

Article IX.—TWO NEW BATRACHIANS FROM COLOMBIA

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In an earlier paper¹ I have indicated that a number of valuable collections of reptiles and amphibians from South America have been acquired in recent years by The American Museum of Natural History. The collection of amphibians from near Mesopotamia, Department of Antioquia, Colombia, presented to the American Museum by Mr. R. D. O. Johnson contains two new species of batrachians in addition to those species discussed in the earlier paper. I have selected one of these species as the type of a new genus, very distinct from *Hylella* with which it has hitherto been confused. *Hylella* has for a long time been recognized as an assemblage of unrelated species of specialized *Hylas*. But it is obvious from the following that all the species of *Hylella* cannot be indiscriminately referred to *Hyla*.

Centrolenella, new genus (Leptodactylidæ)

DESCRIPTION.—Closely related to *Centrolene*, from which it differs in the absence of vomerine teeth and humeral spines; no omosternum; sternum narrow, cartilaginous; sacral diapophyses moderately dilated; fingers and toes webbed; outer metatarsals united; tips of the digits dilated into adhesive disks which are truncate or sub-truncate distally; pupil horizontal; tympanum exposed; tongue slightly notched, scarcely free behind.

TYPE.—*Centrolenella antioquiensis*, new species.

REMARKS.—*Centrolenella* bears nearly the same relations to *Centrolene* that *Hylella* does to *Hyla*. Still, it is more than a *Centrolene* which has lost the vomerine teeth. The Johnson collection contains a large female *Centrolene geckoideum* (A. M. N. H. No. 1383) from Santa Rita Creek. This specimen is 57 mm. in length, and has its ovaries well developed. It possesses the large humeral spines hitherto considered characteristic of the male. It, therefore, seems highly improbable that these humeral spines have any copulatory significance. From their position and form it seems more probable that they have some scansorial function, perhaps enabling the frog to retain its hold on a tree. *Centrolenella* lacks these humeral spines in the adults of both sexes.

¹Noble, 1917, Bull. Amer. Mus. Nat. Hist., XXXVII, pp. 793-814, Pls. xciii-xcvi. Through error one of the captions on p. 796 was repeated. The caption for drawing A of figure 1 should read *Eleutherodactylus martinicensis* in place of *Leptodactylus lineatus*. Typographical errors occur in the spelling of *Leptodactylus melanonotus* on pages 795 and 796, of *Hylodes anomalus* on page 806, and of *Leptodactylus mystaceus* on page 812.

Hyla prosoblepon, described by Boettger (1892, Kat. Batr. Senck. Mus., p. 45) from Costa Rica, possesses so many external features in common with *Centrolene* that one is inclined to refer it to that genus. Still, the humeral spine of *H. prosoblepon* was described as peculiar to the male only, and the vomerine teeth may or may not be present as in many species of *Hyla*. Without an examination of its internal structure, the true relationships of *H. prosoblepon* cannot be determined with any degree of certainty.

It seems very probable that *Centrolenella* will be shown to embrace a number of species usually referred to *Hylella*. *C. antioquiensis*, as stated below, stands intermediate between *H. ocellata* and *H. parambae*. It seems probable that both these species will be shown referable to *Centrolenella*. I have examined a specimen (M. C. Z. No. 2526) of *Hylella buckleyi* in the Museum of Comparative Zoology collected by Rosenberg in Ecuador and probably identified by Boulenger as that species. It agrees entirely with his original description and figure (Boulenger, 1882, Cat. Batr. Sal. Brit. Mus., p. 420, Pl. xxv, fig. 5). This specimen was found on dissection to be a *Centrolenella*. *H. buckleyi* must be referred to that genus.

The question immediately arises whether the type species of *Hylella* possesses the T-shaped terminal phalanges and other features characterizing *Centrolenella*. If so, the name *Hylella* would have priority, but it would have to be restricted to a limited group of species. No specimens of *H. tenera*, the type species, are available for study but every indication points toward the conclusion that it is a *Hyla* which has failed to develop the vomerine teeth, as in the case of many other species of *Hyla*. The vertical loreal region, the distinct canthus rostralis, the type of color pattern, —all suggest the relationship of *H. tenera* to the genus *Hyla*.

An equally important argument, perhaps, is the fact that *Centrolenella antioquiensis* and *C. buckleyi*, as well as their apparently closest allies, are confined to the northern Andes just as is *Centrolene* from which this group of species seems to have evolved. *H. tenera* is a Brazilian species probably most closely related to certain Brazilian species of *Hylella* or *Hyla*. It seems extremely unlikely that *H. tenera* is a *Centrolenella*.

