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CONTRIBUTIONS TO THE KNOW= LEDGE OF THE AMPHIBIA OF SOUTH AMERICA

ΒY

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PREFACE.

During my travels in the tropical parts of South America in the years 1923-26 I spent a great deal of my time in studying their rich fauna of Amphibia. My studies were chiefly concerned with the interesting biology (including life history) and phenomena of adaptation of these animals and also with their classification and relationships. In this paper, which because of my occupation with other material — insects and flower-birds — has been considerably delayed. I first publish an account of those Amphibia which have been collected during my above-mentioned travels. Several of them will surely prove to be new species or varieties. As with regard to the tropics both the degree of variation and the distribution of varieties are little known, I have sometimes also described specimens which belong to known species. In this way the identity of the type in question is in addition more easily verified.

With regard to the identification of tropical forms, there exists a certain amount of confusion in the literature on Amphibia. This is not only due to an inadequate description but also to a deficient knowledge of the degree of variation of certain taxonomic characteristics. As regards the former, we will here only point out the necessity of every description including good drawings or photographs. A text without figures in reality often seems inadequate for a certain identification of forms. A species which is said to be »slender», »thickset», wround-nosed», etc., may have a very different appearance. At any rate the lack of good figures often considerably delays the identification of the special group of forms where the species in question is to be found. As regards the degree of variation we must remember that such characteristics as the shape of the nose, the degree of notching of the tongue, the development and grouping of the vomerine teeth and their place in relation to the choanae, the extension of the web, the length of the hind limb, the size itself and the nature of the skin. can vary considerably within the same species. not only regarding sex and age, but also regarding the influence of various factors of the environment during the life of the specimen and

the fluid of preservation. Thus, for instance, we know that both the tongue and the vomerine teeth may be considerably worn by the treatment of food and that a preservation in alcohol by phenomena of shrinking often influences the measure of length and the extension of the web. Thanks to these and other modifications it often proves difficult or even impossible to determine a form belonging to a genus rich in species (*Hyla*, *Hylodes*, *Leptodactylus*, etc.) by the aid of accessible keys, which usually merely have regard to a few characteristics.

In determining my own material, which belongs to the Museum of Natural History of Göteborg, I had an opportunity of studying the collections of Amphibia in the Museum of Natural History of Stockholm. For ready courtesy in this connection I am greatly indebted to Professor H. RENDAHL and Count N. GYLDENSTOLPE Pn. D. I am also greatly indebted to Head-Master L. G. ANDERSSON of Stockholm for his kindness critically to verify several of my determinations, to Professor A. de MIRANDA-RIBEIRO of Rio de Janeiro who during my stay in Brazil not only showed me great personal amiability, but also always stimulated my interest in the study of the Amphibia and their often interesting life history, and to my two fellow-travellers, Dr. A. ROMAN of Stockholm and my late friend Mr. A. VILARS for their valuable help in my studies.

Further, I here wish to record my indebtedness to Miss A. Wäst-FELT of Upsala who has executed the drawings in Indian ink, to my colleagues Dr. G. BJÖRCK and Dr. J. SVENNUNG of Upsala for their kind help in the choice of classic names, and to Miss E. LINDSTRÖM of Stockholm who has revised my English manuscript.

Finally, my best thanks are due to the officials of the library at Upsala for their ready assistance in procuring the necessary literature and to Dr. O. NYBELLY of Göteborg for his valuable help with the printing of this paper.

Some Words about the Modern Classification and Nomenclature of the Anura.

The recent classification and nomenclature of Amphibia hardly seem to be quite satisfactory. As regards the classification of the Anura, which here especially interests us, this has been altered a good deal in later times. This can inter alia be seen from NOBLE'S (1931, pp. 485 foll.) well-known work, »The Biology of the Amphibia». In this work the former Cystignathidae have not only been divided into several subfamilies, but also united with the Bufonidae. The toad-like Engystomatidae of the genera Rhinoderma, Brachycephalus, and Atelopus, have been united with the ranid genera Phyllobates and Dendrobates to form a new family Brachycephalidae. Hemiphractus and Ceratohyla, provided with bony helmets and pseudoteeth on the lower jaw, the Hyla-like Cryptobatrachus (Hyla, Fritzia, etc.) and Gastrotheca (Nototrema), and the rare Amphignathodon with true teeth on the lower jaw, form the subfamily Hemiphractinae of the Hylidae. Finally, many ranid tree frogs, belonging to the genera Chiromantis, Leptopelis, Hyperolius (Rappia), and Polypedates (Rhacophorus), etc., have been united to form the large family Polypedatidae (Rhacophoridae), and the Brevicipitidae (Engystomatidae) have been divided into no less than fourteen subfatilies. It only remains to ask whether all these alterations have improved the classification of the Anura.

To begin with the Engystomatidae and the former Cystignathidae we must certainly admit that both these families are sufficiently heterogeneous to form several distinctive subfamilies. As regards the former family, whose most characteristic members are not only distinguished by a narrow mouth, a trunk-like snout, and a ridged palate, but also by the reduction or lack of teeth and certain ventral elements of the shoulder girdle, the dilated sacral diapophyses, and a very distinctive tadpole, we may even doubt whether the family in question has yet been naturally limited. From the above-mentioned members differ, as NOBLE himself suggests, not only two African

subfamilies with ranid-like tadpoles, but also several so-called »primitive» forms from Africa and India, the life histories of which are, however, imperfectly known.

The former Cystignathidae are divided by MIRANDA-RIBEIRO (1926) into no less than six new families (Telmatobiidae, Elosiidae, Hylodidae, Ceratophrydidae, Leptodactylidae, and Paludicolidae), while NOBLE in this case only gives three subfamilies (Pseudinae, Elosiinae, and Leptodactylinae). Of the latter Pseudinae is strongly heterogeneous and might be divided into several distinctive groups. Whether these, as MIRANDA-RIBEIRO considers, should form families is open to discussion. On the other hand it is hardly reasonable to form a special family of the *Paludicola*-like forms since in many respects they are closely related to *Leptodactylus*.

If with regard to Pseudinae NOBLE has united very heterogeneous forms into one subfamily, he runs to a still greater extreme when uniting the former Cystignathidae with the Bufonidae. As a reason for this arrangement the author (1931, p. 496) writes: "The toothed bufonids are frequently designated as Cystignathidae or Leptodactylidae. They are more primitive than the toothless genera, but as they have given rise to toothless bufonids in different parts of the world, it makes a more natural system to group toothed and toothless genera together as a single family." The author's phylogenetic views are partly based on certain anatomical studies and partly (ibid., p. 72) on the fact that "various groups of toothless and tooth-bearing toads were found to have the same life history". As will be seen below, both the anatomy and the life history speak, however, against the classification in question.

Apart from the fact that the Bufonidae can hardly a priori be thought to descend from the recent Cystignathidae — NOBLE (1931, pp. 491, 496, 504, 507, 514 etc.) often without any reason traces various groups of Amphibia from *now* existing families or genera but from such forms as were considerably less specialized, several morphological characteristics speak against a near relationship between the two groups in question. Contrary to the Cystignathidae, the true Bufonidae thus lack maxillary teeth and are provided with dilated, instead of cylindrical, sacral diapophyses, and with a thick and warty, instead of a usually thin and smooth, skin. As regards the lack of teeth, which has arisen in a secondary way, this seems to be a real characteristic of the group, the systematic significance of which is hardly lessened by the fact that in other families or genera

both toothed and toothless species occur. This is probably also the case with regard to the nature of the sacral diapophyses, though also in this case variations occur within certain groups. In reality the latter parts, irrespective of the way of living, often exhibit a unique Thus NOBLE (1931, p. 501) himself remarks about conservatism. the Mexican burrowing toad, Rhinophrynus dorsalis: »It is remarkable that the burrowing Salientia of the same body form as Rhirophrynus may have either cylindrical, slightly dilated, or enormously dilated sacral diapophyses.» We may here add that also the nature of the terminal phalanges may play a more important systematic role than many authors consider. Thus species with simple and T-shaped pl.alanges are often little related. Also the different degree of reduction and fusion of the pectoral girdle may sometimes form a good systematic characteristic though, similarly to the above-mentioned characteristics, it may vary a little within the same family.

As regards the life history of Amphibia, which especially interests NOBLE (1926 a, 1927, 1931), the life history of the Bufonidae differs considerably from that of the Cystignathidae both with regard to the biology itself and to the special characteristics of the different stages of development. In connection with his above-mentioned statement about the life history of the »toads», NOBLE (1931, p. 72) writes inter alia: »The habit of Eupemphix of beating its egg mass into a foam which it had laid in or near small pools of water was found not only in the toothed genus Paludicola, immediately ancestral to Eupemphix, but also in the whole series of species referred to several genera. These include the dominant group of South American frogs, namely Leptodactylus.» This statement has, however, nothing to do with the descent of the true Bufonidae. It only proves that a certain type, namely Eupemphix, which formerly was often referred to the Bufonidae, in reality belongs to the Cystignathidae or, more exactly, to the Leptodactylidae. MIRANDA-RIBEIRO (1926, p. 154), too, classifies the type in question together with *Paludicola*-like forms. Thus, also from the point of view of life history we may safely state that the former Cystignathidae generally have little to do with the true Bufonidae. To unite all these forms into one and the same family would be almost as inappropriate as to unite the two proceelous families Bufonidae and Hylidae. The toad-like appearance of certain Cystignathidae may be a phenomenon of convergency.

From the above it will be seen that also the procoelous family

Brack. Calidae of NOBLE (1931, p. 505), the species of which partly resenses Sufonids and partly certain Cystignathids, is not very natural. In reality several of the genera in question, which formerly were numbered with the Engrandmentidae and the Ranidae respectively. in spite of a certain resemblance with regard to the nature of the vertebrae and the musculature of the hind limb, have very little to do with each other. Whereas the toad-like genera Brachycephalus and Atelopus are provided with simple terminal phalanges and more or less dilated sacral diapophyses, the elosiid-like genera Dendrobates and *Phyllobates* are not only characterized by T-shaped phalanges and more or less cylindrical diapophyses, but also by adhesive disks, provided with a pair of dermal scutes. and a special biology of development. As not only the latter characteristic but also the nature of the pectoral girdle (more or less firmisternal) distinguishes these two meners from the Elosiids, which are provided with similar terminal thelanges and adhesive disks and are regarded by NOBLE as the ancestral stock from which the Dendrobatinae have arisen», it may perhaps be convenient, like BOULENGER (1882 b) and MI-RANDA-RIBEIRO (1926), to let the Dendrobates-like species form a special family. Where the Chilean frog Rhinoderma, which has a unique breeding habit and according to NOBLE forms a special subfamily of the Brachycephalidae, should be placed, is open to discusson. By its toad-like appearance and simple terminal phalanges the genus in question resembles Atelopus a good deal.

As regards the Hylidae, NOBLE (1931, pp., 508 foll.), as we have mentioned before, unites the genera Hemiphractus and Ceratohyla, Cryptobatrachus (Hyla, Fritzia, etc.), Gastrotheca (Nototrema), and Amphignathodon into the subfamily Hemiphractinae. This is chiefly characterized by the unique habit that »the female carries the eggs on the back, either exposed or enclosed in a single sac». Moreover (ibid, p. 60), all their larvae have »distinctive bell-shaped gills». On closer examination it seems, however, fairly doubtful whether the forms in question are closed and ded to each other. That Hemiphractus and Ceratohyla with their peculiar bony helmet, V-shaped arrangement of the vomerine teeth, the presence of pseudoteeth on the lower jaw and palatines, their pointed terminal phalanges, cylindrical sacral diapophyses, and peculiar rows of protuberances on the skin, ought to form a special family or other group (cf. MIRANDA-RIBEIRO, 1926, p. 114) in the proximity of certain Cystignathidae, seems to be fairly clear. Whether the Hyla-like »Cryptobatrachus» and Nototrema,

the former of which carries its eggs exposed on its back while the **latter** is provided with various brood pouches, are closer related to **each** other than to many other Hylids, is open to discussion. The different degree of dilatation of the sacral diapophyses of the genera in question seems to speak against such an interpretation. At any **rate**, the wedge-shaped *Amphignathodon* with its subcircular snout, **true teeth** on the lower jaw and strongly dilated sacral diapophyses **does** not seem to be closely related to *«Cryptobatrachus»*, the diapophyses of which are nearly cylindrical.

Thus, it is very probable that the subfamily Hemiphractinae of NOBLE consists of at least three different elements, the morphological and biological similarities of which are chiefly due to various phenomena of convergency. This opinion is inter alia strengthened by the fact that both the habit of carrying eggs on the back and the presence of bell-shaped gills in the larvae (the latter parts in reality oriv recorded from »Cryptobatrachus» and Nototrema) are to be found in quite different groups of Amphibia (Pipa and certain Coeciliidae respectively). It may here be added that, according to habit, the presence of secondary bony deposits and ridges on the vertex, the grouping and position of the vomerine teeth, the size and shape of the choanae, the nature of the adhesive disks, the sacral diapophyses, the larvae, and the biology of development, the very numerous Hvlidae may be united into genera or other groups which give a better idea of the relationship of the various forms than the recent classification can do. It is, however, possible that our present knowledge of the stages of development is too slight for such a purpose.

Finally, it may here also be discussed whether the tree frogs of the Old World, the Polypedatidae, in reality form such a natural group as was evidently considered by NOBLE (1931, p. 524) and AHL (1931). As a reason for his opinion in this case the former author often points out that a great anatomical similarity exists between the genera in question. This is supposed to hold good not only of forms from the same part of the world, but also of those from quite different regions. Speaking of two known vicarious genera from Africa and Asia respectively, NOBLE (ibid p. 525) thus writes: »The African Chiromantis is very closely allied to Polypedates, differing culy in that the two inner fingers diverge more from the others than do those of Polypedates.» If this is true with a certain modification (both with regard to general appearance and special characteristics the genera in question seem to differ a great deal), seve-

ral genera included within the family differ a good deal, both with regard to morphology and life history, from the Polypedates-group. Thus, while the latter is provided with Y-shaped terminal phalanges and foamy egg masses, laid over or near water, some forms (Hylambates, Leptopelis) have claw-shaped phalanges and others (Hyperolius, Kassina) lay their foam-free eggs in the water. This may, however, be a secondary habit. At any rate, as is pointed out by many authors, several facts speak in favour of the Polypedatidae, as well as the Engystomatidae, and partly also the Bufonidae and Hylidae, including various different elements which exhibit several similar phenomena of convergency. Thus, in spite of the presence of adhesive disks, intercalary cartilages, and foamy egg-nests, ranidlike forms both in Africa and in Asia have, independently of each other, assumed an arboreal habit. This opinion is strengthened by the fact that the above-mentioned characteristics of adaptation are found within quite different groups of Amphibia. While, as is well known, adhesive disks and intercalary cartilages also characterize the Hylidae, foamy egg masses are found in many Leptodactylidae.

From the above it will be seen that the recent classification of the Anura leaves a great deal to be desired. Most, if not all, families exhibit heterogeneous elements which often have little to do with each other. This is not only due to a scanty material with regard to many interesting forms and to an imperfect knowledge of their life history, but also to a less successful interpretation of morphological and biological characteristics. In order to clear up the descent and relationships of various groups of Amphibia in a more detailed way, we have also need of a considerably larger material of fossils than is as yet to hand.

If the different opinions diverge a good deal with regard to the natural classification of the Anura, they are hardly less divergent with regard to nomenclature. Under pretext of allowance for the dictate of priority, here as in other parts of the system, several names which have been valid for a long time in current literature are rejected and replaced by such as neither from a linguistic nor a practical point of view are very appropriate. Thus, the known name Hylodes has been replaced by Eleutherodactylus, which is more difficult to pronounce, Nototreina by the misinterpreting Gastrotheca (as NOBLE, 1931, p. 510, himself states, the theca in question wis on the back not on the belly».), Rhacophorus by Polypedates, etc. It seems, however, best, irrespective of the law of priority, to use such

as, systematically seen, cause the least possible confusion, though this of course may sometimes be difficult to decide. Such a principle will be easier to follow if (at least from now on) we do not accept any other right of priority than that which is based on a description (by text and figure) of a certain type which is well understood by a scientific expert. In this way we will also be spared the many diffuse or inadequate descriptions in which current literature abounds.

