 47.8 |
| " of tibia | 16 | 11.5 | 51.6 | 50 |
| " of foot | 22 | 17 | 70.9 | 73.9 |
| The whole hind limb | 52 | 39.5 | 168 | 172 |
| Breadth of disk on 3rd finger . | 1.6 | — | — | — |
| Tympanum : eye | — | — | 30.0 | 29.0 |

A comparison between the descriptions of this species and that of the foregoing one (*E. bufonius*) shows a very great correspondence regarding several important characters, but, in fact, the appearance of the two type-specimens are so different that there is no idea in referring them to the same species. Upper parts of *bufonius* are very rough, in comparison with which those of *pastazensis* seem to be nearly smooth. There are no traces of discoidal folds in *bufonius*, the eye and the disks of this one are remarkably smaller than those of *pastaz-*

zensis, and lastly the shape of the tongue, the vomerine teeth and the colour are different, *bufonius* being nearly black with a whitish black-barred area in the groin, *pastazensis* pale greyish with black marblings. Nor can I identify it with any of the species *glandulosus*, *fassilianus* and *bogotensis*, which seem to be closely allied to this as well as to *bufonius*.

From *glandulosus* it differs by a short web and narrow folds on the toes, not strongly tubercular upper parts, more coarsely granular belly, somewhat shorter hind limbs, folds or ridges on back and sides and a quite different colour-pattern. From the insufficient diagnosis of *fassilianus* I cannot find any other difference than those stated between it and *bufonius*, viz a larger tympanum, a broader interorbital space and a different colour in *fassilianus*. Besides, the diagnosis of this mentions nothing of any ventral discoidal area and lateral dermal folds. *E. bogotensis* from Colombia corresponds with my species in almost all important characters, but its »skin is smooth», there is no ventral disk, the hind limbs are somewhat shorter, the loreal region oblique, the colour-pattern is another.

Eleutherodactylus

va species.

One specimen, Watersl, Pastaza, 1938, 33 mm in total length.

Habit stout, tongue oval, slightly nicked behind. Vomerine teeth in two distinct oblique groups behind the choanae. Head as long as broad. Canthus rostralis distinct, curved, loreal region oblique, concave. Nostrils much nearer the tip of snout than the eye. Interorbital space about as broad as the upper eyelid, not concave. Snout round d, not overlapping, as long as the diameter of eye. Tympanum hidden.

Fingers and toes short, with large disks, those of fingers slightly larger than those of toes. First finger shorter than second. Some of the fingers narrowly fringed. A hardly visible web at the bases of the toes but no fringes along them. An oblong, thick and short inner metatarsal tubercle and a much smaller oblong, less protruding outer one. If the length of tibia is measured off from the knee of the adpressed femur it reaches the axil.

Upper surface of forehead, hind part of back and upper parts of limbs with very small sparse tubercles, the skin of the middle part of back nearly smooth, but very small and oblong tubercles form a very low and narrow, partly interrupted median ridge from tip of snout to vent. The tympanic region with a very distinct arched glandular fold, extending

to above axil. This part densely tubercular, some of the tubercles being rather large and conical. The sides of body, chin, belly and lower surfaces of thighs finely granular (breast smooth). A narrow dermal fold across the breast and discoidal folds along the latero-ventral limits.

Colour in alcohol: Upper surface and sides of head, back and upper parts of limbs blackish brown. Sides of body black, except a large dirty white lumbar area (pink in the living animal?), in which two broad black tongues descend from the surrounding black region. On one side the anterior nar-



Fig. 13. Upper view of *E. brevicrus*.

rower tongue is detached from its base, thus forming an irregular black spot in the light area. Also the inguinal fold is black, bordering behind the light lumbar space. Anterior and posterior parts of thighs and lower surfaces of tibiae are crossed by a few broad distinct black bars alternating with white ones (red in life?). Lower parts of thighs and upper parts of tibiae and feet blackish, the latter above with indistinct light bars. Belly, chin and breast dark brown, minutely and densely dotted with light, the granules being whitish.

Measurements in mm. Total length 33, length and breadth of head 13, length of snout 5.4, diameter of eye 5.3, fore-arm and hand 15, femur 11.5, tibia 13.5, foot 20.

By the hidden tympanum, the short hind limbs and several other characters this new species seems to be most closely allied to *E. whymperi* BLAN also from Ecuador. It differs, however, from this by its almost smooth skin of back, some-

what shorter hind limbs, the heel does not reach the angle of mouth, the presence of discoidal folds and the colour, especially the remarkable light lumbar space with the black tongues and the sharply marked black and white cross bars on thighs and tibiae.

Eleutherodaetylus nigrovittatus Nova species.

One specimen, Ambitagua 1200 m above the sealevel, Sept. 1937, 21 mm in total length.

Habit rather slender. Tongue cordiform, slightly nicked behind. Vomerine teeth in two rather strong transverse series distinctly behind the choanae. Head as long as broad, snout acuminate, overlapping, a little longer than the diameter of eye. Canthus rostralis distinct, loreal region nearly vertical, concave. Interorbital space slightly broader than the upper



Fig. 14. Upper view of *E. nigrovittatus*.

eyelid. Nostril nearly midway between eye and tip of snout. Tympanum round, distinct, $\frac{2}{5}$ the diameter of eye.

Fingers and toes slender. Fingers without disks, merely rounded at the tips, first and second equal in length. Toes without web and dermal folds, the tips dilated into small but distinct disks. Distal bony phalanges T-shaped. A short oblong inner metatarsal tubercle and a small but distinct outer one. No tarsal fold. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the nostril.

Back and upper surfaces of head, thighs and tibiae with very small tubercles, tending to form series. There is a median, very narrow, more or less visible one from the tip of snout to the vent, and numerous short ones forming an irregular pattern of low and faint narrow more or less interrupted ridges on the front part of the back. Upper eyelids distinctly

and densely tubercular. A fold over the tympanum. Sides of body and lower surfaces quite smooth, only the anal part of thighs granular. A distinct discoidal fold.

Colour in alcohol: Back and upper and lateral surfaces of head reddish brown, on each side of back an arched long distinct black band from above the axil to the groin, separating the dark back from the light sides. Two rather indistinct black bars from eye to margin of upper jaw. Limbs above light greyish brown with distinct dark cross-bars. A triangular blackish spot on the anal region. Belly, sides of body and under parts of limbs uniform light brown, except those of hands and feet which are dark brown as also the thighs posteriorly. Chin and throat marbled with brown.

Measurements in mm. Total length 21.5, length and breadth of head 9, length of snout 4, diameter of eye 3.2, that of tympanum 1.4, forearm and hand 9, femur 10, tibia 11, foot 16.

By the lack of disks on fingers, the first finger as long as second, nostril nearly midway between eye and tip of snout, long hind limbs and smooth lower surfaces this species seems to be very well distinguished from other species of this genus.

Eleutherodaetylus leptodaetyloides Nova species.

One male specimen 45 mm in total length, Rio Pastaza, ROLF BLOMBERG, 1937.

Habit slender. Tongue rather narrow, oval, nicked behind. Vomerine teeth in two rather long, distinct transverse arched series considerably behind the choanae. Head as long as broad. Snout subacuminate, slightly projecting, longer than the diameter of eye, canthus rostralis rounded, rather indistinct. Loreal region nearly vertical, concave. Nostril much nearer the tip of snout than the orbit. Interorbital space as broad as the upper eyelid. Tympanum very distinct, a little larger than half the diameter of eye.

Fingers rather short and broad, 1st a little longer than second with two black horny, pointed tubercles on its inner side; tips thickened, not dilated, two rounded metacarpal tubercles and very distinct subdigital ones. Hind limbs rather long, if the length of tibia is measured off from the knee of the adpressed femur, it reaches before the orbit. Toes long and slender with very small but rather distinct disks. The distal bony phalanx T-shaped. A distinct rudiment of web and narrow folds along their margins. An oblong inner metatarsal tubercle and a very small outer one. A tarsal fold.

All upper parts finely chagreened. Head and front part of back smooth, posterior part of back studded with very small pointed prickles; a few such, distantly spread, are to be seen also on the upper surfaces of the hind limbs. Sides of body, belly and posterior lower parts of thighs wrinkled and granular, more faintly marked on the chin and breast. Other lower surfaces of limbs smooth, somewhat wrinkled. A glandular fold above and behind the tympanum and an oblong glandular swelling below and behind the angle of mouth.



Fig. 15. Dorsal view of *E. leptodactyloides*.

Colour in alcohol: Dark brown above, a broad semi-lunar transverse band, occupying the upper eyelids, the space between them and the front part of neck, a streak from orbit through tympanum to axil, a row of oblong spots, separating the uppermost dark part of flanks from the light lower one, and broad cross-bars on thighs and tibiae, black. Lower parts of flanks, in, breast and belly greyish white. Under surfaces of limbs brown. Three broad dark vertical bars on the upper lip.

Measurements in mm: Total length 45, length and breadth head 16, length of snout 6.8, diameter of eye 5.8, diameter tympanum 3.2, forearm and hand 17, femur 21, tibia 22, 34.

Lithodytes cornutus (Esp.).

Syn. *Hylodes*, *Eleutherodactylus*, *Strabomantis cornutus*.

A single male specimen, Rio Pastaza, Watershed, 1938.

An examination of the shoulder-girdle proves that this specimen must be referred to the genus *Lithodytes*, both sternum and omosternum being osseous with cartilaginous terminal parts. The osseous part of sternum is a broad and square plate, somewhat dilated behind. The omosternum has a long and narrow osseous shaft and a somewhat broader oval and rather long cartilaginous part, rounded at the end. As seen by the following description, however, it corresponds so well with the diagnoses of *Strabomantis* (*Hylodes*, *Eleutherodactylus*) *cornutus* Esp. that I must believe that it is identical with it. Evidently this species must be referred to the genus *Lithodytes*, not to *Hylodes* or *Eleutherodactylus*.

Habit stout, short and broad. Tongue small, oval, slightly nicked behind. Vomerine teeth in two long transverse arched series behind the choanae, slightly separated in the midline. Head depressed, considerably broader than long. Snout broad and rounded, slightly longer than the diameter of eye, the tip above with an hourglass-shaped concavity, bordered by two triangular glandular swellings. The upper jaw with a shallow median notch to receive a toothlike prominence of the lower jaw. Nostril somewhat nearer the tip of snout than the orbit. Canthi rostrales distinct, the space between them narrow and concave. Loreal region broadly oblique, gently sloping towards the margin of the upper jaw, slightly concave. Tympanum distinct, large, $\frac{3}{4}$ the diameter of eye, which is rather small. The interorbital space broader than the upper eyelid, deeply concave, the concavity being a prolongation of the furrow on the forehead, the whole median part of the head being more or less deeply furrowed. Between the orbits the concavity is bordered by distinct bony ridges, which extend out on the neck, where they slightly diverge and disappear.

Upper eyelids densely tubercular, one of the tubercles large and pointed. Other upper parts of head and back covered by numerous small tubercles, obtuse or pointed, and with regularly arranged more or less long narrow ridges. Beside the interorbital ones, already mentioned, there is another osseous pair above the tympanum, formed by the thickened protruding edges of the frontoparietal bones. On the middle and posterior part of back there is a symmetrical beautiful pattern of narrow dermal folds or ridges, viz. two anterior ones, forming an H-

shaped figure, the anterior and longer branches of which commence at the hind margin of the upper eyelids, the shorter posterior ones diverging on the middle of the back. Between these latter begins a pair of rather long, slightly curved folds extending to the coccyx. Behind them two other much shorter pairs, one behind another, occupy the posterior median part of back. Outside the anterior branches of the H-shaped figure runs parallel with them another fold as a prolongation of the frontoparietal ridge, but quite dermal. Also sides of body and upper parts of limbs are covered with tubercles like those of the back. Chin, belly and anal region of thighs granular, other lower surfaces of limbs smooth.

Fingers rather short, first longer than second. Tips rounded and swollen, but not dilated to any disks. A distinct rudiment of web at the bases, narrowly continuing along the sides. Subarticular tubercles prominent, two large rounded metacarpal tubercles. Hind limbs moderate. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the nostril. Toes narrow, the fourth much the longest. Disks small but distinct. Distal osseous phalanges T-shaped, the transverse branches very short. There are very slight traces of web at the bases but no fringes along the sides. Subarticular tubercles prominent, two small metatarsal tubercles, an oblong inner one and a very small rounded scarcely prominent outer one. No tarsal fold.