The relationship of *Centrolenella* to *Centrolene* is obvious, but the relationship of these two genera to any other is obscure. *Centrolene* was placed in the Leptodactylidæ by Boulenger (1882) but it has its sacral diapophyses expanded as much as the majority of hylids. If we search for the relationships of *Centrolene* among the Leptodactylidæ, we

find that it differs radically from all neotropical leptodactylids in lacking an omosternum and in possessing moderately expanded sacral diapophyses. The mere tabulation of its characters in general use in classification would show that it has most in common with the South African *Heleophryne*. But it differs from that genus in possessing an intercalary bone (or partly ossified cartilage) between the two terminal phalanges, in having its outer metatarsals bound together, and in exhibiting a narrow sternum, horizontal pupil, and webbed fingers. The several Australian-New Guinean genera of leptodactylids lacking the omosternum and possessing moderately dilated sacral diapophyses have little more in common with *Centrolene* than has *Heleophryne*. *Centrolene* seems to be an aberrant genus not closely allied to any of the known leptodactylids but possessing, perhaps through convergence, more features of certain Australian—South African genera than any neotropical.

So far as the characters used at the present time in batrachian classification would indicate, *Centrolene* and *Centrolenella* cannot be properly assigned to any of the existing families. They stand midway between the Leptodactylidæ and Hylidæ. In the paper mentioned above I have discussed in some detail the relationships of *Hyloscirtus*, a leptodactylid with claw-shaped terminal phalanges. If we should again attribute primary importance to the form of the sacral diapophyses, we might consider *Centrolene* and *Centrolenella* as hylids with T-shaped terminal phalanges. It is then obvious that all distinction between the Hylidæ and Leptodactylidæ breaks down.

There is some doubt as to how much emphasis should be laid on the form of the sacral diapophyses. Fry (1915, Proc. Queensland Roy. Soc., XXVII, p. 75, figs. 2a-2c) has shown that the distinction between the pelobatid *Lechriodus* and the leptodactylids *Chiroleptes* and *Heleioporus* is an artificial one, since their sacral diapophyses are nearly equally expanded. The sacral diapophyses of *Centrolene* are dilated about as much as those of *Heleioporus* (idem, fig. 2b). It seems most advisable to regard *Centrolene* and *Centrolenella* as leptodactylids which have developed expanded sacral diapophyses. These sacral diapophyses are not less expanded than those of several species of *Hyla* and several genera of hylids. The limits of the families Hylidæ and Leptodactylidæ grade into each other. Whether or not it is advisable to combine these two families is a matter of opinion, especially in view of the present unsatisfactory state of the classification of the Salientia.

Centrolenella antioquiensis, new species

DIAGNOSTIC CHARACTERS.—Canthus rostralis very rounded, the eyes directed partially forward; inner finger distinctly longer than the second, two outer fingers one-half webbed; toes nearly completely webbed; tibio-tarsal articulation extending a little beyond the snout; bluish gray above spotted with white.

DISTRIBUTION.—Known only from the type locality.

TYPE.—A. M. N. H. No. 1354 from Santa Rita Creek, fourteen miles north of village of Mesopotamia, in the southern part of the Department of Antioquia, Colombia; R. D. O. Johnson, collector.

DESCRIPTION OF TYPE.—(Adult female.) Tongue nearly circular, slightly notched behind; head about as long as broad, semicircular as seen from above; eyes directed partly forward, their greatest length equal to their distance from the end of the snout; canthus rostralis rounded off, not distinct; loreal region gradually sloping to the edge of the mouth; the two nostrils raised a little above the gradual slope of the snout; interorbital space one and a half times as wide as the width of the upper eyelid; tympanum distinct, one-third or one-fourth the greatest diameter of the eye. Fingers long, the first distinctly longer than the second, digital expansions about a fourth wider than the digits, squarely truncated, giving certain of the digital expansions a sub-triangular form; two outer fingers half webbed, the web extending to the base of the penultimate phalanx of the outer finger and to the distal third of the antepenultimate of the third finger; two inner fingers webbed only at the base; toes webbed to the digital expansions except the fourth which is webbed to the base of the penultimate phalanx; a single, inner metatarsal tubercle; subarticular tubercles small, not distinct; no tarsal fold or spur. Tibio-tarsal articulation extending a little beyond the end of the snout; tibia contained one and two-thirds times in the head and body length; upper surfaces smooth, belly and ventral surfaces of the thighs granular, no distinct fold across the chest.

Color above a bluish or purplish gray; about twenty whitish spots scattered widely over the dorsal surfaces; ventral surface including the concealed portions of the thighs a uniform yellowish white.

Dimensions

Tip of snout to vent.....	22 mm.
Width of head.....	8 “
Length of limb from axilla.....	12 “
Hind limb from vent to top of longest toe.....	38 “

NOTES ON PARATYPES.—In addition to the type we have an adult male, A. M. N. H. No. 1353, 20 mm. in length, and an immature specimen, A. M. N. H. No. 1356, 14 mm. long, both from the same locality as the type. The white dorsal spots of these two paratypes are not so numerous as in the type and the ground tone of the male is lighter. The general body proportions of all three specimens are identical.