Collected Forms.

Of the localities mentioned in the text below, Manáos, capital of the state of Amazonas, is situated near the mouth of the Rio Negro. By the »vicinity of Manáos» is here meant a little »sitio», at that time belonging to the well in naturalist Mr GEORG HÜBNER, situated on the opposite bank of the river, immediately west of the capital in question. S. Gabriel and Taracuá are two missions in the North of Brazil, situated immediately south of the equator on the Rio Negro and its source-river, the Uaupés, respectively. The two localities Iquitos and Roque are situated in the East of Perú. The former, capital of the department of Loreto, is situated on the Rio Marañon. The latter is a little village near the mountain La Campana, about 35 km. south-south-east of Moyobamba. By »Rio Itaya» is meant an hacienda which belonged to Mr. E. BOLLET, situated on the river in question, half a day's journey (by launch) from Iquitos.

Gymnophiona.

Coeciliidae.

Siphonops annulatus (MIKAN). Fig. 1.

The worm-like body provided with 94 and 95 dermal segments respectively, the two foremost longer than those immediately following and each provided with a transversal groove, best developed on the second segment; first segment also ventrally with a feeble groove, chiefly marked by its light margine last 2-3 segments dorsally not marked. Colour slate-grey with the segmental margins whitish and a light area around the anus. Length 365 and 410 mm., greatest breadth 16 and 17 mm. respectively.

Two specimens, Roque, Perú. The species, easily held in terrarium, seemed to be fairly common in the district.

Anura.

Bufonidae.

in the second

Bufo marinus (L.). Fig. 2.

Body broad and depressed. Head with prominent ridges; tympamom distinct, vertically elliptic, more than half the width of the eve and considerably larger than the distance to the angle of the mouth. Toes less than half webbed; terminal subarticular tubercles of the tourth toe simple. The hind limb being carried forward along the body, the tarso-metutarsal articulation reaches the eye. Upper surfaces with numerous warts which in the male are strongly marked and partly spiny; upper eyelid with marked and knobby edge; parotoids very large, irregularly egg-shaped, medially rounded, and fairly transversal. Upper surface in the male greyish brown, in the female greyish yellow with brown, partly dark-edged spots; lower surface light with small, grey, faintly marked spots and dullish yellow with brown-dotted warts respectively. Length 110 and 115 mm. respectively.

1 male, 1 female, vicinity of Manáos, lower Rio Negro, Brazil, 15.11.1923, at a little brook near the river.

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On the same occasion five smaller specimens, probably belonging to the same species, were collected. In them the ridges of the head, and the tympani and parotoids were often faintly marked; tympanum larger than the distance to the angle of the mouth. Upper surface grey to whitish (small specimens) with light, dark-edged spots; lower surface light with reticulate dark spots. Length 19, 23, 28, 31, and 54 mm. respectively.

Another smaller specimen, probably belonging to the same species, was collected in the evening (18.5.1924) on the eastern bank of the Rio Uaupés near Colombia. Partly according to the label, it was on the upper surface grey with brownish red, black-edged spots, cn the lower surface whitish yellow with a reticulate design of fairly large, black spots. Length 67 mm.

Of the above-mentioned species many varieties are found in South and Central America, the classification and distribution of which are not very clear. With regard to their simple subarticular tubercles and broad, strongly transversal parotoids, the larger specimens here described may perhaps form a special subspecies.

Buto marinus andinensis, n. subsp. Fig. 3.

This type resembles a good deal the preceding larger specimens of B. marinus. It is, however, distinguished from them not only by its smaller size and somewhat more pointed snout, but also by its smaller and less distinct tympanum (less than half the width of the eye and often also less than the distance to the angle of the mouth), its less developed tubercles of the hands and feet, and its *double* terminal subarticular tubercles of the fourth toe. More the edge of the upper eyelid is less marked and the parotoids smaller and somewhat more angular, often continued along the sides into a row of warts. Upper surface of the male, which is provided with strongly marked, spiny warts, grevish brown, in the females light or dark brown with a somewhat light medial streak, dark spots on the shoulders and some white spots on the hinder part of the flanks; lower surface in the male dull yellow, in the females sometimes also whitish: from the tip of the snout a dark band runs towards the flank through the eye, tympanum, and lower part of the parotoid; it is best marked behind the eye, and is wedgewise interrupted on the parotoid by a whitish ground; the edges of the jaws are more or less light. Length 90 (male) and 80, 95, and 105 mm. respectively.

1 male, 3 females, Roque, Perú, collected by the natives.

By several of the characteristics in question the above form is well distinguished from many other forms of B marinus. By the warty rows, often confluent with the parotoid, it somewhat resembles B. arenarum HENSEL. From this species it is, however, easily distinguished by its broad, transversal, and medially rounded parotoids, while those of B. arenarum are narrow, more or less longitudinal, and medially concave. Perhaps the form in question is related to B. molitor TSCHUDI (1845, p. 73, Pl. XII), but the description of the latter, chiefly based on colour, is, however, hardly sufficient for any kind of identification. According to COPE (1868, p. 115, B. andianus) and PETERS (1873, p. 624), the latter species is provided with a pointed snout and elongeted, narrow parotoids, which is, however, not the case with B. marinus andinensis.

Bufo anderssoni, n. sp. Fig. 4.

Body strongly depressed and fairly broad. Head without prominent bony ridges, but in front of the eye a knobby protuberance; snout short with rounded tip; edge of upper eyelid angularly pro-



Fig. 1. — Siphonops annulatus (Mikan), dorsal (a) and lateral (b) views of head-region.
Fig. 2. — Bufo marinus (L.) lateral view of head.
Fig. 3. — B. mar. and dimensis, n. subsp., dorsal (a) and lateral (b) views of head.
Fig. 4. — B. anderssoni, n. sp., ditto.
Fig. 5. — B. typhonius roqueanus, n. subsp., ditto.
About nat. size.

jecting; interorbital space somewhat broader than upper eyelid; tympanum very distinct, vertically elliptic, scarcely half the width of the eye. First finger somewhat longer than second: toes less than one third webbed; subarticular tubercles simple, prominent, and pearl-like; two moderate metatarsal tubercles; tarsal fold small but coarse. The hind limb being carried forward along the body, the tarso-metatarsal articulation reaches the tympanum. Upper sur-. faces with flat and rounded, scarcely prominent warts; parotoids fairly large, almond-shaped, in front somewhat truncate or concave, angularly descending on the sides and provided with prominent pits; hinder part of upper eyelid coarsely pleated; between and behind the parotoids numerous fine, transversal pleats; from the tympanum along the sides a marked dorso-lateral fold; lower surface (especially belly and thighs) somewhat granulated. According to the label, brownish grey with reddish warts above; sides of the head brownish, the colour continuing as a dark band along the sides of the body across the lower part of the parotoid and diminishing towards the base of the thigh; limbs blackish; beneath light grey with small, white spots; belly blackish; lower lip bordered with white dots. Length 51 mm.

1 specimen, Taracuá, Rio Uaupés, Brazil, 19.2.1924.

The above type seems to be related to *B. guttatus* SCHEID. and *B. glaberrimus* GTHR. From the former, found in Guiana, it may be distinguished by its fairly narrow interorbital space, small tympanum, and small size and from *B. glaberrimus*, found in Colombia and Ecuador and, according to GÜNTHER (1868, p. 483), having a perfectly smooth body, by its flat but marked warts. Moreover, the type in question, which has been named after Head-Master L. G. ANDERSSON of Stockholm, seems to be exceptionally depressed.

Bufo typhonius (L.).

To this common and widely distributed species some smaller specimens from the upper Rio Negro seem to belong. Head triangular with pointed nose and base of upper jaws angularly and acutely projecting; bony ridges less developed; postorbital edge often shorter than the eye, anteriorly angularly projecting, and posteriorly forming a marked angle with the parotoid; tympanum rounded, fairly distinct, more than two thirds the width of the eye, and about as large as the distance to the angle of the mouth. Toes with simple subarticular tubercles; medial metatarsal tubercle large. The hind

limb being carried forward along the body, the tarso-metatarsal articulation reaches just beyond the eye. Vertebral protuberances not developed; parotoids subtriangular, often somewhat diffuse. Colour strongly varying; upper surface greyish white to light (yellowish) or dark brown (Taracuá) with a light vertebral line and large or small blackish spots along this line; the spots (S. Gabriel) may appear in pairs as triangles on a level with the eyes, hinder part of the parotoids, and sacral region, sometimes (Rio Uaupés near Colombia) they are light-edged; the latter specimen with reddish warts; limbs often faintly banded with brown; sides of head sometimes (S. Gabriel) spotted with brown on a white ground; lower surface in the same specimen brownish with white spots, in others (Taracuá) blackish with or without lighter belly, or (Rio Uaupés) light with reticulate, dark design, being compact on the chest. Length 40, 52, 43, and 49 mm. respectively.

1 specimen, S. Gabriel; Rio Negro, December 1923; 2 specimens, Taracuá, Rio Uaupés, 25. and 29.3.1924; 1 specimen, Rio Uaupés near Colombia, 18.5.1924; Brazil. The two first specimens were collected by my fellow-traveller, Dr. A. ROMAN of Stockholm, the others by myself. One of them, according to the label having a chirping sound, was found beside a forest-path, the other in the evening beside a tree-trunk on the eastern bank of the river.

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Buto typhonius roqueanus, n. subsp. Fig. 5.

Angles of upper jaws less pointed. Postorbital edge often as long as the eye, anteriorly hardly projecting angularly, and posteriorly often forming an even curve with the edge of the parotoid; parietal ridge feeble, but well marked; tympanum less distinct, half or less the width of the eye, often considerably less than the distance to the angle of the mouth. Toes with simple subarticular tubercles; medial metatarsal tubercle large and often somewhat tooth-like. The hind limb being carried forward along the body, the tarso-metatarsal articulation reaches a good bit beyond the eye. Vertebral protuberances 5-6, multiple; parotoids somewhat wedge-shaped, strongly marked, along the sides of the body continuing into an oblique fold of strongly prominent warts. Upper surface dark brown without any marked light medial line, but with black, light-edged spots (in one specimen feebly marked) along the vertebral line, the foremost of them forming a transversal band between the eyes; limbs with broad and dark, transversal bands; lower surface light with dark spots or

to a great extent blackish brown with sparse white warts. Length 70 and 79 mm.

2 males, Roque, Perú, September 1925, collected by our Brazilian assistant, Mr. João Bezerra de Souza.

To the same form probably belong six smaller specimens from the same locality. Postorbital edge not very prominent, forming a fairly even curve with the edge of the parotoid; tympanum more or less indistinct, irregularly elliptical, in the hinder part often provided with minute pleats. Parotoids often somewhat wedge-shaped, in the smallest specimen diffusely marked. Upper surface light or dark brown with a faintly marked light medial line and along this darkish (sometimes indistinct) band-like spots, or small, irregularly scattered black spots; limbs with more or less faintly marked transversal bands; lower surfaces light or dark, in the latter case with scattered light warts (especially on the thighs) and light-spotted limbs; according to the label, the next smallest specimen with golden-spotted iris. Length 27, 46, 51, 62, 23, and 37 mm. respectively.

1 specimen, 18.4; 3 specimens, May; 1 specimen, 21.7.1925; the last specimen is undated. The next smallest specimen, collected by the author himself, was found in an obliterated forest-clearing, a so-called »purma».

The above-mentioned form, the distribution of which is unknown, is thus inter alia characterized by its small and indistinct tympanum, long hind limbs, and somewhat wedge-shaped, strongly marked parotoids. In the species itself the anterior margin of the latter glands hardly seems so diffuse and oblique as it appears in BOULENGER (1882 h = 318) and BAUMANN (1912, p. 98, fig. Ad). Cf. in this case and g others MÜLLER and HELLMICH (1936, p. 21, Fig. 6).

Brachycephalidae.

Atelopus minutus, n. sp. Fig. 6.

Body fairly slender. Head depressed with vertical sides, somewhat longer than broad and about half as long as the trunk; snout triangular with somewhat protruding, swollen tip and somewhat longer than the eye; upper surface of head fairly even; nostril much nearer the tip of the snout than the eye; edges of upper eyelid and jaw strongly marked; interorbital space much broader than the upper eyelid; tympanum not visible. Forelimb about as long as the trunk;

fingers and toes depressed, somewhat swollen at the tips; subarticular tubercles large, simple, often elliptical; fingers rather short; first finger considerably shorter than second but well developed; a large, rounded metacarpal tubercle; toes fairly slender, webbed at the base; first toe very short, fourth especially long; two distinct metatarsal tubercles, the medial one elliptical and the lateral one smaller and rounded. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye. Upper surfaces with small, prickly warts, especially on the sides and limbs; laterally on the neck a triangular swelling, sometimes continued along the sides of the body by a dorso-lateral fold; belly roughly granulated by warts; limbs ventrally in part faintly granulated. Above olive-brown to grevish green with lighter ground or marbled with small black spots; limbs lighter with dark mottle, partly forming diffuse bands; in some specimens a red (possibly light) band along the upper jaw, from the tip of the nose to the base of the forelimb; sides of the body sometimes spotted with yellow; forearm, bends of the forelimb, groin, and belly, according to the label, more or less orangecoloured; belly usually with black spots; head and chest sometimes mottled with brownish black; feet ventrally blackish with reddish tubercles. Length 15-19 mm.

5 specimens, Taracuá, Rio Uaupés, Brazil, 20. and 27.2., 1.3., and »March» 1924. The species was common in the forest among dry leaves, where it moved very swiftly. In copulating the smaller, differently marked male was spasmodically attached to the back of the female with his forelimbs gripping behind the bends of her forelimbs, the female jumping off with her burden, and the couple, when caught, not separating.

By its rough skin the above species somewhat resembles A. tumifrons BLGR. and ignescens (CORN.). It differs, however, from the former by its prominent snout, absence of any defined swelling on the head, small web of the toes, simple subarticular tubercles, fairly long hind limbs, and small size, and from ignescens by its terminally placed nostril, short first finger, and basal web of the toes.

Hylidae.

The following species belong to several different groups, which may probably rank with genera. As, on account of a scanty material, I did not always have the opportunity of studying their osteo-

fingers and toes depressed, somewhat swollen at the tips; subarticular tubercles large, simple, often elliptical; fingers rather short; first finger considerably shorter than second but well developed; a large, rounded metacarpal tubercle; toes fairly slender, webbed at the base; first toe very short, fourth especially long; two distinct metatarsal tubercles, the medial one elliptical and the lateral one smaller and rounded. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye. Upper surfaces with small, prickly warts, especially on the sides and limbs; laterally on the neck a triangular swelling, sometimes continued along the sides of the body by a dorso-lateral fold; belly roughly granulated by warts; limbs ventrally in part faintly granulated. Above olive-brown to greyish green with lighter ground or marbled with small black spots; limbs lighter with dark mottle, partly forming diffuse bands; in some specimens a red (possibly light) band along the upper jaw, from the tip of the nose to the base of the forelimb; sides of the body sometimes spotted with yellow; forearm, bends of the forelimb, groin, and belly, according to the label, more or less orangecoloured; belly usually with black spots; head and chest sometimes mottled with brownish black; feet ventrally blackish with reddish tubercles. Length 15-19 mm,

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Hylidae.

The following species belong to several different groups, which may probably rank with genera. As, on account of a scanty material, I did not always have the opportunity of studying their osteo-

logy, I here include them all in the large genus Hyla. In order to point out the heterogeneous nature of the genus in question, a subgenus is sometimes inserted in brackets.