Colour in alcohol: Above and on the sides uniform blackish brown. Groin, thighs, anteriorly and posteriorly, and concealed parts of tibia ornated with rather well defined white spots. Ill-defined dark cross-bars on the upper surfaces of thighs. Below uniform light brown.

Measurements in mm. Total length 36, length of head 15, breadth of head 17, length of snout 6.6, diameter of eye 4, of tympanum 3, interorbital space 4, forearm and hand 15, hand 9.5, femur 19, tibia 18, foot 25.

As I can see, my specimen differs from the description of *E. cornutus* only in the shape of the »horn» on the upper eyelid. Here it is represented only by an acute conical tubercle, distinctly longer than the other rounded ones, but hardly shown as a horn. Besides there is a rather distinct rudiment of web on the fingers and more indistinct ones on the toes. For the rest the likeness is so conspicuous that I am sure there is no doubt about the correctness of my determination.

Leptodaectylus pentadaectylus LAURENTI.

There are two large specimens in the collection of R. BLONBERG from Rio Pastaza. The largest of these, a male 155 mm in total length, I regard as belonging to the head form, though it differs rather much from the usual colour-pattern of this. The other, a female 126 mm in length, I believe, represents a new variety of this variable species. I have called it *rubioides* because of its likeness with the species *L. rubido* COPE.

Leptodaectylus pentadaectylus pentadaectylus LAURENTI.

The upper surface is crossed by very broad blackish brown bands or perhaps rather more or less squarish large areas, separated by narrow light grey intervals. The first of the



Fig. 16. *Leptodaectylus pentadaectylus pentadaectylus*.

former occupies nearly the whole front head from a level of the nostrils to the front margins of the orbits, the second covers the whole upper eyelids and the interspace between them, and four occupy the front and middle parts of the back. The interspaces between these dark areas appear as much narrower light grey cross-bands. The foremost and the hindmost of the four dark dorsal areas flow together with

the dark colour of the sides, but the two middle ones are separated from these by a short light dorso-lateral band, thus totally encircled by light. The postsacral part of the back and the upper surfaces of the limbs are blackish brown, the black cross-bars on the latter being rather indistinct in the dark ground. Lower parts of sides of body are dirty yellowish white without any dark spots and reticulations. There is a longitudinal rather faint reddish band in their middle but no reddish in the groin and on the thighs. A large spot above and behind the tympanum, the lumbar part of the flanks and the hind surfaces of thighs are uniform black.

The tip of snout and the sides of head are ashy grey, the margin of the upper jaw blackish brown with broad ascending triangular lobes. Chin uniform greyish brown, breast, belly and under surfaces of thighs and tibiae dirty greyish brown, great parts of thighs, however, whitish. Hands and feet blackish brown below.

A large conical tubercle is to be seen on the inner side of the first digit and two small horny points on each side of the breast.

There are different opinions about which variety of this species is to be regarded as identical with LAURENTI's type. Dr ADOLPHO LUTZ, who has treated the Brazilian *Leptodactylus*-species in *Memorias Instit. Osw. Crus.* t. 19, 1926 p. 139—174, means that the type of LAURENTI is identical with the variety which lives in the South of Brazil, and which is described and figured by SPix as *Rana labyrinthiaca* and *R. coriacea* (SPix, *Species Novae Ranarum Bras.* 1839 p. 5 and 7, Tab. 5 fig. 2 and Tab. 7 fig. 2). According to LUTZ and his figures and those of other authors, cited by him, *L. pentadactylus* has »the upper side brown varying from coffee with milk to cinnamon and chestnut with or without dark spots. The under side is light with irregular dark spots forming a labyrinth. The parts which are covered by the folding of the legs have the ground light salmon-colored merging into vermillion and marbled with black designs». Evidently, LUTZ means that this diagnosis is general for the whole species.

If this should be right, my specimen cannot be a *pentadactylus* and can still less belong to the head-form. LORENTZ MÜLLER, however, has shown in *Abhandl. Senckenb. Naturf. Gesellschaft, Frankfurt a. Main*, Tom 40, 1927 p. 276—281 that the colour-pattern of the southern specimens does not correspond with LAURENTI's description, nor with the figure cited by him (Seba *Thesaurus* I tab. 75 fig. 1). This is designed with distinct dark dorsal cross-bars and lacks dark reticulation in the groin and beneath and also red colour on the legs.

MÜLLER states that some specimens found by him in the Amazonas resemble LAURENTI's type in a much higher degree than the southern specimens do, and he points out that this northern form with dark cross-bands and without any dark reticulation beneath and without red colour on the hind limbs must be identical with the type of LAURENTI and be called *L. pentadactylus pentadactylus* LAUR., whereas the southern variety may be named *L. pentadactylus labyrinthiacus* SPix.

Judging from the specimen now in question, which is evidently a northern one and which corresponds more with SEBA's figure than with the figures of SPix and LUTZ, I am convinced that MÜLLER's opinion is the right one, and I have labelled it in accordance to that. The broad dark areas, much broader than the usual bars in the northern specimens, however, give it a very striking and unusual appearance.

There does not, however, seem to be any so distinct difference between the northern and the southern forms, as stated by MÜLLER. The red colour which is lacking in MÜLLER's specimens from Para, Amazonas, and also in my specimens from Ecuador, is to be seen in specimens from Nicaragua, described by NOBLE in Bull. Am. Mus. Nat. Hist. vol. 38 p. 323, New York 1918, and the specimens from Southern Brazil, Parana, Ponta Grossa, described by myself as *L. bufo*, but now referred to *pentadactylus* (see the following) lacks the red ornament of the southern specimens. And further on, MÜLLER's specimens from Para are uniform dirty yellowish white below, whereas two specimens from the same locality in the museum here are distinctly reticulated (see the following).

The second specimen, a female 126 mm between tip of snout and vent, is quite differently coloured than the male, and it differs also from all the colour-patterns of *L. pentadactylus* that I have seen described.

The whole upper surfaces of head and body between the very distinct dorso-lateral folds are beautifully vinaceous red with three distinct black-margined brownish red cross bars on the head, viz. a rather broad X-shaped one on the fore head, behind that a narrower one between the front corners of the orbits, and lastly a rather broad one, crossing the middle of the interorbital space, extending out on the upper eyelids to their outer margin. Also on the back I can see some scarcely discernible faint traces of dark lines, perhaps indicating in the living or young specimens the presence of certain dark markings, now vanished. Only a single transverse stripe is distinct in the middle of the back of quite the same colour

as those on the head but much narrower and shorter, not reaching the lateral folds.

The red upper area is sharply limited: On the head by jet-black band along the canthus rostralis, beginning with triangular spot on the margin of the tip of snout and ending at the orbit, where it descends to below the front lower corner of this, and on the back by a narrow black line, following the dorso-lateral fold to a short space before the vent, where it spreads to a black spot. The sides of the head are ash



Fig. 17. *Leptodactylus pentadactylus rubidoides*.

grey, the margin of the upper jaw light with three large triangular black spots. As anteriorly, the orbit posteriorly is margined by a black band, which continues over the tympanum obliquely out on the side to the middle of it, where it is broken up into some large very distinct round black spots, adorning the whitish posterior parts of the side and the groin. Upper parts of the sides of body faintly vinaceous red, the colour of the back gradually merging into the light lower parts.

Upper parts of limbs dark greyish, distinctly barred with black. Thighs posteriorly black with very small white (perhaps red in the living animal) rounded or irregular spots. Chin and breast uniform grayish white, margin of lower jaw with large black spots, more or less corresponding to the spots on the

upper jaw. Belly and lower surfaces of thighs light grey, marbled with light spots and irregular markings, forming a rather faint network. Tibia below more sharply marbled with dark and whitish, posteriorly with large very distinct triangular black spots.

As shown, this colour corresponds better with that described in *L. rubido* COPE than with that of *L. pentadactylus*, but *L. rubido* is said to be a small species with the tympanum only $\frac{1}{2}$ the diameter of eye and »a lateral glandular mass occupying the width of side». If these characters will be proved to be of specific value for distinguishing *rubido* from *pentadactylus*, my specimen must be referred to the last mentioned one, with which it corresponds in every respect, except the colour (see the table).

In Cat. Batr. Sal. Brit. Mus., p. 243, however, BOULENGER mentions a specimen from Ecuador, which he »thinks must be referred to *L. rubido* though differing in some respects from the diagnosis of this. The differences are: The tympanum is $\frac{2}{3}$ the diameter of eye, there is no second fold below the dorso-lateral, and the lateral glandular mass is much smaller and rendered besides rather indistinct by the smooth state of the specimen. The coloration is very handsome. The hind part of head and the back between the lateral folds vinaceous red, a dark brown bar between the eyes, the space between the canthal and labial streaks beautiful rose, hind limbs blackish brown, the hinder side of the thighs and the inner side of the calves with regular round white spots, lower surfaces brown white-spotted.»

As far as I can judge, this description corresponds so well with what is to be found in my specimen that I believe that these two specimens must be referred to one and the same form, which, according to my opinion, ought to be regarded as a handsome colour-variety of *L. pentadactylus*. I have called it forma *rubidoides*, as connecting the two species *pentadactylus* and *rubido*, the specific distinction of which I dare to doubt.

Among the five specimens from the older collections in the R. Nat. Hist. Mus. of Stockholm, the measurements of which are given in the table below, two (131 and 128 mm) are from Central America (Costa Rica and Nicaragua). In correspondence to their northern habitat their upper brown surface is crossed by darker black-edged bars, yet of a quite different appearance than the broad squarish bands in the male from Ecuador. They are much narrower and on the back

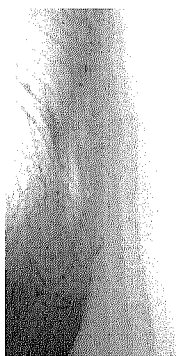
irregular, narrowed or enlarged in the middle (X-shaped or trapezoidal). The interorbital bar, however, is equally broad, not broader than $\frac{1}{3}$ the upper eyelids and slightly curved, quite like that of the *rubidoides*-specimen. Lower surfaces and groin are without reticulation, but one specimen has small light spots on the brown ground. Thighs posteriorly blackish brown with small light markings.

The two smallest specimens (105 and 90 mm), which are from Pará, Brazil, are reticulated with brown and light on belly, groin and lower surfaces of limbs, by this approaching the forma *labyrinthiaca*, but there is no red in groin and on the thighs, and at least one of them has rather distinct cross-bars like those of the specimens from Central America. Even in the other faint traces of such bars are to be seen. Hind parts of thighs blackish brown with or without very small white spots.

The 7th specimen in the table (150 mm) lacks statement of patria. It is of the northern type with traces of rather narrow cross-bars on the front part of back and distinct large blackish spots on the hind part of it and on the flanks, quite as figured by Seba. Lower surfaces and limbs below uniform light yellowish brown.

In the collections of the R. Museum of Nat. Hist. Stockholm there is also preserved the type-specimen of *Leptodactylus bufo*, described by myself in Archiv för Zoologi Bd. 7 N:o 17, Stockholm, 1911. As Lutz in paper cited p. 162 expresses as his opinion that my species »belongs to *pentadactylus*, as this somewhat variable species includes rather similar specimens, supposing that the red color has faded», I have reexamined the specimen in question in connection with the examination above to form an opinion about the placing of it.

In my description I say that *L. bufo* is closely allied to *pentadactylus* but differs »by the quite different appearance of the skin and the colour». All *pentadactylus*-specimens which I had to my disposal for comparison were quite smooth above in likeness with statements in the diagnoses of this species, whereas my specimen was distinctly tubercular. In the figure of a *pentadactylus* given by Lutz to support his opinion and really very like the figure of my specimen, copied close to his, there are some small tubercles on the back, and MÜLLER (loc. cit. p. 272) describes a specimen of *L. pentadactylus labyrinthiacus* »mit grösseren oder kleineren rundlichen Warzen ziemlich dicht» on »die Zone zwischen den beiden Dorsolateral-Falten.»



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In these circumstances the tubercular upper surface of the *bufo*-specimen does not seem to be of specific importance for distinguishing it from *pentadactylus*, and as this species, according to experience now made, varies in colour in a very high degree, I think that I must accept the opinion of Lutz. As is to be expected from its southern habitat, it seems to be nearest allied to the form *labyrinthiaca*, but differs from it by the tubercular upper parts and by want of «the red ornamentation on the parts which are covered by the folding of the legs.» I am sure that no red has been found on these parts. The specimen is in a very good state, and a faint shade of pink on the front part of belly and under parts of thighs is still maintained. It seems to me that a «bright salmon-coloured merging into vermillion» on the concealed parts ought to be better maintained than a faint red colour on parts, not at all sheltered. The concealed parts are fairly marbled by dark and light as the whole lower surfaces and lower parts of sides of body.