RELATIONS.—*C. antioquiensis* appears to be intermediate between the two species described by Boulenger as *Hylella parambae* and *H. ocellata* respectively. The half-webbed outer fingers, long inner finger, and special coloration distinguishes *C. antioquiensis* from these species.

C. antioquiensis and *C. buckleyi* have the rounded snout, flat head, anteriorly directed eyes, truncate digits, and small tympanum of *Centrolene*. A number of species of *Hylella* have been described from the Andes and southern Central America with similar features. Future work will probably show that many, if not all, are referable to *Centrolenella*.

***Bufo rostratus*, new species**

DIAGNOSTIC CHARACTERS.—Crown of the head with or without projecting ridges; snout produced into a three-edged rostrum; paratoid glands triangular, not longer than the greatest diameter of the eye; tympanum hidden; fingers one-third, toes three-fourths webbed; no tarsal fold; skin tubercular above; a prominent series of large tubercles along each side of the back.

DISTRIBUTION.—Known only from the type locality.

TYPE.—A. M. N. H. No. 1359, from Santa Rita Creek, fourteen miles north of the village of Mesopotamia in the southern part of the Department of Antioquia, Colombia; R. D. O. Johnson, collector.

DESCRIPTION OF TYPE SPECIMEN.—(Adult male.) Head pointed, the snout produced into a rostrum which projects beyond the mouth for a distance equal to three-fourths the diameter of the eye; this rostrum flat above, the sides approaching each other to form a sharp ventral edge; distance from the angle of the jaw to the tip of the rostrum exactly equal to the greatest width of the head, one-third the head and body length; canthus rostralis very sharp, loreal region concave; inter-orbital space twice as wide as the width of the upper eyelid; dorsal surface of head tubercular but no cranial ridges apparent except for a short temporal crest extending from the posterior border of the eye to the paratoid gland; tympanum hidden; paratoid glands small, sub-triangular, about equal to the greatest diameter of the eye. Fingers long, webbed only a little beyond the metacarpals, but the web extending into the metacarpal region making the fingers appear about one-third webbed, the web continued along the edges of the fingers as a narrow seam; first finger about half as long as the second, in other words, extending only slightly beyond the metacarpal of the second finger; toes about three-fourths webbed, the web extending to the end of the last phalanx of the two inner toes, to the base of the last phalanx of the third and fifth toes, and to the base of the antepenultimate of the fourth toe; web continued as a seam to the tips of all the toes; two metatarsal tubercles, the inner much the larger; subarticular tubercles indistinct; no tarsal fold. Tibio-tarsal articulation extending only to the anterior end of the paratoid gland; tibia contained two and one-half times in the head and body length; skin of the back tubercular, a series of large tubercles forming a well-marked dorsolateral denticulated ridge; other large tubercles scattered over the back and dorsal surface of the appendages.

Color above yellowish brown, indistinctly marked with darker brown, forming crossbands on the legs; ventral surfaces yellowish white reticulated with dark brown.

Dimensions

Tip of snout to vent.....	41 mm.
Width of head.....	14 "
Length of fore limb from axilla.....	31 "
Hind limb from vent to tip of longest toe.....	51 "

NOTES ON PARATYPES.—Two other specimens, A. M. N. H. Nos. 1384, 1362, complete our series of the species. They come from the same locality as the type but they are apparently immature for they measure only 36 mm. and 23 mm. respectively. The larger of these two specimens differs radically from the type in having the skin of the skull involved in cranial ossification and produced in a series of ridges. The canthus rostralis is very sharp in this specimen and is continued posteriorly as a supraciliary ridge to the posterior border of the eye where it divides into two ridges, one continued posteriorly to the occipital region and the other extending outward along the posterior border of the orbit until it joins the short temporal ridge described in the type. This series of cranial ridges is very similar to that found in *B. coniferus* but here it does not form a specific nor, so far as I have been able to determine, even a sexual character. The three specimens of our series show a little variation in the distribution of the dorsal tubercles. Further, the two paratypes are redder, less yellow, than the type.

RELATIONS.—*B. rostratus* is apparently most closely related to *B. coniferus* Cope, which ranges from Nicaragua to Colombia. It agrees with that species in the formation of the cranial ridges (when present), in the short first finger, the dorsolateral series of tubercles, and small parotoid glands. It differs from *B. coniferus* in its greatly produced snout, hidden tympanum, and more extensively webbed digits. It is noteworthy that *B. rostratus* simulates several species of *Atelopus* in general form, agreeing especially well with *A. festæ* Peracca of Ecuador.