Hyla miranda-ribeiri, n. sp. Fig. 7.

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Body wedge-shaped, limp and depressed, with large head and long, narrow hind limbs. Tongue large, subcircular, in the hinder part longitudinally pleated, slightly nicked, adherent. Vomerine teeth between the very large, oblique choanae, in two angular series, almost on a level with the fore-edge of the choanae. Head depressed, broadly elliptical, about as long as broad; snout subacuminate, truncated, little prominent. one and a half times the diameter of the eye; loreal region oblique. concave; rostral edges well marked, angular, forming with the raised borders of the fronto-parietals a concave, rhembic figure; nostril near the tip of the nose, as far from the eye as the diameter of the latter; eyes strongly bulging, but seen from above hardly reaching the lateral margins of the head; pupil horizontal; interorbital space twice the width of the upper eyelid; tympanum fairly indistinct, rounded, with a tongue-like dermal lobe, about half the width of the eye; lower jaw terminally with a small tooth-like knob. Lateral fingers about half webbed, toes entirely; disks of fingers a little smaller than the tympanum, those of the toes still smaller; subarticular tubercles moderate, those of the first joint larger; first finger free; a distinct, callus-like, slightly projecting rudiment of pollex; a slight medial metatarsal tubercle and a similar tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches to the tip of the snout; tibiae a little longer than the thighs (heels a little crossing). Skin delicate; upper surface finely granulated; sides with a slight dorsal fold; belly and lower surface of the thighs areolate-warty; transversal fold of the chest rudimentary; forearm and tarsus laterally with a slight and notched dermal fold; heels with a partly knobby dermal fold; seat with transversal pleats and knobby rows, the latter forming an subscene a level with the anus; proximal phalanges of the fingers with rows of small warts. Above, according to the label, greyish brown with a violet touch; diffuse, darkish spots and bands along the rostral edge, between the eyes, at the shoulders (a large X-shaped spot), etc.; iris metallically gleaming with black periphery; edge of the jaw with small, dark spots; sides of the body with

about ten dark, narrow, partly forked transversal bands; limbs with a few dark, narrow and diffuse transversal bands; sides of the thighs, inner side of forearms and tibiae, and upper surface of hands and feet with irregular, often hieroglyphic designs, darkest on the outer side of the thighs; heels and seat whitish; hands and feet ventrally greyish; body beneath whitish to yellow; front of chest and edge of the jaw with small, diffuse, black spots. Length 93 mm., thigh: about 50 mm.

1 specimen, Taracuá, Rio Uaupés, Brazil, 24.2.1924.

The above species, sitting on a shelf of rock by the river, may be somewhat related to H. appendiculata BLGR. and crepitans WIED. From the former it is, however, distinguishable by its small tympanum, the large disks of the fingers, the lack of a triangular dermal projection of the heel, and by its larger size; from crepitans by its small tympa-num. slightly projecting rudiment of pollex, granulated upper surface, and large size. It seems not altogether impossible that many of the species, similar to H. maxima (LAUR.) and faber WIED, are only different forms of the same species.

I take the liberty of naming this beautiful species after Professor A. DE MIRANDA-RIBEIRO of Rio de Janeiro.

Hyla granosa gracilis, n. subsp. Fig. 8.

Body wedge-shaped, depressed, with large head and long, narrow hind limbs. Tongue subcircular, in the hinder part slightly nicked. Vomerine teeth between the hinder parts of the fairly large, triangularly rounded choanae, forming two slightly convex broadly separated, anteriorly converging rows. Head flattened, subcircular, about as broad as long; snout a little longer than the diameter of the eye; tip of the nose marked, truncate, not very prominent; rostral edge indistinctly marked; loreal region oblique, concave; nostril small, near the tip of the nose, a little farther from the eve than the diameter of the latter; eves prominent, but seen from above not reaching the margins of the head; pupil horizontal; interorbital space more than twice as broad as the upper eyelid; tympanum somewhat diffuse, rounded, dorsally a little incurved, about half the diameter of the eye; lower jaw terminally with a slight knob. Lateral fingers at most one third webbed, toes somewhat more than half; disks moderate, of the fingers partly as large as the tympanum, of the toes smaller; subarticular tubercles small; first finger thickened at the base, nearly as long as the second; rudiment

of pollex projecting at an obtuse angle, in one specimen with a spine-like process; no metatarsal tubercles or tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the snout; tibiae about as long as the thighs (heels not crossing). Upper surface and region around the seat marked with fine warts; sides and lower surfaces, excepting head but including basal part of the thighs, areolate-warty; sides with slight longitudinal folds; transversal fold of the chest laterally distinct; limbs smooth. According to my field-notes, colour greenish yellow, above with a brown, fine, and fairly thin dotting, in one specimen faintly marked; iris dark, in the central area with metallic lustre. Males with external gular vocal sacs. Length about 36 mm., thighs 19 mm.

2 males, Rio Uaupés (north of Ipanoré), Brazil, 17.5.1924. This species was very common at a little "igarapé" (river-branch) of the western shore of the river, where it occurred among high grasses and small bushes of Melastomae together with *H. tintinnabulum* and *lutzi*. Judging from its dull and coarse, bell-like sound, the species in question may also occur in the trees, both at the above locality and at Taracuá. The intense music-making, together with the fine sound of *tintinnabulum* imitating rapid firing (at a greater **distance a kind** of grinding), was not disturbed by light. When **captured the frogs** proved more or less sluggish, and it could clearly be seen that the vocal sacs were strongly distended.

Systematically seen, the above form resembles a good deal H. grazost BLGR. (1882 b. p. 358. Pl. 24, Fig. 2). According to the description of this species the first finger has a rudiment of pollex, slight in females, claw-like in males». Now, as my own specimens have a very stout rudiment of pollex, projecting at an obtuse angle, (first finger, contrary to the figure of BOULENGER, being very thick . at the base), and in one specimen provided with a spine- (not claw-) like process, I am not quite certain that the two types are identical. In any case the form described above has a different appearance from that shown by BOULENGER. Irrespective of its different colour and smaller size, it seems, indeed, to be much slenderer. The trunk is more wedge-shaped and provided with narrower limbs. The head is not as long as the trunk itself but much shorter. The snout is not pointed but strongly subcircular. In addition to this the tympanum is not very distinct, the web smaller, and the first toe considerably longer than is pointed out by the figure in ques-

tion. Because of these differing characteristics the form described above may at least form a subspecies of granosa.

Hyla parviceps BLGR. Fig. 9.

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Body slender and wedge-shaped with bulldog-like head and long, narrow hind limbs. Tongue angularly elliptical, in the hind border callous and slightly nicked. Vomerine teeth in two small, rough, transverse, somewhat separated groups with plate-like base, somewhat behind the small, triangularly rounded choanae and broadly separated from them. Head small and broad; snout shorter than the diameter of the eve, high and vertically truncate, hardly projecting; rostral edge rounded; loreal region nearly vertical, hardly concave; nostril near the tip of the nose, but hardly half the diameter of the eve from the latter; eves large, strongly prominent, seen from above reaching peyond the margins of the head; interorbital space less broad than the upper evelid; crown somewhat rough; tympanum in the upper part indistinct, about one third the diameter of the eve: lower jaws terminally with a slight knob. Fingers at most one third webbed, toes almost entirely; disks fairly small, about as large as the tympanum; subarticular tubercles small, especially of the toes; first finger much shorter than second; no projecting rudiment of pollex; a feeble medial metatarsal tubercle and a short tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the front of the eve; tibiae longer than the thighs (heels crossing). Skin smooth; belly, hind chest, and medial basal part of the thighs beneath areolate-warty; transversal fold of the chest strongly prominent; sides with a feelle fold; tibiae and tarsi finely pleated. Upper surfaces mottled with white on a dark brown ground; irregular, band-like, black spots behind the eyes and on the shoulders (latter \wedge -shaped); it is mottled with brown and silver-grey; upper jaw with white spots; sides of the trunk blackish brown with two oblique transversal bands at the sacral region and the groin. reaching a little way up the back (posterior band dissolved into spots); on each side of the former band large, partly triangular, white spots; thighs blackish brown with two white cross bands on the anterior half and their inner side medially white; tibiae and tarsi above with a broad and narrow respectively, diffuse, black-edged cross band: inner side of the tibiae blackish brown with a long, orange-coloured spot at the base; a similar spot at the base of the inner side of the forelimb; feet and hands beneath blackish with white disks; first

finger and seat whitish; lower surface white with blackish brown belly; throat and front of chest mottled and marbled with brown respectively. Length 21 mm., thighs 10 mm.

1 (? younger) specimen, Taracuá, Rio Uaupés, Brazil, 14.3.1924. The above specimen, which was found on the leaf of a bush where it entirely escaped discovery by squatting, differs a little from the description by BOULENGER (1882 b, p. 393). Thus, the snout is not as long but shorter the diameter of the eye, the belly not indistinctly, but difference granulated (areolate-warty), and the spots of the limbs partly orange-coloured. As colour easily fades away, the last characteristic may, however, have been overlooked by BOULENGER.

Hyla mimetica, n. sp. Fig. 10.

Body a little thickset (broadly wedge-shaped) and depressed with large head and slender hind limbs. Tongue subcircular, in the hinder part free and slightly nicked. Vomerine teeth a little behind the fairly small, roundly triangular choanae, well separated from them, in two small, forwards it thy angular, somewhat separated series. Head about equally long and broad with broadly elliptical snout about as long as the diameter of the eye; tip of the snout prominent, truncate, a little projecting; rostral edge rounded; loreal region oblique, slightly concave; nostril near the tip of the nose; eyes strongly prominent, seen from above reaching far beyond the margins of the head; pupil horizontal; interorbital space a little broader than the upper eyelid; crown slightly raised; tympanum distinct, rounded, nearly half the diameter of the eye; lower jaw terminally with a slight knob. Fingers webbed at the base, toes almost entirely webbed; disks well developed, the largest somewhat smaller than the tympanum; subarticular tubercles, especially of distal phalanges, well developed; first finger much shorter than second; a callus-like rudiment of pollex; a large, elliptical medial metatarsal tubercle, but lateral one and tarsal fold rudimentary or missing. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the snout, or nearly so; tibiae considerably longer than the thighs (heels strongly crossing). Upper surface fairly smooth, on the eyelids and along the medial line etc. slightly warty; from the eye a slight fold above the tympanum, continuing along the sides of the body; forearms and tibiae with a few longitudinal pleats;



Fig. 6. — Atelopus minutus, n. sp., dorsal (a) and lateral (b) views of head, ventral view of left foot (c), $\times 2$ and 5 resp. Fig. 7. — Hyla miranda-ribeiri, n. sp., dorsal (a) and lateral (b) views of head, nat. size. Fig. 8. — H. granosa gracilis, n. subsp., dorsal view of head (a) and vomerine teeth (b), $\times 1.4$ and 4 resp. Fig. 9. — H. parviceps Blgr., dorsal view (a), lateral view of head (b), and vomerine teeth (c), $\times 1.5$ and 7.5 resp. Fig. 10. — H. mimetica, n. sp., dorsal (a) and lateral (b) views of head, and vomerine teeth (c), about nat. size and $\times 4$ resp. Fig. 11. — H. albida, n. sp., ditto, $\times 1.5$ and 6 resp. Fig. 12. — H. pusilla, n. sp., dorsal view (a), lateral view of head (b), and vomerine teeth (c) $\times 1.5$

belly and thighs below coarsely granulated; transversal fold of the chest rudimentary. Above whitish grey (silver-gleaming) with a dark, wedge-shaped, spot-like design along the vertebral line from the eyes to the sacral region and then continuing as round spots; iris dark with sparse, silver-white radiating lines; upper jaw partly whitish with narrow, dark transversal bands; a blackish band from the tip of the snout through the eye to the base of the forelimb; tympanum brownish, light-edged; sides of the body with reticulate. dark mottle and black spots; limbs with dark, irregular, fairly broad cross bands; hind limbs light, beneath with fine, dark mottle; forearms and tarsi beneath darkish with light spots; single white spots at the base of the forelimb, on the heel and the exterior side of the hand and foot; beneath whitish with brown mottle, the latter especially on the head and chest. The smaller specimen with a whiter ground and more distinct spots (the black ones on upper surface ringshaped); some white spots at the lower jaw; iris with spot-shaped lines; forearms, seat, and tarsi beneath brownish with whitish spots. Length 35 and 24 mm., thighs 18 and 12 mm. respectively.

2 specimens, Roque, Perú, 1925.

This species, which occurred in a "chacra" (kind of cultivation), partly on plants and partly under bark of a very similar colour, may be closely related to H. zernyi AHL and possibly also to H. auraria PTRS. From the latter species, which is greenish yellow, it is, however, distinguished by its silver-white colour, and from zernyi (AHL, 1933, pp. 27 foll.) by its larger disks and lack of dark marble on the hinder side of the thighs. Perhaps it is, however, merely a variety of zernyi, the description of which is probably made from a young specimen. H. mimetica may also be related to leucophyllata (BEIR.), but has the vomerine teeth just and not between the choanae, the web of the fingers less extended, and the hind limbs longer. Besides, the colour is fairly different.

A young Hyla (20 mm. long), collected at Roque, 11.5.1925 and occurring on a green leaf in a cultivation of maize, resembles H. mimetica a good deal. According to the label, it was, however, light bluish green with a greyish yellow tint above and a red iris; limbs chiefly dark; forearms and tibiae with narrow, light, U-shaped cross bars; head and chest covered with fine dark dots.

Hyla albida, n. sp. Fig. 11.

Body thickset, a little wedge-shaped, with a broad head and slender limbs. Tongue rounded, free and narrowly nicked (slightly heart-shaped) at the back. Vomerine teeth between the hinder part of the fairly large, roundly triangular choanae, in two short, well separated, fairly transversal series (of four teeth each), smaller than the choanae. Snout broadly elliptical with high, slightly projecting tip, about as long as the diameter of the eye; rostral edge rounded; loreal region nearly vertical, slightly concave; nostril near the tip of the snout, a little nearer the eye than the diameter of the latter; eyes strongly prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space much broader than the upper eyelid; crown fairly even; tympanum almost invisible, possibly one third the diameter of the eye; lower jaw terminally with a small knob. Fingers webbed at the base, toes three fourths webbed; disks fairly small; subarticular tubercles poorly developed; first finger much shorter than second; a calluslike rudiment of pollex; a slight, elliptical medial metatarsal tubercle, but no lateral one or tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye; tibiae a little longer than the thighs (heels a little crossing). Upper surface smooth, finely granulated, belly and lower side of the thighs coarsely granulated; transversal fold of the chest distinct; throat with a large transversal fold; the smaller specimen possibly with a large external vocal sac. Above whitish with sparse, small, dark spots; from the tip of the snout through the eye and tympanum a narrow, dark band along one half of the side of the body; iris brownish; limbs and belly greenish yellow; a fine, brownish red dotting on the exterior side of the forearm, upper surface of tibiae, and possibly also on the feet. Smaller specimen almost without spots, but posterior part of the body with dots; dark band on the sides less strongly developed; brownish dotting of the forearms, on the other hand, better developed, extending to the hand. Length 22 and 25 mm., thighs 11 and 14 mm. respectively.

2 specimens, Roque, Perú, 1925.

This species may be closely related to H. aluminiata AND. from Bolivia. Irrespective of the sparse and small spots on the upper surface, it is, however, distinguished from the latter species by its reddish dotting on the forearms and tibiae and its larger size. The vomerine teeth am also on a level with the hinder edge of the choanae and not behind there.

Hyla pusilla, n. sp. Fig. 12.