Nor do the measurements of the *bufo*-specimen¹ show any differences from those of a true *pentadactylus*. The broad head and the large tympanum are characteristics of the southern forms, and like these it has the loreal region very oblique and depressed.

The narrow tips of the digits, seen on the figure and remarked upon by Lutz, seem to be caused by the folding of their soft dermal margins.

Leptodactylus hemidactyloides Nova species.

Four specimens, 45–58 mm in length. Three of these collected by Mr WM. CLARKE-MACINTYRE, one male at Rio Napo 400 m, Sept. 1937, two females at Rio Pastaza, 1938. The fourth (the largest one, a female) collected by Mr R. BLOMBERG at Rio Pastaza, 1937.

Habit slender. Tongue long, oval, entire or very slightly nicked. Vomerine teeth in two transverse, slightly arched series behind choanae, nearly meeting in the middle and laterally reaching only the vertical of the inner edges of the choanae. Head a little longer than broad or as long as broad. Snout broad, rounded, longer than the diameter of eye. Nostril much nearer the tip of snout than the orbit. Interorbital space as broad as or broader than the upper eyelid. Canthus rostralis

¹ A few of these measurements have been somewhat altered from what is given in my paper cited, since they have been taken in quite the same manner as those of the other specimens.

| | Measurements in mm | | | | | | | | | | % of the total length (Tympanum in % of the eye) | | | | | | | | | |
|----------------------------|--------------------|------|----------------|------|------|------|----------------|------|-----------------|------|---|------|------|------|------|------|--|--|--|--|
| | Ecuador specimens | | Centre America | | Para | | Patria unknown | | Bufo sp. | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Total length | 155 | 126 | 131 | 128 | 105 | 90 | 150 | 125 | 155 | 126 | 131 | 128 | 105 | 90 | 150 | 125 | | | | |
| Breadth of head | 57 | 50 | 49 | 50 | 40 | 32 | 56 | 50 | 36.8 | 39.7 | 37.4 | 38.9 | 38.1 | 35.6 | 37.3 | 40 | | | | |
| Length of » | 49 | 42 | 45 | 45 | 36 | 32 | 47 | 42 | 31.6 | 33.3 | 34.4 | 35.2 | 34.3 | 35.6 | 31.3 | 33.6 | | | | |
| » » snout | 25 | 20 | 20 | 21 | 16 | 14.5 | 24 | 20.5 | 16.1 | 15.9 | 15.3 | 16.4 | 15.2 | 16.1 | 16 | 16.4 | | | | |
| » » upper eyelid | 17 | 15.2 | 15 | 15.5 | 14 | 12 | 16 | 13 | 11.0 | 12.2 | 11.4 | 12.1 | 13.3 | 13.3 | 10.7 | 10.4 | | | | |
| Diameter of eye | 14.5 | 11 | 12 | 12 | 10 | 9 | 12.5 | 11 | 9.4 | 8.7 | 9.2 | 9.4 | 9.2 | 10.0 | 8 | 8.8 | | | | |
| » » tympanum | 9 | 8 | 8.5 | 7.8 | 7 | 6.5 | 8 | 8 | 53 ¹ | 52.6 | 53.3 | 50.3 | 50.0 | 54.2 | 53.3 | 61.5 | | | | |
| Forearm + hand | 60 | 53 | 53 | 52 | 45 | 38 | 61 | 49 | 62.1 | 68.7 | 70.8 | 6.5 | 70.0 | 72.2 | 64.0 | 72.7 | | | | |
| Femur | 62 | 58 | 60 | 59 | 47 | 42 | 66 | 57 | 38.7 | 42.0 | 40.5 | 40.6 | 42.8 | 42.2 | 40.7 | 39.2 | | | | |
| Tibia | 67 | 57 | 57 | 56 | 49 | 42 | 72 | 58 | 40.0 | 43.7 | 45.8 | 46.1 | 44.8 | 46.7 | 44 | 45.6 | | | | |
| Foot | 97 | 84 | 86 | 83 | 68 | 63 | 104 | 87 | 43.2 | 45.2 | 43.5 | 43.7 | 46.7 | 46.7 | 48 | 46.4 | | | | |
| | | | | | | | | | 62.6 | 66.7 | 65.7 | 64.8 | 64.8 | 70 | 69.3 | 69.6 | | | | |

¹ The upper of these measurements show tympanum in % of the length of the upper eyelid, the lower one in % of the eye-opening.



Fig. 18. Different specimens of *L. hemidactyloides*.

rounded, loreal region vertical, concave. Tympanum very distinct, large, about $\frac{2}{3}$ the diameter of eye.

Fingers long and free, the first slightly longer than second. Tips of fingers somewhat swollen, obtusely rounded, sometimes a little broader than the parts behind. Toes long with very small rounded disks and faint rudiments of web, as the fingers not or indistinctly fringed. Bony terminal phalanges T-shaped with short branches. Subdigital tubercles well developed. Two small metatarsal tubercles, an oblong inner one and a round outer one. A low ridge or fold along the inner margin of tarsus. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the centre of eye.

All upper surfaces are densely covered with small uniform pointed tubercles, the back resembling that of some *Hemidactylus*-lizards. In the largest specimen these tubercles are more minute and more sparsely spread. A curved fold above the tympanum and a distinct dorso-lateral glandular one from the upper eye-lid to the upper angle of the groin. Sides of body smooth in the largest specimen, finely wrinkled and partly granular in the others. Lower surfaces completely smooth, except the posterior parts of the thighs, which are very finely granular.

Colour in alcohol: Upper parts and sides black, dark brown in the largest specimen, with a broad dorso-lateral light, faintly reddish-coloured band, in the living animals probably red, running from tip of snout along canthus rostralis and the dorso-lateral fold to the groin. Sharply contrasting to the dark colour there are also some very well defined crimson-red spots in the groin and on the posterior surfaces of thighs and tibiae, viz. a round or more oblong one in the groin, a lanceolate rather long one on the thighs, in one specimen broken up into two or three smaller ones, and two or three more or less vertically arranged ones on the tibiae. In some of the specimens there are also more or less visible traces of such reddish bars or spots on the upper parts of the feet. Lower surfaces uniform greyish brown, feet blackish.

By the beautiful red spots, which are placed quite as in *L. rhodostigma* COPE as also by other characteristics my species seems to be allied to this one, but it is well distinguished from this, which is said to have »well marked dilatations» on both fingers and toes, a smooth skin and the colour of upper parts brown and that of lower surfaces whitish. Besides, there is no statement of any light (red) dorso-lateral bands, well defined in these specimens.

Measurements in mm.

| | ♂ | ♀♀ | | |
|-----------------------------|------|------|----|------|
| | | | | |
| Total length | 45 | 51 | 54 | 58 |
| Length of head | 14.2 | 17 | 17 | 18.5 |
| Breadth of " | 13.8 | 16 | 16 | 18.5 |
| Length of snout | 6.2 | 7.2 | 7 | 8 |
| Diameter of eye | 5 | 6 | 6 | 6.2 |
| " " tympanum | 3 | 4 | 4 | 4.2 |
| Length of forearm | 10 | 11.2 | 11 | 12 |
| " " hand | 10.5 | 13 | 13 | 13 |
| " " femur | 20 | 25 | 24 | 25 |
| " " tibia | 21 | 25 | 25 | 26 |
| " " foot | 31 | 37 | 38 | 40 |

Leptodactylus nigrescens Nova species.

Three specimens 19, 23, 35 mm in length. Rio Napo, Watershed, 400 m, Oct. 1937.

Description of the largest specimen. Habit rather stout. Head somewhat broader than long. Snout subacuminate, slightly overlapping, longer than the eye. Lower jaw with a distinct knob corresponding to a very small notch on the margin of the upper jaw. Nostril nearer the tip of snout than the eye. Canthus rostralis indistinct, loreal region vertical, slightly concave. Interorbital space a little narrower than the upper eyelid. Tympanum distinct, small, half the diameter of eye. Tongue rather narrow, oval, the free hind margin broadly emarginate. Vomerine teeth in two distinct transverse rounded series behind the interspace between the choanae, distinctly separated from each other and reaching slightly beyond the level of the inner borders of the choanae.

Fingers short, first slightly longer than second, tips rounded, thickened but not dilated, no fringes along their sides. Sub-articular tubercles very distinct, prominent, two distinct metacarpal tubercles, an oblong inner one and a rounded outer one. Hind limbs rather short. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the centre of the eye. Toes long and narrow with small but distinct disks. A slight rudiment of web at the bases and hardly distinguishable fringes along the basal phalanges. Sub-articular tubercles well developed. Two distinct metatarsal tubercles, an oval inner one and a small rounded outer one. A distinct tarsal fold runs from the inner tubercle to the middle of tarsus.

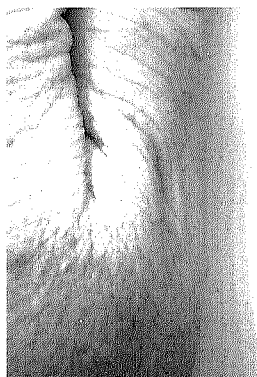
Skin nearly smooth above, the posterior part of back, the thighs and tibiae with some spread, very small tubercles. A well marked glandular fold runs along the upper parts of flanks from the hind margin of orbits nearly to the groin, and on the dorso-lateral line there are two somewhat irregular low folds, a short outer one and a longer inner one. A curved narrow fold above the tympanum. Under surfaces quite smooth. Faint traces of posterior discoidal folds.

Colour in alcohol. Upper parts of head and body uniform brownish black, limbs somewhat lighter and irregularly marbled with black short bars and spots, well visible on the somewhat lighter feet. Belly and lower surfaces of limbs uniform greyish white, chin, throat, and breast marbled with blackish brown, lower parts of feet uniform brown.

The two smaller specimens differ in having the tongue not emarginate, the first finger in one of them slightly shorter than the second, the whole back sparsely studded with very small pointed tubercles, and the folds mentioned not so well marked.

By the dilated tips of toes this species seems to be allied to *L. hylaedactylus* COPE from Upper Amazon, *L. discodactylus* BLGR from Ecuador, *L. andreae* MÜLL. and *L. pumilio* BLGR both from Brazil, but I cannot identify it with any of these. According to the descriptions of the species mentioned, my species is distinguished from *discodactylus* by not dilated tips of fingers, tympanum $\frac{1}{2}$ not $\frac{2}{3}$ the eye, small tubercles on the back and limbs, very narrow, scarcely visible fringes on the toes and uniform blackish colour above. *L. hylaedactylus* is said to have the vomerine teeth in curved series, tympanum $\frac{2}{3}$ the width of the eye, skin of upper surfaces granular, a row of elongate warts on each side of body, a ventral disk and different colour. *L. andreae* is very different in colour and has a row of pointed warts on tarsus and »Runzeln and Warten» on the back and flanks, tending to form rows. Besides the hind limbs are shorter, the heel does not reach the eye. *L. pumilio* has the tympanum hidden, very oblique loreal region, skin perfectly smooth and shiny and different colour.

Measurements in mm of the two largest specimens: Length 35—23, length of head 12.5—8, breadth of head 13—9, length of snout 5.8—4, diameter of eye 4.5—3, diameter of tympanum 2.2—1.5, forearm and hand 13.5—8.7, femur 17—10.7, tibia 15.5—11.2, foot 25.5—16.



Leptodactylus tuberculosus Nova species.

Eight specimens, 32—57 mm in total length, Rio Pastaza and Rio Napo, Watershed, 1937—38.

Habit rather slender. Tongue more or less broadly oval, the free hind margin broad and marginate or rounded and slightly nicked mesially. Vomerine teeth in two short, rounded, transverse or sometimes slightly oblique, not arched series



Fig. 19. *Leptodactylus tuberculosus* Nova species.

immediately behind the interspace between the choanae, not reaching the inner margins of these, well separated from each other. Head as long as broad or a little longer than broad or broader than long. Snout obtusely rounded, longer than the diameter of eye, not overlapping. Nostril much nearer the tip of snout than the orbit. Canthus rostralis rounded, more or less distinct. Loreal region oblique, in some specimens nearly vertical, concave. Interorbital space narrower than the width of the upper eyelid. Tympanum distinct, more than half the diameter of eye (57—66 %). Lower jaw with a short median knob, to which corresponds a small notch on the margin of the upper jaw.

Fingers free, short, first finger as long as, or slightly longer than the second, tips obtusely rounded, not dilated, no dermal borders. Subarticular tubercles very distinct, prominent, two large metacarpal tubercles of about the same size. Hind limbs long. If the length of tibia is measured off from the knee of the adpressed femur, it reaches to or nearly to the tip of snout. Toes long and narrow, not fringed, no rudiment of web. Tips rounded, not dilated. Subarticular tubercles very

well developed, prominent and conical. Two rather well defined metatarsal tubercles, an oval inner one and a round outer one. No tarsal fold.

All upper surfaces densely covered with small pointed tubercles and scattered larger ones, more or less distinctly porous and striated. Lower parts quite smooth, belly with discoidal folds.

Colour in alcohol: Ground-colour above greyish or reddish brown with a very variable pattern of black markings. This is regularly composed by a large longitudinal hourglass-shaped spot on the middle of the back behind the shoulders and before this a broad W-formed band between the shoulders. An X-shaped spot occupies the sacral part of the back and two round ones the anal part of it. Besides, there are an angular band between the orbits, broad vertical bars on the upper lip and very distinct cross-bars on the limbs. Lower lip with black spots corresponding to the black bars on the upper one. Chin, throat and belly light brown, lower parts of limbs darker. In most specimens, among these the figured one, this regular dark pattern is broken up into smaller spots and irregular short bands in a very variable manner. In some of the smaller specimens the ground-colour is blackish brown, causing the dark markings to be rather indistinct and these specimens nearly uniform blackish.

The largest specimen is a female with the ovary filled with large (4 mm) unpigmented eggs.

The smallest specimen (32 mm) differs remarkably from the others in having the head considerably smaller and the limbs shorter. As it corresponds very well, however, with the other

Measurements in mm.

| | | | | | | | | |
|-------------------------------|------|------|------|------|------|------|------|------|
| Total length | 57 | 44 | 41 | 41 | 39 | 36 | 33 | 32 |
| Length of head | 22 | 17.5 | 16.8 | 16 | 16 | 14 | 14 | 12 |
| Breadth of " | 23 | 17.1 | 16.8 | 16.5 | 15 | 14.5 | 14 | 11.5 |
| Length of snout | 10.5 | 7.8 | 7 | 7 | 6.8 | 6 | 6.5 | 5.5 |
| Diameter of eye | 6.5 | 6.3 | 6 | 6 | 5.2 | 5.2 | 5 | 5 |
| " " tympanum | 4.3 | 4 | 3.9 | 3.4 | 3 | 3 | 3 | 3 |
| Interorbital space | 6 | 4 | 4.8 | 4 | 4 | 3.8 | 3.8 | 3 |
| Forearm and hand | 25 | 20.5 | 21 | 20 | 19.8 | 18 | 17 | 14 |
| Whole fore limb | 35 | 28.5 | 28 | 28 | 26.8 | 25 | 23 | 20 |
| Hand | 14.3 | 11.5 | 11.5 | 11.8 | 11.3 | 10.5 | 10.2 | 8 |
| Femur | 27 | 23 | 19 | 21 | 18 | 17 | 18 | 14 |
| Tibia | 29 | 25 | 22 | 22.5 | 22 | 20 | 20 | 16 |
| Foot | 40 | 32 | 31 | 29 | 31 | 26 | 27 | 22 |
| Foot without tarsus | 27 | 21 | 21 | 19 | 20 | 17.5 | 18 | 14 |
| Whole hind limb | 96 | 80 | 72 | 72.5 | 71 | 63 | 65 | 52 |

specimens both in habit, dermal conditions, colour and most important characters, I cannot believe it to be specifically distinguished from them, but regard it as an aberrant specimen of this species.

Fam. Bufonidae.

Bufo marinus L.

6 specimens, 52—90 mm, Baños 1800 m, July and August 1938.

1 specimen, 100 mm, San Francisco, Rio Mapeto.

1 specimen 68 mm, Rio Cosanga, near Archidona, 800 m, Dec 1937.

3 specimens 72—110 mm, Rio Pastaza, Watershed.

1 specimen 60 mm, San Francisco near Mera Rio Pastaza 1200 m, Oct. 1937.

4 specimens 42—136 mm, Rio Pastaza, 1937.

The four last mentioned specimens collected by ROLF BLOMBERG, all others by WM. CLARKE-MACINTYRE.

In most of these specimens the tympanum is smaller than, in some equal with, half the diameter of eye; in none it is two thirds that diameter.

Bufo typhonius L.

1 specimen 70 mm, Rio Blanco, May 1938.

3 specimens 36—60 mm, Rio Cosanga near Archidona.

12 " 14—70 " San Francisco near Mera Rio Pastaza 1200 m, Oct. 1937.

10 specimens 35—102 mm, Watershed Rio Pastaza, 1938.

2 " 55—60 " Baños, Rio Pastaza.

7 " 20—80 " only labelled Eastern Ecuador.

6 " 25—47 " Rio Napo Watershed, 1938.

5 " 33—52 " Rio Pastaza, 1937.

The five last mentioned specimens collected by ROLF BLOMBERG, all others by WM. CLARKE-MACINTYRE.

Bufo crucifer forma *pfrimerii* MIRANDA RIBEIRO.

Two specimens, male and female, 94 and 95 mm in length, Rio Pastaza, Watershed.

Although rather like MIRANDA RIBEIRO's excellent figures in Arch. Mus. Nat. Rio Janeiro v. 27, 1926 Pl. 18, these

specimens differ in some points both from these figures and from each other. The male is provided with well developed bony ridges of all kinds, of which the supra- and postorbital ones form a distinct right angle. In the female the ridges are rather faint, and the angle mentioned is like that shown by the figure cited. In both the posterior parts of back and flanks and upper surfaces of hind limbs are regularly sprinkled with small smooth round tubercles as in the figures. In the female similar but much smaller tubercles are to be found also on the posterior part of belly and lower surfaces of thighs. The male is quite smooth beneath. Tympanum is distinct, but not larger than half the orbit.

The male is light grey above with a brownish tint on the hind part of the back and on the hind limbs. The light upper surface is sharply limited by a broad blackish band, crossing obliquely the sides from the tympanum to the groin. Beneath this band merges without distinct limit into the colour of the lower parts of belly, which are uniform dark grey, but considerably lighter than in the female and in the figure. There are no white spots on the belly.

The female is dark brown above, the legs are greyish brown, the tubercles black. The black lateral band lacks posteriorly. The breast, anterior part of belly, lower parts of fore limbs and feet are nearly black. Head below, posterior part of belly, sides of body and lower parts of thighs are more or less dark greyish, the small tubercles are black. A few very small round light spots are to be seen in the middle of the belly.

Measurement of the two specimens in mm. Total length ♂ 94, ♀ 95, length of head 27—28, breadth of head 33—33, length of snout 10—12, diameter of eye 10—12, diameter of tympanum 5—5, interorbital breadth 10—12, distance between elbow and tip of longest finger 44—42, length of femur 40—37, of tibia 39—38, of foot with tarsus 55—49. The limbs are longer in the male than in the female.

Bufo melini L. G. A-SON.

Syn. *Bufo anderssoni* MELIN.

In Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar följd 6 Ser. B, Bd 1 N: 4 Dr DOUGLAS MELIN describes a collection of Batrachians, brought home from his scientific travels in South America in the years 1923—25. Among these there is a *Bufo*-specimen from Taracuá, Rio Jaupés, Brazil, which he has called »after the Head-master L. ANDERSSON, Stockholm», not observing that this name was

preoccupied. Now Dr MELIN has asked me to revise this species in connection with the publication of the present paper and alter its name.

In likeness with Dr MELIN I regard it as representing a new species, though very closely allied to *B. glaberrimus* GTHR from Ecuador and Colombia. It seems to differ from this by flat and rounded, scarcely prominent warts on the upper surfaces, shorter hind limbs, the heel only reaching the posterior margins of the orbits, very well marked dorso-lateral folds and somewhat different colour. The upper parts are brownish grey not blackish brown, the warts are reddish and the sides brownish, not black. Besides, there are no tubercles on the flanks, and the patria is Brazil, not Ecuador or Colombia.

In acknowledgement of the courtesy of Dr MELIN I have called his specimen after its collector.

Fam. Hylidae.

Hyla lanciformis COPE.

One specimen, female, Rio Pastaza, Watershead, 1938.

It differs from the description of this species by lacking any vertebral line and dark bands across the head, body and limbs. The blackish band on the sides of head is jet-black and extends behind the eye through the tympanum and ends behind the axil, very well marked from the surrounding lighter parts. There is a light angular marking above the vent. Toes and membranes black.

Measurements in mm. Total length 96, length of head 31, breadth of head 27, length of snout 15.8, diameter of eye 11.8, of tympanum 7, forearm and hand 38, femur 48, tibia 54, foot 68, disks of fingers 3.2, of toes 3.

Hyla alboguttata DAUDIN.

Two specimens, one from Rio Napo, Watershed, 400 m, Oct., 1937, WM. CLARKE-MACINTYRE, the other from Rio Pastaza, ROLF BLOMBERG, 1937.

These specimens differ from the description of *H. alboguttata* by lacking any dark reticulation beneath. Besides, the web of the fingers is hardly distinguishable, but as it is said to be only a very slight rudiment and as my specimens are strikingly like the figure of this species in Cat. Batr. Sal. Brit. Mus. tab. 25, fig. 4, I do not hesitate to refer them to

it. The absence of white spots on the flanks and upper surfaces of thighs, the motive of the specific name, cannot be of any importance, as they lack also in one of the type-specimens.

Measurements in mm. Total length 40—38, Length of head 14.5—13.2, Breadth of head 14—12.5, Length of snout 6.5—6, Diameter of eye 5.2—5, Diameter of tympanum 3—2.8. Hand 11—11.8, Femur 19—18.3, Tibia 21—21, Foot 26—26. Disk on 3rd finger 2—2.2, on 4th toe 1—1.3

Hyla marmorata LAUR.

Seven specimens, Rio Pastaza, Watershed, 1937, 35—55 mm in total length.

Hyla quadrangulum BLGR.

Seven specimens, five males, two females, Rio Pastaza, Watershed, 1938.

In the main these specimens correspond well with the description of the type-specimen in Cat. Batr. Sal. Brit. Mus. p. 367, but their colour varies in a high degree. Only three of them (two males and one female) have a distinct large »quadrangular» dorsal spot, the motive of the name. The other female, which is dark red above, has blackish more or less faded traces of it, but the three males are quite uniform, dark olive or dark brownish or reddish above, without any traces of spots on the back and bands on the limbs.

The ground colour of the spotted specimens is light reddish brown in the female, dark greyish olive in one of the males and in the other red anteriorly on the back and dark olive posteriorly. The dorsal spot is not quadrangular, but more or less hourglass-shaped, oval, the anterior and posterior margins being rounded. Besides, it begins at the front margin of the eyes, not between them, and ends about halfway between axil and groin before sacrum. In the female it is chocolate brown, in the males deep bluish black, and in all of them it is margined by a very fine light line, beautifully white in the darker male.

In this and in the female another large spot occupies the anterior part of the back, resembling that of the type-specimen, figured by BOULENGER loc. cit. pl. 25 fig. 2, being a broad transverse triangular band, angularly extended behind, but the oblique and separated from the anterior spot by a much wider interspace than in the type-specimen. It is of the

same colour as the anterior spot and like this margined by a narrow light line. The third spotted specimen (the »red» male) has no posterior spot, the whole posterior part of the back being dark olive. In all seven specimens the upper parts of the flanks are of the same colour as the lateral parts of the back except in the »red» spotted male, in which their anterior parts are bluish black sharply contrasting to the red on the back. In the females there is a short and broad jet-black band above the axil, very conspicuous in the light spotted specimen. Even in the males the region above the axil and above the vocal sacs is black, less distinct in the unspotted darker specimens, in which it disappears into the dark colour of the body.

The colour of the upper parts of limbs is similar to the ground colour of the back. In the females and in the unspotted males they are uniform without any dark cross-bars. The darker one of the two spotted males has the tibiae beautifully ornated with two or three very broad blackish brown, white-edged triangular cross-bars, the broad bases of which confluent at the anterior margin of the tibia, while their tips are broadly separated posteriorly. Bands of the same type are perceptible also in the red male, but rather indistinct. Under surfaces are uniform brownish or greyish white in all. There are no cross-bars on the thighs and on the feet as in the type-specimen.

A rather peculiar difference from the type-specimen is the large tympanum, being, as seen by the table, nearly $\frac{2}{3}$ the width of the eye. Also the web of the fingers is more developed than stated in the type, the membrane reaching to, or nearly to the disks of second and fourth fingers, at least in the males. In the females it is a little shorter.