Body broadly wedge-shaped (conically projecting over the anus) with large, a little bulldog-like head and long, slender hind limbs. Tongue elliptical, markedly nicked, free at the back. Vomerine teeth on a level with the hinder edge of the fairly small, rounded choanae, in two small, slightly separated transverse series of only a few teeth each. Snout broadly elliptical, about as long as the diameter of the eve, with a high, vertically oblique, slightly projecting tip; rostral edge distinct, almost straight; loreal region almost vertical, concave; nostril near the tip of the nose, less far from the eve than the diameter of the latter; eves large, highly prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space a little broader than the upper eyelid; crown a little raised; hinder parts of the upper jaw projecting and provided with marked edges; tympanum visible, vertically elliptical, scarcely one third of the diameter of the eye; lower jaw terminally with a slight knob. Lateral fingers webbed at the base, toes half webbed; disks leveloped, larger ones a little larger than the tympanum; subdated user tubercles small, but partially prominent; first finger a little shorter than second, thickened at the base; a callus-like rudiment of pollex; forearms thickened; an elliptical medial metatarsal tubercle and an edge-like tarsal fold, but no lateral tubercle. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the tip of the nose; tibiae a little longer than the thighs (heels a little crossing). Upper surfaces more or less rough, lower surfaces of body and thighs coarsely granulated; a slight supratympanic fold, continuing along the anterior part of the sides into a coarser fold; seat and heels with small knobs; hands and feet with a slight lateral dermal fold. Above brownish; along the vertebral line a dark, diffuse design from the upper eyelids to the sacral region: hinder part of the sides whitish with some larger, black spots; hind limbs with traces of narrow, dark cross bands; a dark spot at the anus; posterior side of the upper arm partly light; forearm at the base, knobs on the heels and below the anus, and dorsal side of the two first fingers and toes, whitish; beneath light with a brownish tint, especially on the thighs; head with dark mottle. Length 17 mm., thighs 11 mm.

1 specimen, Roque, Perú, 7.6.1925.

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Perhaps this small species belongs to the *leucophyllata*-group, though the prominent hinder part of its upper jaw seems quite specific.

Hyla tintinnabulum n. sp. Fig. 13.

Body a little wedge-shaped with a broad head and slender hind limbs. Tongue subcircular, at the hinder edge truncate and free. Vomerine teeth between the hinder part of the fairly small, roundly triangular choanae, in two small (almost rudimentary), well separated groups of some few teeth each. Snout triangular, rounded, about as long as the diameter of the eye, with high, truncate, scarcely projecting tip; rostral edge rounded or slightly angular; loreal region almost vertical; nostril near the tip of the nose, less far from the eve than the diameter of the latter; eves fairly large, very prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space much broader than the upper eyelid; crown a little swollen (in one specimen with an elliptical depression); tympanum indistinct, about one third of the diameter of the eye; lower jaw terminally with a small knob. Lateral fingers nearly one fourth webbed, toes two thirds webbed; disks small, about as large as the tympanum; subarticular tubercles fairly small; first finger shorter than second, very much thickened at the base (?rudiment of pollex); a slight, elliptical medial metatarsal tubercle, but neither a lateral one nor any tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the eye; tibiae considerably longer than the thighs (heels distinctly crossing). Skin fine and smooth; belly and medial part of the thighs beneath granulated, the latter slightly; tympanum surmounted by a slight fold; transversal fold of the chest laterally very distinct; a longitudinally puckered vocal sac on the throat. Colour, according to the label, above greyish green with a brown tint, beneath bluish green; toes orange-coloured; in alcohol, above a little white-powdered; fine, brownish dots on the back and limbs (excluding part of the forearms and thighs), often forming diffuse bands between the eyes and along the vertebral line; upper eyelids partly dark; iris with metallic lustre on a black ground; a diffuse brownish band along the sides of the head and anterior part of the body, partly edged with white above and fading away behind the forelimbs. Length 19-20 mm., thighs about 9 mm.

3 males, Rio Uaupés (some days' journey north of Ipanoré), Brazil, 17.5.1924. This species, which occurred in great numbers at a little igarapé (river-branch) on the western side of the river among high grasses and Melastomaceae-bushes together with H. granosa gracilis and lutzi, had a brittle, bell-like sound. In playing, not at

all disturbed by our lights, the animals were sluggish and had their vocal sacs greatly distended.

Systematically, H. *tintinnabulum* seems to be closely related to H. *nana* BLGR. from Argentina and southern Brazil. It is, however, distinguished from that species by its indistinct tympanum, smaller web of the toes, and different colour (more or less whitish above, a very indistinct, short lateral band, thighs without dotting, etc.).

Hyla phyllognatha, n. sp. Fig. 14.

Body fairly thickset, depressed, with a large, well defined head and stout, short limbs. Tongue broadly elliptical, slightly nicked (heart-shaped), adherent, in the hinder part with a marked medial furrow. Vomerine teeth a little behind the moderate choanae, in two, well separated, forward converging series (of four large teeth each). Snout subcircular, a little longer than the diameter of the eye; tip of the snout truncate, slightly projecting; rostral edge distinct, a little incurved; loreal region almost vertical, a little concave; nostril near the tip of the nose, about as far from the eye as the diameter of the latter; eyes seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space twice as broad as the upper eyelid; crown a little convex; tympanum indistinct, scarcely one third of the diameter of the eye; lower jaw terminally with an indistinct knob. Lateral fingers one third webbed, toes almost entirely webbed; disks well developed, a little larger than the tympanum; subarticular tubercles fairly small; first finger shorter than second, thickened at the base; a callus-like rudiment of pollex; a slight medial metatarsal tubercle, but lateral one and tarsal fold rudimentary. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye; tibiae a little longer than the thighs (heels slightly crossing). Skin thick, on the upper surface finely granulated and rugose, belly (behind the chest-fold) and thighs beneath coarsely granulated; fold of the chest distinct; belly with metamerically marked musculature and lateral, longitudinal callosities (possibly artificial products of fixation); throat longitudinally puckered (possibly a vocal sac): lower jaw at the base with a couple of crescent-shaped folds; sides of the body anteriorly with a dorsal fold, behind the forelimbs with a cross furrow, pointing forward; upper region of the anus, heels, and outer sides of the forearms, tarsi, and feet with slight. dermal folds. Colour, according to the label, »greenish with yellow

belly», in alcohol, above finely mottled with greyish green; numerous dark, fairly coarse dots, forming an irregular design, from the tip of the snout to the sacral region; iris dark, probably with metallic lustre; dermal folds of the anal region and limbs partly whitish, margined by black lines or spots. Length 33 mm., thighs 16 mm.

1 specimen, Roque, Perú, 7.6.1925.

The above species, found at a »quebrada» (small river), is externally characterized by the crescent-shaped folds of its upper jaw. Perhaps a dissection, hitherto avoided on account of the single specimen, may show other new characteristics. A smaller Hyla (Fig. 15) of a similar shape, taken at the same locality and provided with similar dermal folds in the anal region and on the heels, may perhaps belong to the same species. It is, however, much slenderer, both with regard to body and limbs, and has no projecting folds on the lower jaw. Series of vomerine teeth oblique, each consisting of numerous teeth. Snout broadly elliptical, about as long as the diameter of the eye, with high, truncate tip; rostral edge distinct; loreal region fairly vertical, slightly concave; nostril near the tip of the nose, a little nearer the eye than the diameter of the latter; eyes fairly large, highly prominent; interorbital space much broader than the upper eyelid; crown slightly raised; tympanum almost invisible, small. Lateral fingers webbed at the base, toes a little more than half webbed; disks and subarticular tubercles fairly small; first finger much shorter than second; a distinct callus-like rudiment of pollex; a slight, elliptical medial metatarsal tubercle, a rudimentary lateral one, and a fine tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the eye. Upper surface smooth; belly (up to transversal fold of the chest) and lower sides of the thighs granulated; fold of the chest slightly marked medially; dermal transversal folds at the anus and heels slight, partly interrupted; tarsi and metatarsi with some fine longitudinal pleats. Colour in alcohol, whitish yellow with partly greenish tint; sparse light dots on the back and opper part of the limbs; anterior medial part of the body with very fine, dark dots; upper eyelids translucently dark; iris with mottle of metallic lustre; dermal folds at anus and heels whitish. Length 22 mm., thighs 10.5 mm.

From *H. punctata* (SCHNEID.) and *punctatissima* (RHDT. & LTK.) the small specimen is distinguished by its short, truncate snout, and from *albida* MELIN by its oblique series of vomerine teeth and lack of any reddish brown dotting on the limbs.

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Hyla rubra hübneri, n. subsp. Fig. 16.

Body a little thickset with fairly small, not well defined head and fairly short hind limbs. Tongue broadly elliptical, longitudinally furrowed, at the hinder edge slightly nicked and free. Vomerine teeth between the hinder parts of the moderate, elliptical choanae, in two small, a little curved, well separated series (of eight to nine teeth each), larger than the choanae. Head depressed, a little longer than broad; snout pointedly elliptical, one and a half times as long as the diameter of the eve, with rounded, somewhat obliquely truncate, projecting tip; rostral edge indistinct; loreal region somewhat oblique, scarcely concave; nostril near the tip of the nose; eyes fairly prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space broader than the upper evelid: crown fairly even; tympanum very distinct, rounded, about half the diameter of the eye; lower jaw terminally with a slight knob. Fingers free, toes three fourths webbed; disks well developed, transversely elliptical, a little smaller than the tympanum; subarticular tubercles well developed; first finger shorter than second; a callus-like rudiment of pollex; a large, elliptical medial metatarsal tubercle and a small, rounded lateral one, but no tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye or a little beyond; tibiae like metatarsi fairly plump, longer than the thighs (heels crossing). Upper surface smooth with a slight granulation or small warts; a slight supratympanic fold; forearm possibly with a slight longitudinal fold; exterior sides of hands and feet with an indistinct dermal seam; lower surfaces (especially body and thighs) coarsely granulated; transversal fold of the chest very distinct, covered medially by a convex fold from the base of the forelimbs (especially marked in the female). Colour, according to the label, »darkmottled with vellow-speckled thighs and tibiae»; in alcohol, above olive grey to yellow, sometimes pinkish, with fine brown mottle and brownish red designs (a fine band along the rostral edge, continuing above the tympanum and the base of the forelimb; an angular, sometimes T-shaped band between the eyes; a couple of bands, consisting of spots, along the back; etc.); iris dark with metallic mottle; tympanum brownish; limbs with broad, diffuse and irregular, reddish brown cross bars; posterior part of the sides of the trunk, anterior and posterior sides of the thighs, interior sides of the tibiae, and feet above, partly coarsely and strongly marbled

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Fig. 14. — Hyla phyllognatha, n. sp., dorsal view of head (a), ventral view (b), and vomerine teeth (c), × 1.5 and 6 resp. Fig. 15. — Possibly young specimen of same, dorsal (a) and lateral (b) views of head, and vomerine teeth (c), × 1.5 and 7.5 resp. Fig. 16. — H. rubra hübneri, n. subsp., ditto, about nat. size and × 4.5 resp. Fig. 17. — Possibly young specimen of same, dorsal view of head (a) and vomerine teeth (b), about nat. size and × 6 resp. Fig. 18. — H. rubra inconspicua, n. subsp., ditto, about nat. size and × 4.5 resp. Fig. 19. — H. lutzi, n. sp., dorsal (a) and lateral (b) views of head, and vomerine teeth (c),

about nat. size and \times 4 resp.

with blackish brown on a light (?yellow) ground; beneath whitish yellow or grey with a brown mottle or dotting on the head, chest, and thighs. The female (vicinity of Manáos) has the upper surface almost entirely greyish brown, a line of dark dots from the eyes to the shoulders, dark-spotted sides of the trunk, and a less distinct marble of the latter and the hind limbs; lower surface entirely light

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with merely a sparse, fine, blackish dotting. Length 38-40 mm., thighs about 16 mm. (the female largest).

2 males, 1 female, Taracuá, Rio Uaupés, 11.5. and S. Gabriel, Rio Negro, August 1924, and vicinity of Manáos, 15.11.1923, Brazil. The two former specimens were found on the ground of our encampment and in a forest-clearing under bark respectively, the female, having small eggs in her body, at a little igarapé (river branch) together with H. lutzi and other frogs.

By their fairly long, pointed head, distinct blackish marble of the tibiae and feet (not at all mentioned by BOULENGER, 1882 b, p. 404, BAUMANN, 1912, p. 109, or NIEDEN, 1923, p. 311), brown mottle of head and chest, and their small size, the above specimons may form a special subspecies of *rubra*, named after our kind host, Mr. G. HÜBNER of Manáos. A pointed head is also found in *H. nasica* COPE, but the latter species seems to have the series of vomerine teeth contiguous.

A smaller Hyla (Fig. 17), 26 mm. long, taken at Taracuá,? March 1924, near a shelf of rock and having small eggs in the body, may perhaps be a young specimen of H. rubra. It has, however, the series of vomerine teeth smaller than the fairly oblique choanae, snout merely a little longer than the diameter of the eye, with truncate tip, interorbital space much broader than the upper eyelid, tympanum indistinct, possibly a slight web of the fingers, subarticular tubercles of the penultimate phalanges of the fingers prominent, first finger considerably shorter than second, and tibiae considerably longer than the thighs (heels strongly crossing). Upper surface smooth with sparse, grain-like pustules; upper eyelids wrinkled by warts; knees with a prominent fold; belly and thighs beneath areolate-warty. Above fine dark mottle on a light, greyish yellow ground with irregular, smaller, dark spots; a dark, diffuse band along the rostral edge, continuing above the tympanum; upper eyelids dark; margin of the upper jaw whitish, as also the sides of the body and hind limbs with a fine, sparse, and dark mottle; limbs with sparse and diffuse, dark cross bars.

Hyla rubra inconspicua, n. subsp. Fig. 18.

Body thickset with a slightly depressed, triangular head. Tongue subcircular, at the hinder edge slightly truncate, free. Vomerine teeth between the elliptical, moderate choanae, in two almost contiguous, backwards slightly angular series (of about nine teeth

each), longer than the choanae. Head about as long as broad; snout broadly elliptical, more than one and a half times as long as the diameter of the eye, with slightly projecting tip; rostral edge fairly indistinct; loreal region oblique, a little concave; nostril half as near the tip of the nose as the eye; eyes fairly prominent, seen from above slightly projecting beyond the lateral margins of the head; interorbital space more than twice as broad as the upper evelid; crown fairly even; tympanum very distinct, nearly three fourths the diameter of the eve: lower jaw terminally with a small, tooth-like knob. Fingers free, toes three fourths webbed; disks large, rounded, a little smaller than the tympanum; subarticular tubercles well developed; first finger much shorter than second; rudiment of pollex a little callus-like; a large, elliptical medial metatarsal tubercle and a small, rounded lateral one, but no tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the nose; tibiae considerably longer than the thighs (heels strongly crossing). Upper surfaces fine and smooth, partly with sparse pustules or small knobs; tympanum surmounted by a slight fold; lower surface of the body (behind the transversal fold) and thighs coarsely granulated; fold of the chest very distinct; throat with a large, external vocal sac. Above fine dark mottle on a whitish grey to greyish yellow ground, with dark, diffuse, openwork spots (a slightly W-shaped spot between the eyes, a couple of longitudinal spots on the shoulders and sacral region respectively, etc.); rostral edges and upper jaw (on a level with the eye and the tip of the nose) with dark bands; supratympanic fold slightly darkedged; fairly large, sparse, blackish brown, distinct spots on the hinder part of the sides of the body; limbs with broad, partly diffuse cross bars; posterior sides of the thighs with traces of dark brown marble; beneath yellowish white with a blackish grey mottle on the head along the lower jaw. Length 44 mm., thighs 22 mm.

1 male?, Roque, Perú, 1925.

This specimen belongs to the rubra-group — H. rubra DAUD., nasica COPE, funerea (COPE), and phrynoderma BLGR. As it does not exactly resemble any species of the group in question and some of them are hardly sufficiently distinguished, it may for the present form a subspecies of rubra, characterized by its larger tympanum, longer hind limbs, and defective design of blackish marble. From *funerea*, found at Moyobamba near Roque, it differs by its broad and long snout, larger tympanum, and shorter hind limbs.

Hyla lutzi, n. sp. Fig. 19.

Body depressed, a little wedge-shaped, with a large head and slender limbs. Tongue elliptical, at the hinder edge free and slightly nicked. Vomerine teeth between the posterior parts of the large, longitudinal, oblong choanae in two small, closely standing, towards the back convex, series, smaller than the choanae. Head a little longer than broad; snout pointedly elliptical, depressed, nearly twice as long as the diameter of the eve: its tip prominent, obliquely truncate. angularly projecting, (sometimes in a spine-like manner); rostral edge indistinct, incurved; loreal region a little oblique, slightly concave; nostril fairly near the tip of the nose, more than the diameter of the eve from the latter: eves moderate, fairly prominent, seen from above projecting a little beyond the lateral margins of the head: pupil he al; interorbital space broader than the upper evelid; crown slightly concave; tympanum very distinct, rounded, dorsally with a tongue-like dermal lobe, two thirds the diameter of the eye; lower jaw terminally with a slight knob. Lateral fingers rudimentarily webbed, toes three fourths webbed; disks transversally elliptical, largest on the fingers, hardly half the size of the tympanum; subarticular and carpal tubercles fairly small; first finger much shorter than second; a slight rudiment of pollex; first toe free, separated from the others; two small, rounded metatarsal tubercles, but no tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the nose: tiolae longer than the thighs (heels strongly crossing). Upper surface rough and granulated; upper eyelids with spiny warts; a triangular figure of small puckers and knobs (edging a brownish spot) behind the eves: tympanum surmounted by a slight fold; posterior part of the sides of the body smooth: limbs partly with small sparse knobs; anal region knobby with a mosal fold; heels with a short, spine-like dermal process; lower surface of head with small warts, of body and thighs granulated and areolate-warty respectively; edge of the lower jaw with small, sparse knobs, continuing below the tympanum and there forming a closer row; vocal sac and transversal fold of the chest well developed. In alcohol, above brown to greyish yellow with darkish brown mottle and spots: a large, Y-shaped spot, sometimes not filled, between the eyes, a small medial spot at the nose, a couple of narrow bands at the tympanic folds, shoulders (comma-shaped), and sacral region (possibly a diffuse transversal band) respectively; iris with metallic lustre; upper

jaw diffusely cross-barred on a partly white ground; sides of the body vhitish, partly with a blackish brown mottle; limbs with irregular, partly diffuse, dark cross bars (on the tibiae at least two distinct ones); anterior and posterior sides of the thighs with large black spots on a white (?partly yellow) ground which form part of the cross bars; proximal parts diffusely marbled; lower surfaces whitish with a dark marble or mottle of the head (especially along the jaw); head and thighs with a slight white dotting. The smaller specimen (Rio Uaupés), which lacks the heel-process, according to notes, greyish brown with orange-coloured, dark-spotted sides of the thighs and green-gleaming regions below the eyes, at the groins, base of the thighs, and bend of the arms respectively; in alcohol, bands and spots partly silver-grey, margined with black. Length 46 and 37 mm., thighs 22 and 19 mm. respectively.

2 specimens, vicinity of Manáos, 15.11.1923 and Rio Uaupés (some days' journey north of Ipanoré), 17.5.1924, Brazil. Both were found at small igarapés (river-branches), the former together with *H. rubra* and *Bufo marinus*, the latter among high grasses together with *H. granosa gracilis* and *tintinnabulum*. Judging from its sound, a short creaking with a high final tone, the species in question was obviously less common in the latter locality than the other frogs. them it was sluggish when captured.

By its yellowish, dark-spotted thighs the above species somewhat resembles *H. rubra* and nasica, but differs from them by its long, depressed snout and very rough skin. On the other hand, it very much resembles a Hyla from Venezuela, described by LUTZ (1927, Pl. 11, Fig. 20) under the name of palpebrogranulata AND., which, however, merely seems to have the warty upper cyclids in common with the species of ANDERSSON (1906, p. 14; Pl. 1, Fig. 2). The author's statement (loc. cit., p. 44) about »sua voz especial» also speaks in favour of the identification in question, since the species observed by me had a harsh and very characteristic sound. The species, which I take the liberty of naming after Professor A. LUTZ of Rio de Janeiro, resembles a good deal Garbeana garbei MIR.-RIB. (1926, p. 96), which is also provided with a spine-like process of the heels. As far as I can see, the latter species, taken at Rio Juruá, is, however, more slender, and has a smaller head and no cross bars on the upper surface of the limbs; besides, the cross bars on the posterior side of the thighs are oblique, which is not the case in H. lutzi. Perhaps the latter is also related to H. rostrata

PTRS., the vomerine teeth of which are, however, very differently described. While BOULENGER (1882 b, p. 353) states that the teeth in question appear win two series forming a / », NIEDEN (1923, p. 184), in his key speaks of »Gaumenzähne in nach hinten konvergierenden, geraden Reihen angeordnet» the diagnosis (ibid., p. 306) of the same species, of »Gaumenzähne in 2, zusammen einen nach vorn konkaven Bogen bildenden Reihen». The statements of the two authors regarding the presence or lack of the tarsal fold are also contradictory. At any rate, *H. rostrata* seems to have a much longer snout than *lutzi*.

Hyla (Trachycephalus) taurina (FITZ.). Fig. 20.

Body wedge-shaped with strongly marked sacral diapophyses, a well defined head, and long, slender hind limbs. Tongue flat, broadly elliptical, slightly nicked, free behind. Vomerine teeth between the very large choanae, in two angular, closely standing series, forming together a / . Head large, very depressed, a little broader than long, with very prominent hinder parts of the jaws; snout rounded, about one and a third as long as the diameter of the eye, with prominent, but only slightly projecting tip; rostral edges very strong, fairly straight, together almost forming a right angle; loreal region oblique, deeply concave; nostril near the tip of the nose, a little farther from the eye than the diameter of the latter; eyes very prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space much broader than the upper evelid; crown concave; skull rugose; the edges of the fronto-parietals forming two prominent, slightly S-shaped carinae; tympanum very distinct, rounded (dorsally truncate), sometimes more than three fourths the diameter of the eye; lower jaw terminally with a tooth-like knob. Lateral fingers about one third webbed; toes almost entirely webbed; disks large, not much smaller than the tympanum, a little transversally elliptical; subarticular tubercles fairly small but tooth-like; first finger much shorter than second, at the base very much thickened; a callus-like rudiment of pollex; a large, very prominent medial metatarsal tubercle and a small, rudimentary lateral one, but no true tarsal fold (possibly replaced by an indistinct row of knobs). The hind limb being carried forward along the body, the tibio-tarsal articulation reaches somewhat beyond the tip of the nose; tibiae a little longer than the thighs (heels slightly crossing). Upper surface in the male very rough with knobs and

spiny warts, in the female slightly warty; a distinct furrow along the anterior part of the vertebral line; tympanum surmounted by a coarse and knobby fold; sides of the body and front of the chest areolate furrowed; belly and thighs beneath coarsely granulated (the latter slightly); an indistinct fold of the chest. Above, according to the label, reddish brown to whitish grey, beneath whitish, iris black with golden radial streaks; in alcohol, light or dark reddish brown with blackish brown mottle or spots (from neck almost to the sacral region a couple of narrow, diverging bands consisting of spots, other spots on the tympanic region and fold, etc.); posterior part of the sides of the body often coarsely and darkly marbled on a whitish ground, in one specimen with bright white spots, also found at the base of the thighs; limbs with some few oblique, fairly broad, diffuse, dark-edged cross bars; thighs with a slight yellowish brown tint; anal region with spots (possibly transversal bands); beneath whitish with more or less distinct brownish design (mottle, marble, or spots) on the head, chest, and possibly belly (?male). Males with large external vocal vesicles behind the angle of the mouth; first finger medially with a pear-shaped, blackish brown breeding-callus. Length of the males 77-82 mm., thighs 40-42 mm., of the females 82–98 and 46–55 mm. respectively.

2 females, Taracuá, Rio Uaupés, 21.3 and 7.4.; 3 males, 3 females, Rio Uaupés (north of Rio Japú), 20.5.1924; Brazil. Of the two first-mentioned specimens one, sitting on a trunk in the water of an igarapé (river-branch), had among other things a spider and a kind of Myriapod in its stomach. The other was full of dark eggs. Remaining specimens, taken by Indians and, though alive, in a barbaric manner stringed through the head on twigs like fishes, occurred »low down by the river».

By their short-webbed fingers and long hind limbs the above specimens differ a little from the usual descriptions of the species, which is now in general classified into the large genus Hyla. On account of its broad, depressed head with projecting bases of the jaw, very prominent rostral edges, rugose skull, bony carinae of the fronto-parietals, etc., it may, however, as MIRANDA-RIBEIRO (1926, p. 93) considers, together with some other related forms, form a special genus, though more restricted than the former *Trachycephalus*.

Among the above large tree-frogs, obtained by Indians at Rio Uaupés (north of Rio Japú), 20.5.1924, one male and one female,

a little differing in colour from the mentioned specimens of *taurina*, were also found. The male, having only slight carinae of the frontoparietals, above blackish brown with a fine, distinct, light medial line from the tip of the nose to the anus, the female, being fairly smooth, light brownish red with ϵ fainter medial line; cross bars on the limbs fairly indistinct and defective; beneath light with indistinct spots, the head and chest of the female faintly mottled with • brown. Length 80 and 93 mm., thighs 37 and 45 mm. respectively.

In spite of the web of the fingers scarcely differing in size from other specimens of *taurina*, the above form may perhaps be identical with *Trachycephalus flavolineatus* STEIND. which, according to MIRANDA-RIBEIRO (1926, p. 95), is characterized not only by a yellow medial line, but also by the fact that the bony carinae run »quasi em direcção recta e parallelas entre si» and by a merely basal web of the fingers. As, however, both these characteristics seem to vary a good deal, we have, perhaps, only to do with a kind of aberration.

Hyla (Trading phalus) vilarsi, n. sp. Fig. 21.

Body wedge-shaped, depressed, with a fairly large, well defined head and long hind limbs. Tongue elliptical, depressed, at the hinder edge truncate and slightly free. Vomerine teeth between the very large, somewhat rectangular choanae, in two slightly angular, closely a little longer than broad, with hinder parts of the jaw rounded and prominent: snout broadly elliptical. about one and a third times as long as the diameter of the eye. with prominent, slightly projecting tip; rostral edges very prominent, fairly straight, and together forming a broadly acute angle; loreal region oblique, very concave; nostril near the tip of the nose, a little farther from the eye than the diameter of the latter; eyes very prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space much broader than the upper eyelid; crown slightly concave; skull rugose; edges of the fronto-parietals forming two slight, fairly straight carinae; tympanum very distinct, rounded, dorsally truncate, more than three fourths the diameter of the eye; lower jaw terminally with a small knob. Lateral fingers webbed at the base, toes almost entirely webbed; disks small, scarcely half the size of the tympanum, a little oblong; subarticular • tubercles fairly small but tooth-like: first finger much shorter than



Fig. 20. — Hyla taurina (FITZ.), dorsal (a) and lateral (b) views of head, and vomerine teeth (c), about nat. size and × 2.3 resp. Fig. 21. — H. vilar i, n. sp., ditto. about nat. size and × 4 resp. Fig. 22. — H. leprieurii britti n. subsp., dorsal view of head (a) and vomerine teeth (b), about nat. size and × 4 resp.

second; a callus-like rudiment of pollex; a large, elliptical medial metatarsal tubercle and an indistinct lateral one, but no distinct tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the nose; tibiae a little longer than the thighs (heels a little crossing). Upper surfaces slightly granulated (especially head, hinder part of the back, and limbs); region of the shoulders with a prominent longitudinal furrow; tympanum surmounted by a slight fold, continuing towards the base of the forelimb; sides of the body areolate-furrowed, with pleats along their hinder part; lower surfaces with a slight (head,

forechest and thighs) or strong (belly) granulation; transversal fold of the chest indistinct. Above uniform reddish brown; upper eyelids and sides of the head darkish brown; below the rostral edge a narrow dark band, continuing as a broader light-edged one through the eye and tympanum towards the base of the forelimb and then farther on continuing along the sides as a line of black spots; sides of upper jaw whitish with traces of dark cross bars (one distinct under the eye); sides of the body darkish with black spots and marble, often on a whitish ground; thighs, tibiae, and tarsi each with two broad, light-edged, dark cross bars on a brownish ground (less distinct on the thighs); sides of the thighs finely mottled with brown; beneath whitish with small, dark, sparse spots along the jaw, on the chest and sides. Length 64 mm., thighs 32 mm.

1 specimen, Taracuá, Rio Uaupés, Brazil, 7.4.1924.

By its angular series of vomerine teeth and bony carinae of the skull the above species, named after my late friend, Mr. A. VILARS, is related to H. taurina. It is distinguished from H. planiceps (COPE) by its non-transverse series of vomerine teeth, distinct web of the lateral fingers, and possibly also by the conspicuous designs on the sides of its head and body.

Hyla leprieurii britti, n. subsp. Fig. 22.

Body thickset with a fairly large head and long hind limbs. Tongue elliptical, flattened, at the hinder edge slightly nicked and free. Vomerine teeth between the hinder parts of the large, oblong choanae, in two separated series, forming together an arch, the convexity of which is turned forward. Head depressed with slightly projecting bases of the jaw, about as long as broad; snout elliptical, a little longer than the diameter of the eve; rostral edges very prominent, fairly straight, forming together an acute angle; loreal region oblique, very concave; nostril near the tip of the nose, as far as the diameter of the eve from the latter; eyes prominent, seen from above projecting beyond the lateral margins of the head; pupil horizontal; interorbital space broader than the upper eyelid; the edges of the fronto-parietals forming indistinct carinae; tympanum very distinct, rounded, about half the diameter of the eye; lower jaw terminally with a small knob. Lateral fingers webbed at the base, toes almost entirely webbed; disks rounded, largest on the fingers, a little smaller than the tympanum; subarticular tubercles of the fingers toothlike, of the toes slightly developed; first finger much shorter than

second, thickened at the base; a large, elliptical medial metatarsal tuberclo and above this a small (?lateral) one, but no tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the tip of the nose; tibiae a little longer than the thighs (heels a little crossing). Upper surfaces with numerous small, round, spiny warts; tympanum surmounted by a warty fold, continuing above the base of the forelimb; lower surfaces granulated, most distinctly on the belly; an indistinct transversal fold on the chest. Above blackish brown with a very indistinct band between the eyes; iris with mottle of metallic lustre; hinder parts of the upper jaw whitish; sides of the body mottled with blackish brown; hind limbs (especially tibiae and tarsi) with narrow, diffuse cross bars; beneath whitish with a slight brown mottle along the jaw. Male with two large external vocal vesicles behind the angles of the mouth; first finger medially with a blackish, pedunculate breeding-callus. Length 49 mm., thighs 28 mm.

1 male, Rio Uaupés (north of Rio Japú), Brazil, 20.5.1924.

This type, taken by Indians together with *H. taurina*, resembles a good deal *H. leprieurii* DUM. & BIBR. As, however, it differs from the latter species by its very concave loreal region, small tympanum, and almost uniformly brownish colour, it may at least form a subspecies of *leprieurii*, named after the hospitable director of the Salesian mission at S. Gabriel (Rio Negro), padre L. DE BRITTO.

Hylodidae.

Like NIEDEN (1923) and MIRANDA-RIBEIRO (1926), I here retain the prevalent genus-name *Hylodes* which, like *Hyla*, probably indicates a very heterogeneous group. The species *cornulus* (ESPADA) and allied forms with their characteristic habit and bony carinae of the head I group into the new genus *Ctenocranius*.

Hylodes peruvianus, n. sp. Fig. 23.