Measurements in mm.

| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------------------------|-----|------|------|------|-----|------|------|
| Total length | 58 | 59 | 60 | 60 | 60 | 61 | 64 |
| Length of head | 18 | 18.3 | 17.6 | 19 | 18 | 19 | 19 |
| Breadth " | 22 | 21 | 22 | 22 | 22 | 21 | 22 |
| Length of snout | 9 | 8.9 | 8.5 | 9 | 8 | 9.1 | 9 |
| Diameter of eye | 6.3 | 7 | 6.5 | 7 | 6 | 6.5 | 7 |
| " " tympanum | 4 | 4.5 | 4 | 4.3 | 4 | 4.1 | 4.2 |
| Forearm and hand | 28 | 27 | 28 | 29 | 28 | 28 | 29 |
| Hand | 18 | 18 | 19 | 18.2 | 18 | 18.5 | 19 |
| Femur | 27 | 29 | 30 | 29.7 | 31 | 30 | 29 |
| Tibia | 30 | 30 | 30 | 30 | 32 | 30 | 29.5 |
| Foot | 41 | 41 | 41 | 40 | 39 | 42 | 41 |
| Width of disk of 3rd finger . . . | 3.5 | 3.2 | 3.8 | 4 | 3.1 | 4.2 | 4.2 |

A very broad distinct dermal fold runs from the orbit above tympanum and axil, in the males forming a broad cover of the deep and large pits, from which the large vocal sacs are stretched out. In all males the inner finger is covered with brown horny rugosities.

As seen, the measurements show no differences between the females (No. 1 and 5) and the males, nor between the male-specimens without dorsal spots (No. 3, 4 and 7) and those with such spots (No. 2 and 6).

Hyla maxima LAUR.

Two specimens. Rio Pastaza, Watershed, 1938.

These specimens differ in a few points from the diagnosis of this species, but in the whole they correspond well with it. In one of them the hind limbs are somewhat longer than stated, the tibio-tarsal articulation reaching beyond the tip of snout, in both specimens the fingers are not quite entirely webbed, the membrane reaching not quite the disk of 3rd finger, and only with a magnifying glass one can see that the upper parts are very minutely granulate. A reddish brown line runs from the tip of snout out on the anterior part of back, and dark cross-bars, narrow and rather numerous in one, broad, irregular and few in the other, ornate the light sides of body.

Measurements in mm. Total length 98—90, length of head 30—28.5, breadth of head 33—29, length of snout 16—14.8, diameter of eye 10—9, of tympanum 5.8—4.8, forearm and hand 40.5—38, hand 28—25, femur 50—43, tibia 50—44, foot 61—60, width of disk of 3rd finger 5—4, that of 4th toe 3—3.

Hyla rubra DAUDIN.

A small specimen (27 mm) from San Francisco near Mera, Rio Pastaza, 1200 m, Oct. 1937.

Above dark brown with small irregular white dots, lower parts of flanks and under surfaces yellowish white. Groin, anterior and posterior sides of thighs and tibiae posteriorly marbled with blackish and light.

See also the following species.

Hyla depressiceps BLGR.

Five specimens, Watershed, Rio Pastaza, 1937—38.

These specimens correspond well both with *H. depressiceps* 1 with *H. rubra* DAUDIN, as these species are described in

Cat. Batr. Sal. Brit. Mus. The only important difference that I can find stated there between them is that the fingers of *H. depressiceps* are said to be webbed at the base, while they are quite free in *H. rubra*. As such a basal web is totally absent at least in two of these specimens and very small, hardly perceptible, in the others, I at first considered them as belonging to *H. rubra*. This opinion was confirmed by the measurements of the specimens of the two species in this collection, which do not show any difference of specific value. (See the table below).

On the other hand, the five specimens now in question agree in coloration and habit so exactly with BOULENGER's figure of *H. depressiceps* in Cat. Batr. Sal. Brit. Mus. Pl. 25 fig. 4 that I cannot doubt their identity with this. If really the presence or absence of web at the base of the fingers should be the only distinguishing character between the two species, these facts should prove that they ought not to be specifically distinguished. A comparison between the specimens at my disposal show, however, a rather great external difference between them, especially in the shape of head. The *depressiceps*-specimens have, as indicated by the name, a very depressed head with a low and very oblique loreal region and a rounded, not overlapping tip of snout, while the *rubra*-specimen is not at all »*depressiceps*», the head being of the usual shape with a rather high, nearly vertical loreal region and subacuminate overlapping tip of snout. Besides, the lower surfaces of the former are smooth or feebly, that of the latter coarsely, granular. Possibly a greater number of specimens may prove these characters not being more constant than the development of the web. In such a case I cannot find any reasons for distinguishing *H. depressiceps* from the very variable *H. rubra*.

The great difference in colour which is to be seen between the specimens of the two forms in this collection cannot be regarded as any specific distinction, as this difference is not greater than that between the different forms of *H. rubra*, figured by SPRIX in Species novae Ranarum pl. 6 fig. 4, 7 fig. 3, 10 fig. 1 and 11 fig. 3. If the two dark curved bands on the front part of the back of the variety *X-signata* (pl. 11 fig. 3) are thought to be connected by an angular marking and the ground colour becomes darker for instance in forma *affinis* (pl. 7 fig. 3), a colour pattern is formed quite similar to that of *H. depressiceps*, shown in BOULENGER's figure as well as in my specimens.

| | Measurements in mm of | | | | | | Measurements in total length in | | | | | |
|---------------------------------------|------------------------|-----|------|------|------|-----------|---------------------------------|------|------|------|------|------|
| | depressiceps specimens | | | | | rubra sp. | depressiceps specimens | | | | | |
| Total length | 42 | 40 | 39 | 37 | 33 | 27 | 42 | 40 | 39 | 37 | 33 | 33 |
| Length of head | 14 | 15 | 13.6 | 14 | 11 | 10 | 33.3 | 37.5 | 34.9 | 37.8 | 33.3 | 33.3 |
| Breadth of | 14 | 15 | 14 | 14 | 11 | 9 | 33.3 | 37.5 | 35.9 | 37.8 | 33.3 | 33.3 |
| Length of snout | 6.8 | 7.5 | 6.2 | 7 | 5.2 | 4.8 | 16.2 | 18.7 | 15.9 | 18.9 | 15.3 | 15.3 |
| Diameter of eye | 5 | 5.8 | 5 | 5 | 4.6 | 4.2 | 11.9 | 14.5 | 12.8 | 13.5 | 14 | 14 |
| " tympanum | 2.4 | 2.2 | 2 | 2 | 1.8 | 1.7 | — | — | — | — | — | — |
| Forearm and hand | 19 | 19 | 17.3 | 17 | 15 | 12 | 45.2 | 47.5 | 44.4 | 46.0 | 45.5 | 45.5 |
| Hand | 11.5 | 12 | 11.5 | 10.2 | 9.6 | 7.2 | 27.4 | 30 | 29.5 | 27.8 | 29.1 | 29.1 |
| Femur | 18 | 20 | 19 | 17.6 | 14.2 | 12.5 | 42.9 | 50 | 48.7 | 47.8 | 42.4 | 42.4 |
| Tibia | 20 | 22 | 20 | 18.8 | 16 | 15 | 45.2 | 55 | 51.3 | 50.0 | 48.5 | 48.5 |
| Foot | 29 | 28 | 27 | 25.5 | 21.5 | 18 | 69.0 | 70 | 69.2 | 68.9 | 65.1 | 65.1 |
| Width of disk on 3rd finger | 2.1 | 2 | 2 | 2 | 1.5 | 0.9 | — | — | — | — | — | — |

Hyla *g.* *melas* CORR.

Three specimens from Pastaza, no. 1 from Watershed
1938, no. 2 from San Francisco near Mera 1200 m, Oct. 1938
no. 3 from Baños, Meratoxi 1200 m, Oct. 1937.

Two of these specimens are uniform blackish olive, near black above and on the sides. The third is dark reddish brown above, black on the lower part of the sides. In all of them the lower surfaces are greyish or brownish white with the exception of tibia, tarsus (in no. 1 and 2), and outer parts of hands and feet, which are blackish both above and beneath. Inner parts of hands and feet are more or less white (coloured less). Below, the two inner fingers are white in all specimens above, this is the case in specimen 1 with the two inner fingers in specimens 2 and 3 only with the first finger, in no. 3 only to some extent. Also the two inner toes are somewhat discoloured but in a much less degree. Peculiarly enough both BOULENGER and NIEDEN say that it is the *outer* parts of the hands and feet that are discoloured, not the *inner* parts. I cannot but think this statement is due to a misprint. CORR. says nothing about that.

Any dark cross-bands on the limbs, stated in the descriptions, are not to be seen in the very dark ground colour, and as shown in the table, the snout is somewhat longer than the eye, not equal with it as in the type-specimen. In other respects my specimens correspond so exactly with this that there cannot be any doubt about their identity with it. Specimen no. 1 is a male with brown rugosities on the inner finger.

| Measurements in | Measurements in | | | | | |
|----------------------------|-----------------|-------|-------|-------------------|-------|-------|
| | mm | | | % of total length | | |
| | No. 1 | No. 2 | No. 3 | No. 1 | No. 2 | No. 3 |
| Total length | 40 | 37 | 36 | — | — | — |
| Length of head | 16 | 14 | 13 | 40 | 38 | 36.1 |
| Breadth | 16 | 15 | 15 | 40 | 40 | 41.7 |
| Length of snout | 7 | 6.6 | 5.8 | 17.5 | 17.8 | 16.1 |
| Diameter of eye | 6 | 5 | 4.8 | 15 | 13.8 | 13.3 |
| " " tympanum | 3.0 | 3.0 | 2.9 | — | — | — |
| Forearm and hand | 20 | 17 | 18 | 50 | 45.9 | 50 |
| Hand | 12.5 | 11 | 11.5 | 31.2 | 29.8 | 31.9 |
| Femur | 20 | 20 | 18 | 50 | 54.1 | 50 |
| Tibia | 22 | 20 | 19 | 55 | 54.1 | 52.8 |
| Foot | 29 | 25 | 24 | 72.5 | 67.6 | 66.7 |
| Hind limb | 71 | 65 | 61 | 178 | 176 | 170 |
| Tympanum in % of eye | | | | 65 | 59 | 60 |

Hyla buckleyi BLGR.

One specimen, female, 71 mm total length, Rio Pastaza, Watershed 1938.

The colour-pattern of this specimen is quite similar to that of the type-specimen, as it is figured in Cat. Batr. Sal. Brit. Mus. Pl. 25 fig. 1. The description of this also corresponds well with my specimen, which, however, differs in having somewhat shorter hind limbs (the heel reaches only the front margin of the orbit, the head deeply concave with the orbits strongly projecting, and some small tubercles spread on the upper surface, although the specimen is a female. There are two rather large pointed tubercles on each of the upper eyelids, some very small ones on the forehead and on the forearm and tarsus, where they form a low crenulated ridge along their outer edges. I suppose, however, that these abberances are not sufficient to distinguish it specifically from *H. buckleyi*.

Measurements in mm. Total length 71, length of head 23, breadth of head 24, length of snout 10.8, diameter of eye 7.5, diameter of tympanum 5, forearm and hand 33.5, hand 21, femur 35, tibia 39, foot 47, disk on 3rd finger 4, on 4th toe 3.5.

Hyla calcarata TROSCHEL.

One specimen, female with large eggs, San Francisco, Rio Pastaza, near Mera 1200 m, Oct. 1937.

Though differing in some points from the descriptions of this species, this specimen is, however, so strikingly like Gün-

THIER's figure of *Hyla fasciata* in his Cat. Batr. Sal. Pl. fig. D that I must believe that it may be referred to this species. It differs in the following points. The heel reaches only halfway between eye and nostril, not to tip of snout; the toes are only half webbed, not $\frac{2}{3}$, the tongue is distinctly longer than broad, the head is concave, the concavity prolonging into a narrow and deep furrow on the neck bordered by thick walls, there are two faint dermal dorsal lateral folds, broad thin folds along the margins of thighs and tibiae, and no dark vertical bars on the front of the thighs and on the upper parts of tarsus. I believe these differences are too small to be anything but individual ones, or they are omitted in the descriptions.

Measurements in mm. Total length 55, length of head 18, breadth of head 17, length of snout 8.5, diameter of eye 5.0, diameter of tympanum 2.9, forearm and hand 25, hand 14, femur 25.5, tibia 28, foot 38, disks or lateral fingers 2.6.