Body slender with long, slender limbs. Tongue rounded, slightly nicked. Vomerine teeth in two small, well separated, backwards converging series, a little behind the small choanae. Head triangular, depressed; snout truncate, a little projecting, nearly one and a half the diameter of the eye; rostral edge rounded, a little S-shaped; loreal region almost vertical, concave; nostril much nearer the tip of the snout than the eye, the orbital diameter equalling the distance **bet**ween the eye and the nostril; interorbital space much broader

than the upper eyelid; tympanum distinct, transversely elliptical, scarcely half the diameter of the eve; lower jaw terminally with a small process. Fingers and toes with moderate disks (considerably smaller than half the diameter of the tympanum) and tooth-like subarticular tubercles, the disks truncate; first finger slightly extending beyond second; toes long and slender (especially the fourth). webbed only at the base; a stout, oblong medial metatarsal tubercle. but lateral one and tarsal fold rudimentary. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the tip of the nose. Upper surface, especially of the eyelids, anterior part of the sides, and anal region, finely granulated; from the eye towards the base of the forelimb a fairly coarse supratympanic fold: from the eve to the sacral region a slight dorso-lateral fold. some irregular fine puckers on the sides; anterior part of the sides along the belly and lower surface of the thighs granulated; belly smooth with a kind of discoidal fold. Above greyish yellow with a whitish tint and brownish designs (two small spots on the nose, a narrow irregular band between the eves, four partly diffuse, \wedge -shaped, light-edged bands on the back, partly continuing across the sides); sides of the nose blackish through diffuse transversal bands; from the tip of the nose through the eve and round the tympanum a black band; hinder parts of the upper jaw whitish with a dark transversal band at the eye, continuing to the lower jaw; the left dorso-lateral fold edged with small black spots, similar spots on the back and the posterior part of the right side; limbs with diffuse, irregular, light brown, partly angular cross bars (in the forearm and tibiae with marked black spots at the anterior edge); base of the forelimbs and distal part of the thighs anteriorly with large black spots; posterior part of the thighs brownish with light-marbled ground; a black \wedge -shaped spot above the anus; tibiae with dark mottle; posterior parts of the forearms, hands, tarsi, and feet blackish brown; beneath whitish with a dark mottle or marble on d, at the base of the forelimbs, and at the sides; edge of the + jaw with black spots. Length 50 mm.

1 specimen, Roque, Perú, July 1925.

This type, which, according to notes by my travelling-companion Mr. H. DENGLER of Dresden, was called »pangazapidju» by the natives, is related to H. conspicillatus GTHR., lymani BARB. & NOBLE, achatinus BLGR., and probably also to gollmeri PTRS, most of which have a darkish colouring of the sides of the head and a black, con-

spicuous band above the tympanum. From the latter species it differs by its first finger extending a little beyond the second, by the characteristically shaped bands on the back, and by its larger sizé. From *uchatinus* it differs by its shorter snout, broader interorbital space, prominent subarticular tubercles, less pointed angular bands on the back, and greyish ground-colour. This Peruvian type seems to resemble a little more *H. conspicillatus* and *lymani*; the latter of which has also been taken into Perú. As *conspicillatus*, like *gollmeri*, has, however, the first finger equal in length to the second, a small medial metatarsal tubercle, and (in contradistinction also to *gollmeri*) a conspicuous W-shaped design behind the eyes, and *lymani*, in which the first finger extends beyond the second, is said to have especially short toes, I can for the present not assign the type in question to any of the mentioned species, some of which may, perhaps, only be varieties of the same species.

Hylodes vilarsi, n. sp. Fig. 24.

Body fairly slender with moderately long hind limbs. Tongue subcircular, at the hinder edge acutely nicked. Vomerine teeth in two small, well separated, slightly oblique series, fairly far behind the roundly triangular small choanae. Head fairly broad, depressed; snout elliptical, nearly one and a half the diameter of the eye, with truncate, slightly projecting tip; rostral edge distinct; loreal region oblique, concave; nostril much nearer the tip of the nose than the eye; eyes prominent, seen from above projecting beyond the lateral margins of the head; interorbital space much broader than the upper eyelid; tympanum fairly distinct, rounded, with a dorsal dermal lobe, scarcely half the diameter of the eye. Disks and subarticular tubercles of the fingers and toes well developed; the former truncate, largest on the fingers, but much smaller than half the diameter of the tympanum; first finger extending beyond second; toes fairly long, slender, merely with a rudimentary web; a prominent, oblong medial metatarsal tubercle, but lateral one and tarsal fold rudimentary. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches only beyond the eye; tibiae longer than the thighs (heels crossing). Upper surface, especially of the eyelids, fairly distinctly granulated; a slightly curved suprany inpanic fold and a slight short dorso-lateral one along the body; sides and thighs beneath coarsely granulated, the former with a slight longitudinal fold; belly smooth with an indistinct discoidal fold. Colour monotonous, accord-

ing to the label, above brownish, beneath whitish grey; in alcohol, one specimen partly whitish grey with traces of bands between the eyes and along the rostral edge and tympanic fold; some dark spots on the back; the other specimen more light brown with a narrow medial line of white dots, alternating with brown ones, on the back; limbs without cross bars; beneath whitish with a fine, dark mottle. Length 39 and 41 mm.

2 specimens, Taracuá, Rio Uaupés, Brazil, 5. 3. 1924.

The above species, which was taken by my late friend Mr. A. VILARS and named after him, had insects in its stomach and resembles a good deal H. peruvianus. From the latter it differs, however, by its acutely nicked tongue, short hind limbs, quite different colouring, and possibly also by its less oblique series of vomerine teeth which seem to be situated farther behind the choanae than in peruvianus. According to Head-Master L. G. ANDERSSON, who is treating a collection of Amphibia from Ecuador, this type may perhaps be a variety of H. gollmeri, which has, however, a slightly nicked tongue, first finger equal to second, a small medial metatarsal tubercle, longer hind limbs, and also a different colouring.

Hylodes roseus, n. sp. Fig. 25.

Body thickset with large broad head and fairly slender hind limbs. Tongue subcircular, at the hinder edge a little angularly nicked and free. Vomerine teeth in two oblique, backwards converging, broadly separated irregular groups (of comparatively few large teeth each) far behind the moderate, roundly triangular choanae. Head depressed, about as long as broad; snout elliptical, nearly one and a half times the diameter of the eye, with rounded, slightly projecting tip; rostral edge distinct, a little incurved; loreal region oblique, concave; nostril near the tip of the nose, about as far from the eye as the diameter of the latter; eyes fairly prominent, but seen from above not projecting beyond the lateral margins of the head; interorbital space broader than the upper eyelid; crown slightly concave; tympanum distinct, transversally elliptical, with a dorsal dermal lobe, about half the diameter of the eye; upper jaw terminally with a slit-like incision; lower jaw terminally broadly notched with a small medial knob. Fingers and toes almost free; disks small, scarcely one third the size of the tympanum, transversal, in front truncate and possibly concave; subarticular tubercles well developed; first finger extending a little beyond second; toes long, slender; a large, elliptical medial



3 23. — Hylodes peruvianus, n. sp., dorsal (a) and lateral (b) www of head, ind vomerine teeth (c), about nat. size and × 1.5 resp. Fig. 24. — H. vilarsi, n. p., dorsal view of head (a) and vomerine teeth (b), about nat. size and × 2.3 esp. Fig. 25. — H. roseus, n. sp. ditto, about nat. size and × 4 resp. Fig. 26. – H. hylae/ormis, n. sp., dorsal (a) and lateral (b) views of head, and vomerine eeth (c), about nat. size and × 7.5 resp. Fig. 27. — Ctenocranius koki, n. sp. and gen., ditto, about nat. size and × 2.3 resp.

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netatarsal tubercle and a small, round lateral one; tarsal fold slight. The hind limb being carried forward along the body, the tibio-tarsal articulation scarcely reaches the tip of the nose; tibiae longer than the highs (heels crossing). Skin fine, on the upper surface slightly granuated; tympanum surmounted by a slight fold, a similar dorso-lateral one along the body; sides and thighs beneath coarsely granulated;

lower surface fairly smooth. In alcohol, upper surface greyish white with a pink tint and brownish designs (a band along the rostral edge and tympanic fold, with a diffuse branch on the dermal tympanic lobe; traces of transversal band between the eyes; a W-shaped figure behind the eyes; several black spots or longitudinal bands on the back, a couple of which along the vertebral line); sides of the head blackish, at the eyes with traces of three broad transversal bands on a white ground; tympanum brownish; sides of the body mottled or marbled with darkish brown; limbs with fairly broad, straight, partly diffuse, irregular, brownish cross bars on a light ground; thighs brownish, on the hinder side mottled; tubercles of hands and feet greyish; beneath whitish with a brownish mottle or dotting, especially on the head. Length 40 mm., thighs 20 mm.

1 specimen, Rio Uaupés (north of Rio Japú), 20.5.1924.

This species, taken by an Indian, fairly much resembles the Ecuadorian species H. pagmae FOWLER, which has, however, longer series of vomerine teeth, round disks, a small medial metatarsal tubercle, and, according to the figure (cf. NIEDEN, 1923, p. 454), oblique, not straight, bands on the tibiae.

Hylodes hylaeformis, n. sp. Fig. 26.

Habit Hyla arborea-like. Body thickset, broad, a little depressed, with not very well defined head and slender hind limbs. Tongue elliptical, at the hinder edge slightly nicked and free. Vomerine teeth in two small, broadly separated, oblique (backwards converging), irregular series just behind the moderate, rounded choanae. Snout broadly elliptical, one third longer than the diameter of the eye, with somewhat projecting tip; rostral edge rounded, a little incurved; loreal region oblique, a little concave; nostril fairly near the tip of the nose, about as distant from the eye as the diameter of the latter; eyes fairly prominent, seen from above projecting somewhat beyond the lateral margins of the head; pupil horizontal; interorbital space much broad the upper evelid; crown fairly even; tympanum indistinct, about one third of the diameter of the eye; lower jaw terminally angularly notched, with a small tooth-like knob. Disks of fingers and toes fairly small, transversal, in front a little concave; subarticular tubercles well developed (penultimate phalanges above with a prominent tubercle); first finger shorter than second; toes with rudimentary web; a slight, elliptical medial metatarsal tubercle, lateral one and tarsal fold rudimentary. The hind limb being carried

forward along the body, the tibio-tarsal articulation reaches beyond the eye; tibiae a little longer than the thighs (heels slightly crossing). Upper surface finely and sparsely granulated or warty, the latter especially on the eyelids; tympanum surmounted by a slight fold; limbs partly knobby; some fine longitudinal puckers on the forearms, tibiae, and tarsi; belly and lower side of the thighs coarsely granulated; transversal fold of the chest indistinct, but a strong one on the hinder part of the belly. In alcohol, above whitish grey with reddish brown marble or mottle and designs (traces of bands between the eyes and on and behind the sacral region, the latter two continuing on the sides; a spot on the nose; a W-shaped figure behind the eyes); a broad band above the tympanum; upper jaw whitish with diffuse transversal bands (a couple over the tip of the nose and two others radiating from the eye); limbs with diffuse cross bars (one on the forearm, three and two on thighs and tibiae respectively), those of the tibiae oblique; sides of the limbs, as also the anal region, partly with white spots; beneath greyish white with fine dark dotting or mottle, the latter especially on the head and chest. Length 26 mm., thighs 13 mm.

1 specimen, Roque, Perú, 1925.

This species, which is very Hyla-like but by its notched lower jaw and characteristic disks soon exhibits its relation to the Hylodids, seems to be related to *H. unistrigatus* GTHR., *frater* WERN., and *affinis* WERN. From the first-mentioned species, found in Ecuador and Bolivia, it differs by its longer snout and hind limbs, and from the two Colombian species *frater* and *affinis* by a shorter snout, indistinct rostral edge and small tympanum respectively, and its reddish brown design. It may also be related to *H. platydactylus* BLGR.

Ctenocranius n. gen.

In this new genus I unite Hylodids of the type H. cornutus (ESPADA), which by their very large depressed head, subcircular snout, crestlike edges of the fronto-parietals, small or rudimentary disks of the fingers. etc., very much differ from other Hylodids.

Ctenocranius koki, n. sp. Fig. 27.

Body fairly slender with very large head and long slender hind limbs. Tongue subcircular, at the hinder edge slightly nicked, free. Vomerine teeth in two, fairly straight, oblique (backwards converging) series a little behind the moderate, roundly triangular choanae.

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Head very broad, depressed; snout subcircular, one and a half times as long as the diameter of the eve; rostral edge distinct; loreal region oblique, concave; nostril nearer the tip of the nose than the eve, about as distant from the latter as the diameter of the eye; interorbital space about as broad as the upper eyelid; edges of the frontoparietals forming two fairly small crests; tympanum fairly indistinct, rounded, about two thirds the diameter of the eye; lower jaw terminally with a tooth-like knob. Disks of fingers and toes rudimentary and small respectively; subarticular tubercles prominent, carpal tubercles very large; first finger a little longer than second; toes slender, long (especially the fourth one), with a rudiment of a web; a prominent, oblong medial metatarsal tubercle and a slight, rounded lateral one, but no distinct tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tip of the nose; tibiae not much longer than the thighs. Upper surface with small warts. knobs, and dermal calli; of the latter a)(-shaped couple behind the eyes and behind them, nearer the vertebral line, a smaller similar one, exteriorly followed by a straighter couple of ridges; from the sacral region towards the anal one two converging lines of small dermal calli or knobs; upper evelid warty, with a short spine-like process in its hinder part; limbs fairly smooth; belly well granulated; single warts often at the articulations of the limbs (proximal exterior part of the tarsi etc.). Above greyish yellow with a reddish brown tint; from the eyelids to the socral region greyish brown diffuse bands, converging along the vertebral line; a dark oblong spot between the hinder part of the eyes; small squarish black spots behind the nostrils; warts and process of the upper eyelid whitish; dermal ridges on the back whitish, edged with black dots; from the second pair, exteriorly to the lines of dermal calli, a row of black spots; sides of the nose brownish; posterior part of the upper jaw whitish with three diffuse, partly black-edged, broad cross bands, radiating from the eye; a narrow black band behind the tympanum; latter brownish; sides of the body with traces of broad dark transversal bands, especially behind the forelimbs; a large dark spot in the groin; limbs with diffuse, fairly narrow cross bars; a narrow hinder part of the thighs and tibiae and the anal region blackish brown with white marble or spots; beneath greyish brown with light spots or granulation; head with small white spots; edge of lower jaw white with dark diffuse spots; tarsi and feet beneath darkish brown with light marble or spots. Length 28 mm.

1 specimen, Taracuá, Rio Uaupés, Brazil, April 1924.

This species, taken in the forest by our Brazilian assistant, is related to H. cornutus (ESPADA), which has, however, a heart-shaped tongue, arched series of vomerine teeth, no distinct disks of the fingers, and shorter hind limbs. It possibly also resembles H. maussi BOETTG., which has, however, the nostril at about an equal distance from the eye and tip of the nose and lacks disks of the fingers.

3 small (11-12 mm long) Hylodids of a similar shape but without bony ridges on the head and with only slight warts and calli, taken by Dr. A. ROMAN and myself on the ground in the forest at the same place as early as March, probably belong to the same species. The latter has been named after the known missionary and ethnographer padre P. Kok who, living in the small Colombian mission San Bernardo at Rio Papurí, showed great personal kindness to me during my travels in this part of South America.

Leptodactylidae.

Leptodactylus pentadactylus dengleri, n. subsp. Fig. 28.