Hyla appendiculata BLGR.

One specimen, Rio Pastaza, 1937, ROLF BLOMBERG.

Measurements in mm. Total length 65, length of head 22, breadth of head 24, length of snout 11, diameter of eye 7, of tympanum 4.8, forearm and hand 30, hand 18, femur 33, tibia 33, foot 47, breadth of disk on third finger 3.3, on fourth toe 2.5.

Hyla macrotis Nova species.

One specimen, female 120 mm, Rio Pastaza, Watershed 1938.

Habit stout, tongue large, circular, nicked behind and slightly free. Vomerine teeth in two arched transverse series close together between the large choanae. Head depressed, much broader than long. Snout rounded, not overlapping, more than $1\frac{1}{2}$ the diameter of eye. Canthus rostralis indistinct, rounded, loreal region very oblique, slightly concave. Nostril near the tip of snout. Interorbital space broader than the upper eyelid, slightly concave. Tympanum very large, as large as the eye.

Fingers halfwebbed. The web reaches the base of the penultimate phalanx, except on the outer side of the second finger, where it reaches the middle of this phalanx, and on the inner side of the third, on which it reaches only the middle of the infrapenultimate one. On all fingers the web continues

as rather broad folds to the disks. No projecting rudiment of pollex. Disks large, nearly as large as tympanum. Toes $\frac{3}{4}$ webbed, on the fourth toe and on the inner side of the second and third the membrane reaches somewhat beyond the base of the penultimate phalanx and extends as folds to the disks. On the first and fifth toes and on the outer side of the third and second it reaches to or nearly to the disks. Disks of toes slightly smaller than those of fingers. An oblong inner and a round very small outer metatarsal tubercle. Hind limbs

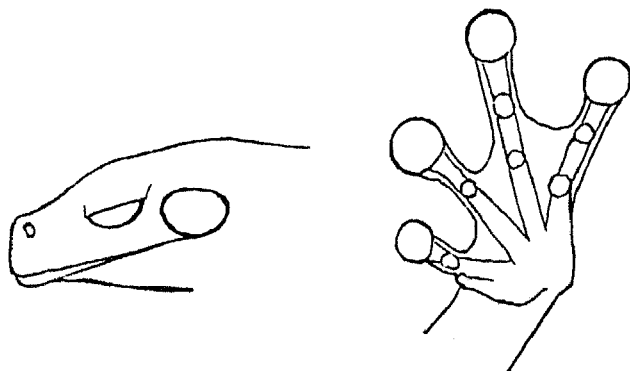


Fig. 20. Head and hand of *H. macrotis* (1/1).

short, if the length of tibia is measured off from the knee of the adpressed femur, it reaches the centre of eye.

Head above and the middle part of back finely granular, the granules diminishing behind; the hindmost part of back and upper surfaces of limbs only finely punctuated. Lateral parts of the front parts of back above the shoulders coarsely granular. Flanks nearly smooth. Chin, belly and lower surfaces of thighs coarsely, breast more faintly, granular.

Colour in alcohol: Upper surface of head and anterior part of back uniform dark reddish olive, posterior part of back, sides of body and upper surfaces of limbs light reddish olive with very faint traces of narrow dark cross-bars on the thighs. Chin and breast pale reddish, belly brownish grey with a shade of green and lilac. Margins of upper and lower jaws light reddish brown. Tympanum yellowish horny-coloured.

Measurements in mm. Total length 120, length of head 32, breadth of head 39, length of snout 15, diameter of eye 9, of tympanum 9, forearm and hand 55, hand 37, femur 51, tibia 54, foot 74, breadth of disk on 3rd finger 7, on 4th toe 6.

By its very large tympanum this species seems to be well characterized. Possibly, it may be regarded as most closely allied to *Hyla buckleyi* BLGR and *H. lepreurii* Dum. & Bibr., but it differs by its much larger tympanum, shorter limbs, more developed web on the fingers, tuberculated back even in the female, different colour and larger size.

Hyla riopastazae Nov. species.

One specimen, female, with large eggs. Rio Pastaza, 1840 m, 1938.

Habit rather slender. Tongue broader than long, very slightly nicked behind. Vomerine teeth behind and between the posterior parts of the large choanae, in two curved long

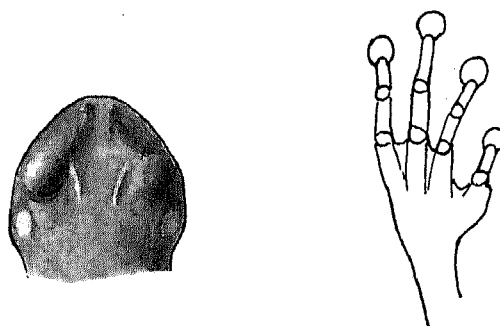


Fig. 21. Upper side of head ($\frac{2}{3}$) and hand ($\frac{1}{1}$) of *H. riopastazae*.

series close to each other and forming together a long arch, the convexity of which is directed forwards. Head broader than long, depressed. Snout rounded, longer than the diameter of orbit. Canthus rostralis distinct, curved. Loreal region very oblique, concave. Tympanum very distinct about $\frac{2}{3}$ the diameter of eye. Upper surface of head strongly ossified, the derm, however, quite free. Interorbital space broader than the upper eyelid, slightly concave, the concavity laterally limited by two faint, slightly protruding bony ridges, slightly converging behind.

Fingers long and narrow, distinctly webbed at the bases. No projecting rudiment of pollex. Disks nearly as large as tympanum. Toes $\frac{3}{4}$ webbed. On the first and fifth toes and on the outer sides of second and third the membrane reaches the disks, on the fourth toe and inner sides of second and third it reaches the base of the penultimate phalanx but extends as distinct folds to the disks. Disks of toes as large

as those of fingers. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the front margin of the eye.

Upper parts smooth to the naked eye, under the magnifying glass finely corrugated and minutely and sparsely tubercular on the hindmost part of the back. Upper eyelids finely granular. Tympanic region, belly and lower surfaces of thighs coarsely, anterior parts of flanks sparsely, granular. Chin and breast smooth. A narrow fold above tympanum.

Colour in alcohol: Brownish above with small very indistinct dark dots, of these a spot is most distinct behind the orbits. Upper eyelids, temporal regions and sides of body blackish. A few indistinct cross-bars on the limbs. Chin, breast and anterior part of belly yellowish white; the middle part of belly with large black spots, which confluent posteriorly to a uniform blackish area on the posterior part of belly. The membranes of the toes black.

Measurements in mm. Total length 67, length of head 20.5, breadth of head 22, length of snout 8.3, diameter of eye 6, diameter of tympanum 4, forearm and hand 33.4, hand 22, femur 30.2, tibia 33.5, foot 46, disk of third finger 3.5, that of fourth toe 3.5.

In likeness with foregoing and following species (*Hyla macrotis* and *depressa*) also this species seems to be closely allied to *H. leprourii* and *H. buckleyi*. The only difference I can find in the descriptions of these two species is the different shape of the loreal region which is »very oblique» in *H. buckleyi* and »not very oblique» in *H. leprourii*. If this difference may be regarded as sufficient to distinguish the two species, my species should be most closely allied to *H. buckleyi*. It differs, however, so distinctly from that specimen in this collection, which I have determined as belonging to this species, and also from BOULENGER's figure of it, that I cannot refer it to this one. The hind limbs are shorter, the fingers are longer, narrower and less webbed, the disks larger, the tympanum smaller, the chin quite smooth, and the colour very different.

Hyla depressa Nova species.

One male specimen, 73 mm in total length. Rio Pastaza, Watershed, 1938.

Closely allied to *Hyla leprourii-buckleyi*.

Head and body very depressed. Tongue large, round, slightly emarginated, totally adherend. Vomerine teeth in two angular

bent, closely approximated series behind and between the posterior parts of the large choanae, forming together an arch, the convexity of which is directed forwards. Head a little broader than long. Snout longer than the diameter of eye, ending in a squarish projecting tip, angularly bent to the forehead. Canthus rostralis distinct, straight but angularly bent on the tip of snout. Loreal region vertical, concave.

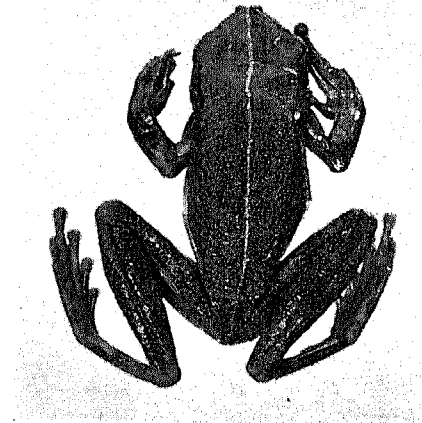


Fig. 22. *Hyla depressa*. The broad black dorsal band only partly visible on the photo.

Tympanum large, $\frac{3}{5}$ the diameter of eye, its posterior margin not so distinct as the anterior one, somewhat suppressed by large tubercles on the posttympanic region. Interorbital space slightly broader than the upper eyelid, concave as the forehead; two faint bony ridges limit the concavity along the eyelids.

Fingers rather short and broad, the outer ones with a well developed web at their bases, not reaching the bases of the penultimate phalanges. Disks nearly as large as tympanum. No projecting rudiment of pollex. Toes nearly entirely webbed. On the first, fifth and outer sides of second and third the membrane reaches the disks, on the fourth and inner sides of second and third it reaches the bases of the penultimate phalanges, continuing as distinct folds to the disks. These are nearly as large as those on fingers. A well developed longitudinal inner metatarsal tubercle, no outer one.

All upper parts densely and very regularly covered with all round tubercles, very small on the head and neck, growing size behind. On the sides of back they are largest. All

lower surfaces finely granular, except the breast which is nearly smooth. Tympanic region with some large and irregular tubercles.

Colour in alcohol: Above and on the sides dark purplish brown with a broad black median band running from the tip of snout to vent, divided mesially along its whole length by a narrow white line. Under parts dark grey, densely marbled with small rather indistinct brown dots.

Measurements in mm. Total length 73, length of head 22, breadth of head 23, length of snout 10, diameter of eye 8, that of tympanum 4.8, forearm and hand 34, hand 22, femur 38, tibia 39, foot 47, disk on 3rd finger 4, on 4th toe 3.6.

As shown, the correspondence between this species and *H. lepricuri-buckleyi* is very great. By the vertical loreal region it seems to be most closely allied to *H. lepricuri*, but I do not dare to identify it with this one. The singular colour, the strongly depressed and uniformly and totally granular head and body, the shape of the snout, the large disks both on fingers and toes and the short web on the fingers, not reaching one third of them, are, as it seems to me, sufficient reasons to distinguish it from this species.

Hyla capitocarinata Nova species.

One specimen, 60 mm in length. Rio Pastaza, Watershed, 1938.

Habit slender. Tongue moderate, adherent, rounded, broader than long, slightly nicked behind. Vomerine teeth in two short transverse groups between the moderate choanae close to their inner margins. Head large, considerably broader than long. Snout rounded, longer than the diameter of eye. Upper surface of forehead short, tip of snout and forehead gently sloping towards the margin of the upper jaw. Canthi rostrales form two elevated thick bony ridges on the horizontal part of the forehead. From the protruding ends of these, and separated from them by a transverse depression, two other straight narrower bony ridges run along the tip of snout downwards to its margin. Both these and the anterior parts of the canthi rostrales are separated by a deep and narrow furrow widened behind to a λ-shaped pit. Nostrils at the end of the horizontal part of the forehead beside the protruding ends of canthi rostrales halfway between the orbits and the tip of snout.

Skull strongly ossified, the derm, however, free. Interorbital

space considerably broader than the upper eyelid, deeply concave the concavity limited in front by two faint bony ridges, converging forwards from the anterior corners of the orbits and nearly meeting in the middle, and laterally by two rather well marked longitudinal bony ridges on the interorbital part of the frontoparietal bones. These ridges extend out on the occiput, where they limit its concave median part. Tympanum hidden or indistinct. The tympanic region bordered by four more or less bony faint ridges, forming together a trapezoidal figure, the upper margin of which is formed by the erected lateral margin of the broad postorbital part of the frontoparietal bone, the lateral sides of a postorbital and a post

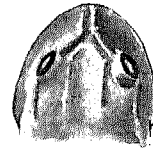


Fig. 23. Upper side of head of *Hyla capitocarinata*. $\frac{1}{4}$.

tympanic partly dermal ridge, and lastly a fourth ridge running along the margin of the upper jaw, forms a border below. Besides, a short curved ridge is to be seen in the middle of this area.

Fingers long, the three lateral slightly webbed at the base. No web between first and second. Disks of lateral fingers large. No projecting rudiment of pollex. The first finger nearly as long as second, opposite to the others and angularly bent nearly as in a *Phyllomedusa*-species. Toes $\frac{3}{4}$ webbed, the web reaches the base of the penultimate phalanx of the fourth and first toes and on the inner sides of the second and third, and extends as narrow folds to the disks. On the fifth toe and on the outer sides of the second and third it reaches nearly the disks. Disks of toes slightly smaller than those of the outer fingers. A small oval inner metatarsal tubercle and a round, less distinct outer one. The hind limbs long, the length of tibia, marked off forwards along the body from the knee of the adpressed femur, reaches a good deal beyond the tip of snout.

Upper parts smooth. Chin, breast, sides of body, belly and under surfaces of thighs granular. A narrow dorso-lateral dermal fold runs on each side from the posterior end of the erected edge of the postorbital part of the frontoparietal bone to coccyx and vent.

Colour in alcohol: All upper parts uniform pale brown with



a faint lilac tint on the back and limbs and with a few small black dots or markings, viz. very small dots on nostrils and back, very fine lines along the postorbital ridges of the frontoparietal bones, a narrow stripe across the interorbital space, a short line on each side of the vent, and lastly and most distinct, a stripe from the heel along the outer lower margin of the tarsus, extending out on the two lateral toes and their membranes, which are perfectly black.

Measurements in mm. Total length 56, length of head 17, breadth of head 20, length of snout 9, diameter of eye 7, of tympanum 2, forearm and hand 29, hand 19.6, femur 31, tibia 33, foot 45, width of disk of third finger 2.5, that of fourth toe 2.

By the shape of the head this species seems to be well distinguished from all South-American *Hyla*-species, hitherto described.

Hyla membranacea Nova species.

Four specimens, females. Rio Pastaza, Watershed, 1938.

Habit rather slender. Tongue oval to nearly circular, a little emarginated behind, its posterior third free. Vomerine teeth in two small transverse or slightly oblique, straight, distinct, well separated groups between the moderate choanae. Head slightly broader than long. Snout rounded, longer than the diameter of eye. Nostril near the tip of snout; canthus rostralis indistinct, rounded; loreal region not or slightly concave, vertical. Interorbital space $1\frac{1}{2}$ times as broad as the upper eyelid. Tympanum small, round, $\frac{2}{5}$ — $\frac{1}{2}$ the diameter of eye, not very distinct, pigmented as the surrounding dermal parts, its upper margin concealed by a thick tympanic fold.

Fingers $\frac{1}{3}$ — $\frac{1}{2}$ webbed, the three outer ones fringed to the disks (not distinctly in two of the specimens). Disks slightly smaller than tympanum, no projecting rudiment of pollex. Toes $\frac{3}{4}$ webbed, but the membrane rather much incised.

On the 4th toe and inner sides of 3rd and 2nd it reaches the base of the penultimate phalanx and continues as broad folds to the disks. On the 1st and 5th toes and on the outer sides of 2nd and 3rd it reaches the disks. Disks of toes nearly as large as those of fingers. A small oval inner metatarsal tubercle, no outer one; subdigital tubercles slightly developed. The length of tibia, set off forwards from the knee of the adpressed femur, reaches to or nearly to the tip of snout.

Upper surfaces completely smooth. The part behind the orbit forms a loaf-shaped swelling, sharply set off from the axil by a deep vertical depression. Belly and lower parts of

thighs coarsely granular. Chin and breast smooth. A distinct dermal extension connects the inner half of the upper arm with the side of body and continues as a thin membranaceous fold out on the flanks. Also the hind limbs are margined with a membranaceous fold as usual most distinct on the tibia, rather indistinct on tarsus.

Colour in alcohol: The whole animals are uniform brown, dark olive brown above, pale brown below. The darker colour above is established by very small and densely placed dark points in the lighter ground, so minute that they are only seen with a magnifying glass. Here and there these points are gathered more closely together, then forming darker parts, especially seen on the upper parts of the head. In one specimen there are traces of a broad indistinct dark band from the tip

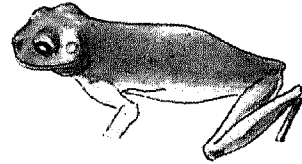


Fig. 24. *Hyla membranacea*. $\frac{1}{1}$.

of snout along the sides of head through the eye, continuing on the side of body to the groin.

By the uniform brown, very slightly remarkable colour and the general *Hyla*-habit, lacking all peculiar characters, except the dermal extension at the upper arm, these specimens correspond rather well with several tropical American species of this genus, but I have not been able to identify them with any of these. By the presence of the humeral dermal extension and several other characters they seem to be allied to *Hyla favosa* COPE from Upper Amazon and also with *H. rickardsi* TAYLOR from Mexico, but they seem to differ specifically also from them.

According to COPE (Proc. Amer. phil. Soc. v. 29 1886, p. 95) the former has a very singular colour of »brown which is interrupted by a coarse honeycomb or net-like pattern of bright yellow color» of which no traces are to be seen in my specimens. Besides in *favosa* the dermal extension extends along the greater part of the upper arm, the web is more developed at least on the toes, and the hind limbs seem to be shorter than in my specimens. Lastly, there are no statements of any membranaceous folds on limbs, and *favosa* is a much larger species (63.5 mm).

As seen by the table below, my specimens seem to differ

from *H. rickardsi* in the external characters only in having a longer snout. According to TAYLOR, however, *H. rickardsi* has a distinct canthus rostralis, the tongue distinctly broader than long, the fingers more than half webbed and a dissimilar colour. The limbs are more or less barred with brown, a white line constantly borders the outer edge of the foot and 5th toe, and there are a transverse light line above anus and indistinct whitish or cream spots along the sides.

As seen these differences are rather unimportant, but the different patria Ecuador and Mexico, does not speak for any synonymy.

Measurements in mm

| | of <i>H. membranacea</i> | | | | <i>H. rickardsi</i> |
|---------------------------|--------------------------|------|-----|-----|---------------------|
| Total length | 37 | 38 | 38 | 38 | 37 |
| Length of head | 11.5 | 12 | 12 | 12 | 11.2 |
| Breadth " " | 13 | 13 | 13 | 13 | 13 |
| Length " snout | 5.2 | 5.6 | 5.8 | 6.0 | 4 |
| Diameter of eye | 4.3 | 4.1 | 4.3 | 4.5 | 4.2 |
| " " tympanum | 1.8 | 1.9 | 2.3 | 2.2 | 2 |
| Femur | 18 | 20 | 20 | 19 | 18 |
| Tibia | 19 | 20.2 | 20 | 20 | 21 |
| Foot | 25 | 28 | 27 | 27 | 27.5 |

Hyla (Hylella) bifurca Nova species.

One specimen, 29 mm in total length, Rio Pastaza, 1937,

ROLF BLOMBERG.

Habit slender. Head broader than long, broader than the body, the largest breadth at the protruding eyes. Snout short, as short as the eyes, broadly rounded, not overlapping. Canthus rostralis slightly marked, loreal region vertical, not concave. Nostril close to the tip of snout. Interorbital space much broader than the upper eyelid. Vomerine teeth none. Tongue narrow, oval, entire. Tympanum distinct, round, nearly half the diameter of eye.

Fingers slender, outer fingers $\frac{1}{3}$ webbed, the innermost free and probably opposite to the others, no projecting rudiment of pollex, disks rather large but smaller than the tympanum. Hind limbs long, if the length of tibia is measured off from the knee of the adpressed femur, it reaches nearly the tip of snout. Toes $\frac{2}{3}$ webbed. On the 1st, 5th and outer sides of 2nd and 3rd the web reaches to or nearly to the



Fig. 25. *Hyla (Hylella) bifurca*.

between the front corners of the orbits bright white (in life possibly red). This white area is prolonged backwards by two very distinct white (red?) streaks, running along the outer margins of the upper eyelids above tympanum and shoulders on the sides of back to sacrum, where they end. There is a white spot above the vent and another on the heel, but no other light markings, stated in the very closely allied *H. carnea* COPE. Belly, breast and chin brownish white, limbs below, upper arms above, thighs, fingers and inner toes colourless. No dark cross-bars on limbs.

Measurements in mm. Total length 29, length of head 9.1, breadth of head 11, length of snout 4, diameter of eye 4, diameter of tympanum 1.8, forearm and hand 14, femur 15.3, tibia 16, foot 23, disk on third finger 1.4.

Evidently this species is closely allied to *H. carnea* COPE and it may possibly be considered as an aberrant colour variety of this. As, however, COPE's diagnosis is very incomplete, lacking statements about several important characters generally used to specific distinction, and as my specimen differs in some points, having a different colour-pattern, though of the same type, a distinct, not »small and indistinct» tympanum, a narrow not round tongue, I do not dare to identify it with *H. carnea*.

disks, on the 4th and inner sides of 2nd and 3rd it reaches the base of the penultimate phalanx extending as narrow borders to the disks. These are well developed, but somewhat smaller than those of fingers.

Skin smooth above, granular on the belly, slightly granular on lower surfaces of thighs. Chin smooth. A fold above the tympanum not very distinct.

Colour in alcohol: Posterior part of interorbital space, back sides of head and body and upper parts of limbs, except the thighs, fingers and feet, which are colourless, chocolate brown with very small white points, scarcely visible with the naked eye, sparsely spread over the whole dark area. Upper surface of forehead to a curved line

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Hyla (Hylella) porifera Nova species.

One specimen, 40 mm in length, Rio Pastaza 1937, ROLF BLONBERG.

Habit slender, depressed. Head broader than body, broader than long. The greatest breadth at the protruding eyes. Snout subacuminate, not overlapping, slightly longer than the diameter of orbit, slightly furrowed above. Nostrils close to the tip of snout; canthus rostralis rounded, loreal region nearly vertical, slightly concave. Interorbital space broader than the upper eyelid. Vomerine teeth none. Tongue resembling that of a *Rana*, narrowly heartshaped, distinctly emarginate, its posterior half free. Tympanum distinct $\frac{2}{5}$ the diameter of eye.

Fingers short with large disks, as large as tympanum. No traces of web. Hind limbs long and slender, if the length of tibia is measured off from the knee of the adpressed femur, it reaches between eye and nostril. Disks of toes distinct, but smaller than those of fingers. Outer toes scarcely one third webbed, no web between the three inner toes. An oblong inner metatarsal tubercle, no outer one.

All upper parts densely covered with small round porous warts. Belly granular, other lower parts smooth. A thin dermal fold along the latero-ventral margin from axil to the middle of body. Hind margin of forearm and outer finger, anterior margin of tibia and hind margin of foot bordered with a sparsely crenulated very low ridge.

Colour in alcohol: Upper parts uniform plumbous olive, chin whitish, other lower surfaces uniform brown. The margins along the limbs whitish.

Measurements in mm. Total length 40, length of head 13, breadth of head 14, length of snout 5.5, diameter of eye 4.8, diameter of tympanum 1.9, length of forearm and hand 17, length of femur 19, of tibia 19, of foot 25.

The peculiar form of the tongue, not seen by me in any other *Hyla*-specimen, the nearly total absence of web, the densely and very distinctly porous upper surfaces together with the absence of vomerine teeth have caused me to doubt whether this specimen ought to be referred to the genus *Hyla*, or represent a new genus. In habit, structure of the ultimate phalanx of digits, sternal apparatus, sacral vertebra, etc., it is, however, a true *Hyla*, and as none of the aberrances from the usual conditions mentioned seems to form an obstacle to its being referred to this genus, I have preferred to do so.

Nototrema viviparum Nova species.

10 specimens, 7 males, 3 females. Of these 9 specimens from Baños, Rio Pastaza, 1600—1900 m, Nov. 1937—Febr. 1938 (two of these from Mount Tungurahua 1840 m), 1 specimen from Watershed, Rio Pastaza, Nov. 1937, 500 m.

Habit stout. Tongue circular, the posterior part free and distinctly nicked, sometimes somewhat prolonged. Vomerine teeth in two straight transverse series, occupying the whole interspace between the small choanae. Head broader than long. Snout rounded, distinctly longer than the diameter of eye. Canthus rostralis distinct, swollen, curved. Loreal region oblique, not concave. Nostril twice as distant from the eye as from the tip of snout. Skull more or less rugose even in the small specimens, the derm, however, free. Interorbital space a little broader than the upper eyelid, concave in the older specimens. Tympanum visible in all specimens but rather indistinct in some, especially in the largest ones, half or somewhat less than half the diameter of eye.