Body stout and toad-like with thick limbs. Tongue oval, slightly nicked behind. Vomerine teeth in two arched, well separated series behind the choanae. Head large; snout rounded, more than one and a half times the diameter of the eye; rostral edge fairly distinct; loreal region oblique; nostril nearer the tip of the nose than the eye; interorbital space narrower than the upper eyelid; tympanum very distinct, about three fourths the diameter of the eye; lower jaw terminally with a stout knob. Fingers and toes pointed; subarticular tubercles large but only moderately projecting; first finger longer than second; toes long with a rudimentary dermal seam; a fairly stout, oval medial metatarsal tubercle and a slight, rounded lateral one; tarsal fold fine. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches far beyond the eye. Upper surface fairly smooth; tympanum surmounted by a stout curved fold from the eye towards the base of the forelimb; from the upper eyelid towards sacral region a fine dorso-lateral fold; flanks with a longitudinal fold or flat swellings; belly fairly smooth without distinct discoidal fold; throat slightly granulated, thighs beneath areolate-warty, the former strongly puckered. Above whitish grey with black-edged, partly defective, dark cross bands (five from the eyes to sacral region); iris dark yellow; sides of

upper jaw and neck whitish; at the edge of the jaw four broad black triangles, the first one continuing as a narrow band through nostril, eye, and on the tympanic fold, and the third forming a transversal band to the eye; flanks dark with light spots; limbs above with dark, broad, partly defective cross bars (3-4 on each joint); hinder side of thighs dark, conspicuously spotted with red; beneath dully grey, throat slate-grey; edge of the jaw darkish with narrow, curved, whitish bands; limbs beneath, especially on the forearms and thighs, light. Larger specimen more darkish brown with an indistinct whitish ground, beneath somewhat brownish with small light spots, also appearing on the limbs. A strong conical tubercle on the inner side of the first finger and, in the larger specimen, another, threeor four-cusped transversal one, on each side of the chest; the spinelike protuberances blackish. Length 120 and 160 mm.

2 males, Roque, Perú, May 1925. The smaller specimen taken by a native, the larger by my fellow-traveller Mr. H. DENGLER of Dresden, after whom the the has got its name.

From many other valueties of this very heterogeneous species this type differs inter alia by its, at least partly, whitish grey tint, characteristic design of the upper jaw, and its long hind limbs. From the type described by LUTZ (1926, Pl. 30, Figs. 1, 2) and MÜLLER and HELLMICH (1936, p. 47, Fig. 16), which has a pointedly oval snout, it differs by its broadly oval one and the design of its upper jaw, the triangular bands of which are as large as the white ground and not, as pointed out by LUTZ (1926, p. 163) for the type in question, »very much larger than the light ones between them ». The above type has a certain resemblance also with *L. macroblepharus* MIR.-RIB. from Manáos but differs from it inter alia by its considerably smaller eyes.

Leptodactylus vilarsi, n. sp. Fig. 29.

Body somewhat thickset with short hind limbs. Tongue oval, somewhat nicked behind (somewhat heart-shaped). Vomerine teeth in two slightly arched, somewhat separated series behind the moderate choanae. Head large; snout oval, somewhat longer than the diameter of the eye, with truncate tip; rostral edge indistinct; loreal region slightly concave; nostril near the tip of the nose but not as far from the eye as the diameter of the latter; eyes large, prominent; interorbital space about as broad as the upper eyelid; tympanum distinct, rounded, with a dorsal dermal lobe, about half the



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Fig. 28. - Leptodactylus pentadactylus dengleri, n. subsp., lateral view of head (a) and vomerine teeth (b), nat. size. Fig. 29. - L. vilarsi, n. sp., dorsal (a) and lateral (b) views of head, and vomerine teeth (c), nat. size.

diameter of the eye; lower jaw terminally with a strong tooth-like knob. Fingers and toes pointed; subarticular tubercles simple, well developed; first finger much longer than second; toes fairly long, slender, with rudimentary web, not fringed; a long, stout medial metatarsal tubercle and a round, small lateral one; a distinct tarsal fold. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the tympanum; tibiae longer than the thighs. Upper surface slightly rough; tympanum surmounted by a stout fold from the eye to the base of the forelimb; from the middle of this fold another fine dorso-lateral one along the flanks; latter somewhat irregularly areolate-warty, dorsally with round swellings; from the groin a tongue-like swelling, pointing forwards; lower surface smooth without distinct discoidal fold; thighs beneath areolatewarty; small pustules on the hinder part of the back, upper side of

the thighs, exterior side of the tibiae (especially distally), and on the exterior and lower sides of the tarsi and feet. Above greyish brown with small, sparse, black and diffuse spots, especially on the hinder part of the back; a narrow, short, dark band at the rostral edge; tympanic folds and dorso-lateral folds on the back more or less black-edged; side of the upper jaw with dark diffuse spots, forming a narrow transversal band at the front of the eye; flanks light with dark mottle or spots (the round swellings blackish); upper side of the limbs with traces of narrow dark cross bars (thighs with four, tibiae with three, and forearm and feet each with two); anterior side of the thighs marbled with light spots, their posterior side, according to the label, the rusty yellow spots; interior side of the tibiae with light spots hands and feet beneath slate-grey; lower surface brownish grey with the round spots; edge of the jaw light. Length 102 mn.

1 specimen, Taracuá, Rio Uaupés, Brazil, 30.5.1924.

The above type, which has been named after my late friend and fellow-traveller Mr. A. VILARS, somewhat resembles the Peruvian species L. rhodonotus (GTHR.) and rubido (COPE), which are, however, smaller and without the characteristic glandular swellings of the sides and groins and the yellow colouring of the thighs. It seems more related to L. macroblepharus MIR -RIB. and »gigas», pictured by LUTZ (1926, Pl. 30, Figs. 3, 4), which have the colouring in question. The former has, however, fringed toes and longer hind limbs, and gigas, the characteristics of which (with the exception of colour) are not described by LUTZ, seems to have smaller eyes and larger spots on the back than vilarsi.

Leptodactylus romani, n. sp. Fig. 30.

Body fairly slender with a large head. Tongue broadly oval, angularly nicked behind. Vomerine teeth in two slightly arched, somewhat separated series behind the fairly small choanae. Head pointedly oval with rounded tip of the snout; latter one and a half times the diameter of the eye; rostral edge indistinct; loreal region concave; nostril much nearer the tip of the nose than the eye; eyes slightly prominent, seen from above far from reaching the lateral margins of the head; interorbital space somewhat broader than the upper eyelid; tympanum distinct, longitudinally slightly oval, sometimes more than two thirds the diameter of the eye, and nearly half its size from the latter; lower jaw terminally with a large knob. Fingers

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and toes terminally slightly swollen; first finger somewhat longer than second; toes long and slender (especially the fourth) with basal web and well developed dermal seams; subarticular tubercles well developed but not very prominent; a slight, oblong medial metatarsal tubercle and a rudimentary, rounded lateral one; tarsal fold small but distinct. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye; tibiae somewhat longe, than the thighs. Upper surface fairly smooth; tympanum surmounted by an angularly bent fold, reaching from the eye to the base of the forelimb; a finely pricked dorso-lateral band from near the eve along the flanks; a similar pricking appearing as spots along the vertebral line; flanks and thighs beneath coarsely granulated; belly without distinct discoidal fold; throat with a transversal fold; exterior sides of forelimbs, tibiae, and tarsi finely pricked; tarsi beneath with minute pustules. Upper surface greyish brown with blackish spots and bands: spots along the rostral edge, continuing along the tympanic fold as a band; a sometimes V-shaped band between the eyes and two dorso-lateral bands along the body, medially edged with a light band; iris, according to the label, golden; sides of upper jaw whitish with traces of dark transversal bands or reticular design; from lower side of the eye a black band through the tympanum, often blending with the supratympanic band; tympanum brownish; the (at least in alcohol) white ground forming a marked stripe from below the eye towards the base of the forelimb; flanks greyish with a violet tint and black spots, largest in the groins and partly on a white ground; limbs above with traces of dark irregular cross bars, forming in the tibiae black spots at the edges; thighs in front with dark spots, behind marbled or with dark spots on a light ground; beneath whitish with indistinct dark spots or reticulate design; edges of the jaw whitish with traces of dark bands or spots; hands and feet above light, beneath dark with indistinct narrow cross bars.

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Some smaller specimens from the same locality have a fairly small tympanum (two thirds the diameter of the eye); in one of them the vomerine teeth are placed fairly far behind the choanae, and the largest specimen, a male, has two small blackish, well separated, tooth-like protuberances on the medial side of the swollen base of the first finger. One specimen, according to the label, above greyish green; spots diffuse, dorso-lateral bands dissolved into spots; edges of the jaws appearing more white-spotted, and behind the tympanum (also according to the label) an orange-coloured spot,

probably forming the hinder part of the above-mentioned white stripe under the eye and tympanum; lower surface in one specimen, according to the label, yellowish white, in all specimens more or less distinctly mottled with grey; thighs beneath with distinct reticulate design.

Length 35, 36, 39, 45, and 60 mm.

5 specimens, Taracuá, Rio Uaupés, Brazil, March and April (largest specimen 14.4; the two next largest 1 and 3.3,) 1924. The two largest specimens were found on a shelf of rock by the river, the smallest one by a brook in the forest. Two of the specimens had remains of insects in their stomachs.

This species, which has been named after my fellow-traveller Dr. A. ROMAN of Stockholm, is related to L. mustaceus (SPIX). mystacinus (BURM.), typhonius (DAUD.), rhodomystax BLGR., and kreffti WERN. From the first three, which have no distinct dermal seams of the toes, it differs inter alia by its very distinct ones. Besides, it is in the male provided with two digital protuberances, which are said to be wanting in the three mentioned species. From *rhodomystax*, which, according to BOULENGER (1883, p. 637), has the tongue slightly nicked behind, the snout »as long as the diameter of the orbit», short hind limbs (the tibio-tarsal articulation only reaching the shoulder), a privaceous brown » colour above, and »a band round the upper lip pinkish white», it is distinguished by its acutely nicked tongue, its longer snout, longer hind limbs, grevish brown or green colour, and the light stripe on its upper jaw which does not continue in front of the eve. In his description of the same species from Pará, Müller (1923, p. 52) the nostril is »gleichweit vom Auge, wie von der Schnaustate zenspitze entfernt» and that the tips of the toes are distended to »kleinen, aber deutlichen Haftscheiben». Now, as rhodomystax has its nostril »nearer the tip of the snout than the eve» and lacks true disks of the digits, which are only slightly swollen, we may doubt whether MÜLLER really had specimens of this species at his disposal. From the Chilean species L. kreffti, which also has a whitish maxillary stripe at the angle of the mouth, romani differs by its non-warty limbs and considerably larger size.

Leptodactylus caliginosus GIRARD. Fig. 31.

Body thickset. Tongue broadly oval, acutely nicked behind. Vomerine teeth in two fairly straight, somewhat separated series

behind the small choanae. Snout pointedly oval, somewhat longer than the diameter of the eve, with projecting tip; rostral edge indistinct; loreal region slightly concave; nostril nearer the tip of the nose than the eye; eyes prominent; interorbital space somewhat broader than the upper eyelid; tympanum somewhat indistinct, more than half the diameter of the eye; lower jaw terminally with a small spine-like knob. Fingers and toes terminally somewhat swollen; subarticular tubercles stout; first finger as long as, or somewhat longer than, second; toes long, slender, webbed at the base and distinctly fringed (dermal seam bent downwards); an oblong, well developed medial metatarsal tubercle and a smaller, rounded lateral one; tarsal fold fine but distinct. The hind limb being carried forward along the body, the tibio-tarsal articulation in one specimen reaches beyond the tympanum, in the others far beyond the eye; tibiae somewhat longer than the thighs (heels crossing). Upper surface (including the limbs) with numerous minute pustules; a slight fold above the tympanum from the eye towards the base of the forelimb; from near the upper eyelid a short narrow dorsolateral fold along the shoulder, possibly continuing into small swellings; flanks with a posterior dorsal fold and small oblong swellings; lower surface smooth with a distinct discoidal fold; throat sometimes with a transversal fold; thighs beneath slightly but coarsely granulated. Above greyish brown with a whitish tint and dull dark spots; a black-edged, defective, somewhat Y-shaped, dark medial band from the eyes to the shoulders or further; in front of this a light band between the eyes; two narrow, light, dark-edged dorsolateral bands and dull spots on the back; pustules and swellings often light with brownish edges or spots; iris, according to the label, with golden mottle; supratympanic fold dark-edged; tympanum greyish brown; sides of upper jaw silver-grey with blackish diffuse transversal bands (two at the tip of the nose), partly continuing to the lower jaw and here surrounding white spots; a silver-grey oblique band under the tympanum from the forelimb to the hinder part of the eye; flanks greyish with dark spots; limbs above with irregular brownish cross bars; hinder part of the thighs light with dark marble; feet above whitish, beneath brownish; lower surfaces whitish with brownish mottle on the head and chest. One specimen with indistinct designs above. Two other specimens almost entirely slate-grey above with a sharp boundary to the white beneath; a grevish mottle or marble beneath on the head and possibly

also on the anterior part of the chest. One of the latter specimens with a band-like pricking along the body, the other one with two black spine-bearing tubercles on the inner side of the first digit. Length 44, 48, 53, and 55 mm.

4 specimens, Roque, Perú, July (two specimens 21.7.) 1925.

The above type, which, according to the notes of my fellow-worker Mr. H. DENGLER of Dresden, was called hold pagazapidyu» and piko-piko» by the natives, seems to belong to the large group formed by *L. caliginosus* GIRARD and *brevipes* COPE. As this heterogeneous group, distributed from Mexico to Argentina, is not systematically cleared up (cf. for instance NIEDEN, 1923, p. 492, note), and both MIRANDA-RIBEIRO (1926, p. 149) and LUTZ (1926, p. 170) suspect that the two species are identical, I assign the type in question to *caliginosus*, though it differs somewhat from this by the numerous minute pustules on its back, glandular swellings on its flanks, and its often silvery ground-colour. From *brevipes*, which has a slightly nicked tongue, it differs by its acutely nicked such organ. The above type also somewhat resembles *L. romani* MELIN, from which, however, it differs by its short snout, smaller tympanum, pimply skin, and the oblique silvery band under the tympanum.

Leptodactylus rugosus, n. sp. Fig. 32.

Body somewhat thickset. Tongue oval (somewhat rhombic), acutely nicked. Vomerine teeth in two slightly arched, somewhat separated, and backwards slightly angular series behind the small choanae. Snout oval, about as long as the diameter of the eye, with rounded, somewhat projecting tip; rostral edge indistinct; loreal region concave; nostril near the tip of the nose; interorbital space broader than the upper eyelid; tympanum distinct, rounded, about half the diameter of the eye, and hardly half its own diameter from the eye; lower jaw terminally with a small tooth-like knob. Fingers and toes terminally somewhat dilated; subarticular tubercles well developed; first finger not reaching the tip of second; toes fairly slender and free, not fringed; two metatarsal tubercles, lateral one very small; tarsal fold indistinct. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the eye; tibiae considerably longer than the thighs. Upper surface slightly warty; a couple of vertebral and dorso-lateral folds on the back, the latter starting from near the tympani and along the flanks edged by an irregular swollen band; thighs above puckered, beneath

with flat granules; tibiae distally, and tarsi and feet beneath, with small pustules; body beneath smooth with an indistinct discoidal fold. Above greyish brown with fine dark dots and with very indistinct brownish designs: bands between the eyes, along the rostral edges and dorso-lateral folds, mottle and spots on the back; an indistinct, light, narrow vertebral line; tympanum brownish, its fold dark-edged; sides of the upper jaw with traces of transversel bands; flanks and lower surface whitish with a fine blackish dotting, especially on the limbs and along the edge of the jaw; limbs above with traces of irregular cross bars; hinder side of thighs greyish; feet beneath dark with translucent blackish tendons. Length 26 mm.

1 specimen, vicinity of Manáos, Brazil, 15.11.1923.

The above type has certain resemblances both to L. hylaedactylus (COPE) and diptyx BOETTG. From the former it differs, however, by a smaller tympanum, the lack of true disks of the digits, and the greyish hinder side of the thigh, which is dark brown in hylaedactylus. Diptyx has the vomerine teeth in round groups and a longer snout. According to PARKER (1935, p. 508) the latter species is identical with L. nanus LOR. MÜLL. (1922, p. 168; LUTZ, 1926, Pl. 32, Figs. 10, 11). On account of the different nature of the groups of vomerine teeth and the skin in the mentioned species, this is, however, hardly probable.