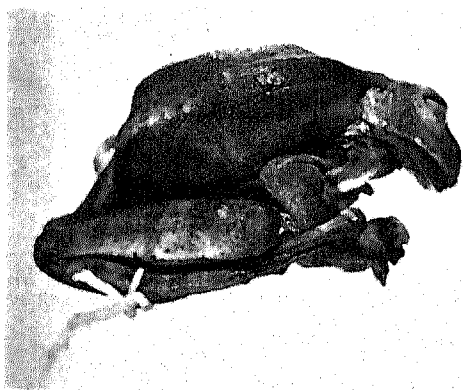
Fingers rather short and broad with a slight rudiment of web. Disks as large as tympanum. Hind limbs rather short, if the length of tibia is measured off from the knee of the adpressed femur, it does not reach farther than to the front margin of the orbit. Toes half webbed, disks nearly as large as those of fingers. An oblong inner metatarsal tubercle, no outer one. A distinct fold along the inner edge of the tarsus.

Above quite smooth, in the older specimens the skin of the back is studded with very small bony deposits. A semilunar thin dermal fold across the occiput. Belly and lower parts of thighs coarsely, chin and breast slightly granular. A strong dermal fold across the breast behind the fore limbs.

Colour in alcohol: Most specimens, especially the young ones, above brownish grey to olive with broad dark reddish brown black-edged cross-bars, more or less confluent on the middle of back, forming an irregular deeply lobated leave-shaped figure. The other specimens are uniform light grey above, with or without very faint traces of these bands. In one of these the posterior part of back is marbled with blackish. Flanks and anterior and posterior sides of thighs and posterior parts of tibiae are deep bluish black. On the flanks sometimes this colour is divided into a large spot behind the axil and another in the groin. Upper surfaces of limbs more or less distinctly cross-barred. In the females and in a few of the males there is a triangular black, above light-edged spot above the vent, separated from the other dark colour on the posterior

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26. *Nototrema viviparum*. Dorsal view of a male, lateral view of a female.

parts of thighs. In these specimens a similar light-edged spot to be seen on the heel. Lower parts uniform yellowish or brownish grey. The two largest females are gravid. The pouch of the largest one is filled with completely developed youngs, lying in two layers, that of the other is distended with large eggs, 5 mm in diameter. The youngs are tailless and provided with four developed legs and two long-shafted bell-like gills. figured in *N. cornutum* by BOULENGER in Pr. Z. Soc. 1898

Pl. 18. They measure 10 mm in length and are uniform olive white below. Without emptying the pouch, I am not able to count the eggs nor the youngs, but I calculate their number to about 20—30.

By the development of the tadpoles, the bony deposits in the skin and other characteristics this species seems to be very closely allied to *N. testudineum* ESPADA, to which I referred my specimens at the first glance. Finding, however, at a closer examination, that they differ in having a quite dissimilar colour-pattern, shorter hind limbs, quite straight (not oblique) series of vomerine teeth, and the interorbital space concave only in the largest specimens as in *N. marsupiatum* DUM. & BIRK., I do not dare to refer them to *testudineum*, especially as the description of this species is very incomplete. Nor have I succeeded in comparing them with ESPADA's figure.

| Measurements in mm. | Females | | | | Males | | | | | | | |
|-----------------------------|---------|------|------|------|-------|------|------|-----|------|------|--|--|
| Total length | 84 | 82 | 65 | 64 | 63 | 61 | 59 | 56 | 53 | 43 | | |
| Length of head | 25 | 22.5 | 22 | 20 | 20 | 20 | 19 | 19 | 18 | 16 | | |
| Breadth of » | 28 | 29 | 25.5 | 23.2 | 24 | 24 | 21 | 21 | 20.5 | 17 | | |
| Length of snout | 11 | 11 | 11 | 10 | 10 | 9.8 | 9 | 8 | 8 | 7.8 | | |
| Diameter of eye | 8 | 7.2 | 7 | 7.1 | 6.2 | 6.1 | 6.1 | 5 | 5 | 5 | | |
| » » tympanum | 3.5 | 3.5 | 3 | 3 | 3 | 3 | 3 | 2.2 | 2 | 2.1 | | |
| Forearm and hand | 37 | 38.5 | 32 | 31 | 30 | 29.5 | 28 | 27 | 24 | 22.3 | | |
| Hand | 24 | 25.2 | 23 | 20 | 21 | 20 | 19 | 18 | 17 | 15 | | |
| Femur | 38 | 38 | 33 | 31.2 | 30 | 30 | 28 | 28 | 25 | 21 | | |
| Tibia | 38 | 38.5 | 33 | 31 | 31 | 30 | 29.8 | 28 | 26 | 24 | | |
| Foot | 52 | 54 | 48 | 45 | 43 | 42 | 41 | 39 | 38 | 34 | | |
| Width of disk on 3rd finger | 4.5 | 5 | 4 | 3 | 3 | 3.1 | 4 | 3 | 3 | 2.3 | | |

Phyllomedusa edentula Nova species.

One female specimen with small unpigmented eggs, Rio Pastaza, Watershed, 1938.

Habit slender. Tongue large, triangular, very broad behind, entire and extensively free behind. No vomerine teeth but a low transverse bony ridge behind each choana. Head as long as broad. Snout subacuminate, slightly longer than the diameter of eye, not overlapping. Canthus rostralis distinct, curved. Loreal region vertical, slightly concave, interorbital space flat, broader than the upper eyelid. Tympanum very distinct, somewhat larger than half the diameter of eye, close to the orbit. Paratoid glands rather indistinct, long and narrow, longer than the head.

Fingers free with large disks, somewhat larger than $\frac{2}{3}$ the tympanum. First finger a little shorter than second, fourth

shorter than third. Fourth toe very long; first much longer than second. Disks of toes similar to those of fingers but somewhat smaller. On the 1st, 4th and 5th toes they are larger than on the 2nd and 3rd. A slight web at the bases of the three outer toes. Both 1st and 2nd toes opposite to the others. If the length of tibia is measured off from the knee of the adpressed femur, it marks the posterior margin of the orbit.

Upper parts completely smooth, belly and anal part of thighs with close and low granules, other lower parts smooth. The outer margin of tibia is crenulated by a row of pointed tubercles, and on the under surface of forearm there is a row of distinct round tubercles, and a faint more or less visible ridge of very small warts runs along its posterior edge.

Colour in alcohol: Head, back, upper parts of sides of body and of limbs uniform dark bluish violet. Concealed parts of flanks and limbs, especially those of the hind ones, beautifully reddish lilac-coloured with small light spots on the hind limbs. Lower parts dirty white, chin dusky grey with two small transverse light spots posteriorly.

Measurements in mm. Total length 84, length of head 25, breadth of head 26, length of snout 10, diameter of eye 8.2, of tympanum 4.5, forearm and hand 45, hand 20, femur 37, tibia 35, foot 52, disk of 3rd finger 3.5, of 4th toe 3.

By the absence of vomerine teeth this species seems to be allied to *Phyllomedusa hypochondralis* DAUD., but it differs distinctly from this by its large disks both on fingers and toes, basal web on the outer toes, larger tympanum and different colour (upper lip not white-edged, no white streak from the angle of mouth out on the flanks and on the forearm, no vertical bars on concealed portions of limbs and sides of body etc.). I believe that the specimen must be regarded as representing a new species.

Chorophilus olivaceus Nova species.

A male specimen, Rio Napo, 400 m, Oct. 1937.

Habit of *Hyla arborea*; tongue oval, not notched behind, free in its posterior half. Vomerine teeth in two short rounded groups, connected mesially into a bilobate slightly arched series, the anterior border of which is situated on the line of the posterior borders of the choanae. Head short and broad, broader than long, snout obtusely rounded, longer than the diameter of eye. Forehead concave between canthus rostrales, which are distinct, but short. Loreal region moderately

oblique, slightly concave. Interorbital space broader than upper eyelid, concave and provided with a distinct transverse fold between orbits. Tympanum distinct, a little larger than half the eye.

Fingers moderate, free, with distinct, but small disks, only a little broader than the fingers, 1st distinctly longer than 2nd with a large oblong metacarpal tubercle. Hind limbs short. If the length of tibia is measured off from the knee of the adpressed femur, it does not reach the eye. 1st and 2nd toes very short, disks of toes smaller than those of fingers, hardly broader than the penultimate phalanx. A slight rudiment of web at the base of the 4th toe and narrow folds, bordering the outer toes. Terminal bony phalanges claw-like and separated from the penultimate one by an intercalated cartilage as in the genus *Hyla*. An oblong inner metatarsal tubercle, no outer one. Diaphyses of sacral vertebra scarcely dilated.

Head and back, except the hindmost part, smooth. This part, sides of body and head behind the orbits, chin, throat, belly and lower surfaces of thighs densely covered with small uniform granules. A dorso-lateral glandular fold extends from behind the tympanum to behind the coccyx, and another similar one above this runs from above axil to the upper corner of groin, but only well distinct on one side. Besides, there is a short dermal fold close to the posterior margin of tympanum, extending to before the axil.

Colour in alcohol. All upper parts and sides uniform dark olive, lower surfaces uniform violet brownish.

Measurements in mm. Total length 42, length of head 14.2, breadth of head 16, length of snout 6, diameter of eye 4.1, of tympanum 2.3, forearm and hand 20, hand 12, femur 16, tibia 17.2, foot 27.

From the other species of this genus from South America, *Ch. cuzeanus* CORE, my species seems to be distinguished by the shape and situation of the vomerine teeth, shorter hind limbs, glandular folds, granular sides of body, and partly also by the colour. The sides of head have quite the same colour as the whole upper parts, and there are no blackish line along the canthus rostralis and no light labial border. Lower parts not whitish.

Pseudohyla Nov. genus Hyldidarum.

Pupil horizontal. Tongue large, oval, free in its posterior half. No vomerine teeth. Tympanum distinct. Fingers and toes free with well developed disks. Outer metatarsals united.



Omosternum and sternum cartilaginous, the former short, rounded, the latter long and narrow. Coracoids rather strong, dilated, praecoracoids narrow styles. Diaphyses of sacral vertebra moderately dilated. Ultimate bony phalanges of toes and fingers clawshaped, separated from the penultimate ones by an intercalated cartilage.

The type-specimen of this new genus, described below, seems to be nearly allied to the genus *Hyla*, but its total want of web both on fingers and toes, is not agreeable to this genus. The want of vomerine teeth is also a character which is seldom to be found in the genus *Hyla*.

Pseudohyla nigrogrisea Nova species.

One specimen, 21 mm in total length, and five small ones, 12 mm and less, all from Baños, Eastern Ecuador, January 1938.

Habit stout. Tongue oval, a little longer than broad, entire, its posterior half free. Vomerine teeth none. Head and body depressed. Snout shorter than the diameter of eye, acuminate, slightly overlapping, the margin of the upper jaw slightly notched at the tip. Canthus rostralis indistinct, loreal region vertical, not concave. Nostril a little nearer the tip of snout than the orbit. Interorbital space flat, broader than the upper eyelid. Tympanum small, distinct, scarcely $\frac{1}{3}$ the diameter of eye. First finger shorter than second. Disks of fingers well developed, about as large as the tympanum. No traces of web, neither on fingers nor on toes. If the length of tibia is measured off from the knee of the adpressed femur, it reaches the centre of eye. Disks of toes very distinct, slightly smaller than those of fingers. A well developed inner metatarsal tubercle, slightly longer than broad, and a very small round outer one. Sub-articular tubercles of fingers and toes very distinct.

The whole upper surface, except that of snout, covered with tubercles of different size and form, a thick fold above tympanum and a distinct dorso-lateral dermal fold between axil and groin. Belly and lower surfaces of thighs granular, sides of body, chin and throat smooth. A transverse dermal fold across the breast.

Colour in alcohol: Snout and forehead dark brown, a broad blackish transverse band between the orbits, angularly prolonged backwards out on the nape. Other upper parts light greyish brown with dark markings, viz. a broad transverse irregular band on the middle of the back, cross-bars on the limbs and

traces of oblique bars on the sides of body. Posterior parts of flanks and lower parts greyish white. Anterior parts of flanks and posterior parts of thighs and tibiae marbled with dark and light.

Measurements in mm. Total length 21, length of head 7.5, breadth of head 8, length of snout 3, diameter of eye 3.4, diameter of tympanum 1.1, hand 7, forearm 4.2, femur 9.5, tibia 10.5, foot 14.5.

Tryckt den 23 oktober 1945.

Uppsala 1945. Almqvist & Wiksells Boktryckeri AB