Leptodactylus poeppigi, n. sp. Fig. 33.

Body fairly thickset with short hind limbs. Tongue oval, indistinctly nicked. Vomerine teeth in two fairly straight, somewhat separated and backwards slightly angular series behind the small rounded choanae. Snout roundly oval, somewhat long r than the diameter of the eve, with blunt, somewhat projecting tip; rostral edge indistinct; loreal region slightly concave; nostril somewhat nearcr the tip of the nose than the eye; eyes, seen from above, just reaching the lateral margins of the head; interorbital space somewhat broader than the upper evelid; tympanum somewhat indistinct, rounded, a little more than half the diameter of the eye. Fingers and toes terminally roundly distended; subarticular tubercles prominent; first finger shorter than second; toes free, not fringed; an oblong, tooth-like medial metatarsal tubercle and a small, rounded lateral one; tarsal fold indistinct. The hind limb being carried forward along the body, the tibio-tarsal articulation only reaches as far as the shoulder (far behind the tympanum). Upper surface of

the body, especially in the hinder part, with flat granules; some flat swellings on the lateral part of the back; a slight supratympanic fold from the eye to the base of the forelimb; flanks and thighs beneath (in their hinder part) with flat granules; distal part of the tibiae (above), tarsi, and feet beneath with rows of minute pustules; lower surface smooth with a partly prominent, discoidal fold. Above greyish white with reddish or blackish brown spots: a' dorso-lateral row of large irregular distinct ones from the eyes along the body, diffuse spots along the vertebral line (latter one from the shoulders marked by a narrow white medial line), and numerous smaller spots; tympanic fold blackish; large blackish brown spots on a light ground along the edge of upper jaw, partly merging into each other; flanks whitish with a fine reticulate dark mottle and a row of blackish spots, bounded by light colour above; limbs with traces of dark broad cross bars; hinder side of the thighs dark-mottled with small indistinct light spots; feet, as in L. diptyx and rugosus, with translucent, blackish tendons; beneath light with a fine reddish brown mottle, especially along the edge of the jaw, the flanks, and edges of the thighs. Length 27 mm.

1 specimen, Roque, Perú, 28.6.1925.

The above type, taken in a cultivation of bananas under a fallen plant, in habit and design fairly much resembles L. pygmaeus (SPIX), described by MIRANDA-RIBEIRO (1926, p. 151, Pl. 19, Fig. 2), but has its first finger not longer but shorter than second and broader cross bars on the limbs. According to MIRANDA-RIBEIRO the species in question (cf. also ibid, p. 220) is also identical with L. mystacinus (BURM.). The identifications may, perhaps, be open to discussion. The pygmaea of SPIX (cf. NIEDEN, 1923, p. 490) is indeed usually considered to be identical with L. ocellatus (L), and mystacinus (BURM.) has according to LUTZ (1926, p. 167, Pl. 32, Figs. 8, 9) and V. MÉHELY (1904) another appearance.

The species has been named after the well known explorer E. POEPPIG.

Dendrobatidae.

This firmisternal family, including the genera Hyloxalus, Phyllobates, and Dendrobates, seems to be fairly little arranged. Besides, by the nature of the shoulder girdle the mentioned genera, all lacking vomerine teeth and provided with T-shaped terminal phalanges and a couple of dermal scutes on the disks, are usually distinguished

by the fact that Hyloxalus, in contradistinction to the others, has a more or less large web of the toes, and that Dendrobates, in contradistinction to Hyloxalus and Phyllobates which are provided with maxillary teeth, has no teeth at all. Their close relationship is expressed by NOBLE (1931, p. 507) in the following way: »Phyllobates is merely a Hyloxalus without webs between the toes. Dendrobates is a Phyllobates without maxillary teeth.» As far as I can see a classification of species according to at least the latter characteristic is not wholly advisable. Thus, among Phyllobates (cf. BARBOUR and NOBLE, 1920, p. 401), we find several types (belonging to the old genus Prostherapis COPE etc.) which are wholly Dendrobates-like. BOULENGER (1882 b, p. 140) writes about this: »Between Prostherapis and Dendrobates the analogy is so great in every respect, anatomical as well as external, that, were it not for the presence of maxillary teeth in the former, both genera might be united.» And sometimes Dendrobates-like frogs with rudimentary teeth or tooth-like asperities are found, which does not facilitate classification. It may here be added that the resemblance is very great also between Hyloxalus and the Elosiid genus Crossodactylus, which is not only provided with maxillary teeth and dermal scutes of the disks, but often also lacks vomerine teeth. According to NOBLE (1931, p. 507) the latter genus also »shows a reduction in width of the coracoid cartilages, the first step in the development of the firmisternous girdle...».

Phyllobates peruvianus, n. sp. Fig. 34.

Body somewhat thickset. Tongue somewhat subcylindrical, acutely nicked, free. Small maxillary teeth but no vomerine ones. Head fairly large; snout about as long as the diameter of the eye, with rounded (possibly truncate), somewhat projecting tip, and vertical, slightly concave sides; rostral edge rounded, somewhat incurved; nostril much nearer the tip of the nose than the eye; eyes strongly prominent, seen from above projecting far beyond the lateral margins of the head; interorbital space broader than the upper eyelid; tympanum partly indistinct (most distinct in front), about one third the diameter of the eye; upper jaw terminally acutely notched, lower one broadly incised with a medial knob. Disks of fingers and toes fairly small, (smallest in the fingers), somewhat transversal, in front truncate and sometimes notched, with two rounded dermal scutes above; subarticular tubercles fairly small

but prominent; first finger about as long as second; toes fairly long. webbed at the base; a small, oblong medial metatarsal tubercle and an indistinct, rounded lateral one; a small knob at the interior edge of the tarsus. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches beyond the eye, and the tarsometatarsal one far beyond the tip of the nose. Skin fairly smooth. Above, according to the label, »greenish yellow to brown, above the eve reddish»; in alcohol, a wedge-shaped blackish medial band on the back beginning at the eves; another dark band from the nostril through the eve and above the tympanum towards the base of the forelimb, medially edged by a light band, continuing towards the base of the hind limb; sides of upper jaw transversely banded; flanks blackish with light spots; limbs with diffuse cross bars; hinder part of the thighs blackish with light marble and dots; feet above light; body beneath whitish with a fine blackish mottle or dotting; hinder part of the belly and thighs beneath whitish. Length 21 mm.

Larva (Fig. 34 c): Body oval, slightly convex above. Head with rounded snout, flat beneath; nostrils broadly separated, directed forwards and outwards, about equally distant from the tip of the nose and the eves; eves somewhat more separated than the nostrils, directed upwards; opening of the mouth not especially broad, subterminal; lower lip and a short lateral part of the upper lip with a terminal fold covered with papillae, sometimes in two rows; ridges of teeth 2/3, long and narrow, the row nearest the upper jaw interrupted in the middle; jaws with fine spine-like protuberances; upper jaw angularly notched medially, covering the strongly angular lower jaw; spiracle on the left side of the body; tail compressed, one and a half times as long as head and body together, and three and one third times as long as high, with about equally broad fins; the dorsal fin continuing slightly on the body; anus nearly medial, directed to the right. Colour more or less vitreous, above with blackish brown design on the head and medial part of the body; rest of the body transparent with translucent, long, twisted intestine; head beneath with slight dark marble; rows of teeth and jaws blackish brown; tail irregularly mottled with blackish brown reticulation or diffuse cross bars; the mottle continuing on the dorsal fin, but sometimes leaving the ventral one nearly free. Length 14-17 mm.

1 specimen with four larvae, adherent to the back, Roque, Perú, 1925.

This type may, perhaps, be related to P. trilineatus BLGE.



which has, however, the nostril almost equally distant from the tip of the nose and from the eye, first finger longer than second, shorter hind limbs, and a somewhat different colouring.

Phyllobates ? marchesianus, n. sp. Fig. 35.

Body fairly slender, lizard-like, with a slightly defined head. Tongue oval, fairly entire, free in the hinder part. Small maxillary teeth but no vomerine ones; choanae small, near the tip of the nose. Shoulder-girdle ranid-like (Fig. 35 e). Head fairly narrow, depressed, with vertical sides: shout about as long as the diameter of the eve with prominent, roundly truncate tip; rostral edge rounded; nostril near the tip of the nose, a little nearer the eye than the diameter of the latter; eves not very prominent, with slightly marked upper lid: interorbital space much broader than the upper eyelid; tympanum indistinct, in front with a slight pucker, about one third the diameter of the eye; lower jaw broadly notched with a small medial knob. Fingers free, toes webbed at the base and provided with slight dermal seams; disks and subarticular tubercles well developed. the former largest in the toes, somewhat transversely elliptical. with two rounded, anteriorly well separated, dermal scutes above; first finger longer than second, fourth very short, somewhat connected with third one; toes slender, fourth one very long; metatarsal tubercles well developed, behind the common ones probably a slight third tubercle and, behind this, an oblique, ridge-like tarsal tubercle (Fig. 35 d); tarsus with several small longitudinal dermal ridges. The hind limb being carried forward along the body, the tibiotarsal articulation reaches the front of the eye. Upper surface with indistinct warts; sides coarsely granulated in the middle; thighs and tibiae with several longitudinal dermal folds; feet beneath with small longitudinal pleats; lower surface fairly smooth. Above brownish with indistinct black spots; a blackish brown dorso-lateral band round the tip of the nose, through the eyes, and along the sides of the body, broadest behind and from in front of the eves edged above by a light band; upper evelids dark; sides of head and body under the longitudinal band whitish with brownish dotting or mottle; forearms and tibiae with traces of dark cross bars; hinder part of thighs and tibiae (proximally), and forearms, hands, tand and feet beneath, dark brown; thighs at the base with large light spots; lower surfaces of other parts greyish, on the thighs somewhat mottled with brown. Length 16-17 mm.

2 specimens, Taracuá, Rio Uaupés, Brazil, 28.2, 25.3.1924. This type, taken partly at our camp and partly on the ground in the forest, seems to resemble *P. latinasus* (COPE) and related species in colour. On account of its lizard-like appearance, broad tongue, distinctly webbed toes, and three metatarsal tubercles it does not seem, however, to be a true *Phyllobates*. *Hyloxalus* has, however, a heart-shaped tongue, and the *Elosiidae*, which are also provided with digital scutes, have another type of shoulder-girdle. I have taken the liberty of naming the species after our kind host, the Salesian missionary padre J. MARCHESI, at that time living at Taracuá.

Dendrobates bassleri, n. sp. Fig. 36.

Body fairly slender with long hind limbs. Tongue subcylindrical, irregularly nicked, very free. Upper jaw with tooth-like asperities, and no vomerine teeth. Head fairly large, depressed but not well defined; snout with vertical sides, about as long as the diameter of the eye; tip broadly rounded, somewhat projecting; rostral edge rounded, somewhat S-shaped; loreal region concave; nostril much nearer the tip of the nose than the eye; eyes not very prominent, but seen from above somewhat projecting beyond the lateral margins of the head; interorbital space broader than the upper eyelid; latter slightly marked; tympanum indistinct, somewhat visible only in front; lower jaw terminally incised with a small medial knob. Fingers and toes with fairly small disks (largest on the former), provided with a couple of slightly defined dermal scutes above; subarticular and carpal tubercles of the hands strongly developed; first finger somewhat longer than second; toes long and slender (especially the fourth) with basal web and small but prominent subarticular tubercles; two rounded, fairly slight metatarsal tubercles. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the front of the eye. Skin above coarsely granulated; flanks prickled; limbs, especially the thighs and tibiae, furrowed; lower surface fairly smooth. Colour almost entirely black with light green designs: medial row of large dots from the eye; dorso-lateral bands round the tip of the nose, above the eyes, and along the body, and possibly also some transversal spots on the upper side of the thighs; iris black; in alcohol, a light band under the eye, light spots on the base of the upper jaw towards the base of the forelimb, edge of lower jaw light, thighs behind partly light-

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mottled, one tarsus proximally with a light spot beneath, fingers and tubercles of the hands partly light. Length 37 mm.

1 specimen, Roque, Perú, 1925.

The above type may be related to *Prostherapis inguinalis* COFE and *Dendrobates trivittatus* (SPIX). The latter species has, however, a longer snout, and both usually have a different colouring. Whether the black specimens from Pará, described by NATTERER (STEINDACH-NER, 1864, p. 259, *D. nigerrimus*) and having a similar green colouring as the above species, are also provided with tooth-like asperities on the upper jaw, is unfortunately not evident from any description. I have taken the liberty of naming this beautiful species after Dr. H. BASSLER of Boston, U. S. A., who during several decades has greatly contributed to the scientific exploration of the Peruvian East.

Dendrobates tinctorius igneus, n. subsp. Fig. 37.

Body thickset with short hind limbs. Tongue subcylindrical, entire, very free. No teeth. Head not well defined, with vertical skles; snout broadly rounded, about as long as the diameter of the eye, with slightly projecting tip; rostral edge indistinct; loreal region hardly concave; nostril nearer the tip of the nose than the eye; eyes prominent; interorbital space somewhat broader than the upper eyelid; tympanum only visible in front; lower jaw terminally with a small knob. Fingers and toes free, with well developed, transversal, truncate disks; latter with a couple of rounded dermal scutes above; subarticular tubercles prominent on the fingers, on the toes slightly developed; first finger shorter than second; carpal tubercle strong; toes indistinctly webbed; first toe very short; two slight metatarsal tubercles, the medial one longest; an oblique ridge-like tubercle at the interior side of the tarsus. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches to about the base of the forelimb and the tarso-metatarsal one to the tip of the nose. Skin to a great extent slightly warty. Above highly orange-coloured with longitudinal, partly interrupted black bands: two medial ones from in front of the eyes, intermated on the shoulders, and one dorsal one on the flanks; the latter, limbs, and lower surface with reticulate light blue design, including numerous rounded black spots; fingers partly whitish; hands and feet dark beneath, disks ventrally and tubercles light. Length 16 mm.

2 specimens, Rio Itaya (near Iquitos), Perú, 19. and 20.1.1925.

This beautiful type, which was a little shy, occurred in thin forest among dry leaves on the ground where, thanks to its bright colours, it was very conspicuous. It is closely related to D. tinctorius (SCHN.) and reticulatus BLGR. which have, however, a smooth skin. Besides, both the latter species have a longer snout (longer than the diameter of the eye) and a more or less different colouring. Possibly, however, the type in question is a variety of *tinctorius*.

Engystomatidae.

Like MIRANDA-RIBEIRO (1926) I here retain this known familyname, founded on the American genus *Engystoma*. The name *Microhyla* will be reserved for species from the Old World.

Engystoma microps DUM. & BIBR. Fig. 38.

Body somewhat pear-shaped (cylindrical with pointed head) with short, chubby limbs. Tongue large and thick, fairly adherent. No teeth. Head small; snout conically pointed, about four times as long as the diameter of the eye with rounded, strongly projecting tip; pupil probably round; tympanum indistinct, rounded, less than half the diameter of the eye; lower jaw terminally incised with a small medial knob. Fingers and toes free, the former slightly distended terminally, the latter with small disks; subarticular tubercles hardly defined; first finger shortest, third longest; first toe very short, fourth long; a rudimentary medial metatarsal tubercle. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the shoulder. Skin entirely smooth; transversal fold of the chest distinct. Above brownish with fine white dots; a narrow white line, partly changing into spots, from the tip of the snout to the neck through the upper part of the eye; beneath whitish with a fine light brown mottle on the throat and limbs. Length 18 and 24 mm., thighs 8 and 9 mm. respectively.

2 specimens, Taracuá, Rio Uaupés, Brazil,? March and 1.4.1924. One of them was taken by Dr. A. ROMAN in a nest of termites, the other was dug up in the forest from a spot in the ground covered with dry leaves, from which a creaking sound was heard.

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