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THE BREVICIPITID FROGS ALLIED TO THE GENUS
GASTROPHRYNE

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During recent years a number of the species which had previously been referred to the genus *Gastrophryne* (= *Engystoma*) have been made the type species of genera differing from *Gastrophryne* (type species *G. carolinense*) in the possession of clavicles or procoracoids. *Dermatonotus* was proposed for *G. muelleri* (Boettger), *Chiasmocleis* for *G. albopunctatum* (Boettger) and *Gastrophrynoides* for *G. borneense* (Boulenger). In addition, the genera *Glossostomum*, *Nectodactylus*, *Dasytops* and *Emydops*, all closely allied to *Gastrophryne*, have been proposed for various newly discovered neotropical frogs.

Examination of all the material available in the British Museum shows that these genera are probably not all tenable but that for the sake of uniformity another new genus must be proposed. The genera which appear to be valid may be distinguished in key form as follows:

I. Clavicle and procoracoid present

A. Clavicle well developed, articulating distally with the scapula

- (1). Clavicle more or less straight, leaving a wide foramen
between itself and the coracoid.....*Hypopachus*

- (2). Clavicle very much bent and closely following the curvature of the coracoid.....*Emydops*
- B. Clavicle reduced, not reaching the scapula
- (1). Clavicle moderate, articulating with the coracoid in its distal half*Chiasmocleis*
- (2). Clavicle very small, not extending laterally beyond the mesial half of the coracoid....*Elachistocleis*, gen. nov.
- II. Clavicle absent
- A. Procoracoid present*Gastrophrynoides*
- B. Procoracoid absent*Gastrophryne*

I. *Hypopachus*

PL. I, FIG. 3

Hypopachus, Keferstein, Götting. Nachr., 1867, p. 352.

Dermatonotus, Mehely, Ann. Mus. Hung. 2, 1904, p. 207.

As has already been pointed out by Miranda Ribeiro,¹ *Dermatonotus* cannot be maintained as distinct from this genus.

Type species *H. variolosus* (Cope). In addition to the type species *H. oxyrrhinus* Bouleng., *H. inguinalis* Cope and *H. muelleri* (Boettger) have been examined.

II. *Emydops*

PL. I, FIG. 2

Emydops, Mir. Ribeiro, Rev. Mus. Paulista, xii, 1920, p. 286, figs. 4-6.

No specimens of this genus have been examined, but the very distinctly bent clavicles would appear to distinguish it from *Hypopachus*, with which in other respects it is almost identical.

Type species *Emydops hypomelas* Mir. Ribeiro.

III. *Chiasmocleis*

PL. I, FIGS. 4 AND 5

Chiasmocleis, Mehely, Ann. Mus. Hung. 2, 1904, p. 210.

Nectodactylus, Mir. Ribeiro, Bol. Mus. Nac. Rio Janeiro, 4, 1924, p. 256.

Comparison of the type species of *Nectodactylus* (*N. spinulosus*) with the type species of *Chiasmocleis* (*C. albopunctata*) shows that these two genera cannot be maintained as distinct; the presence of small digital discs and webbing between the fingers of the former cannot be considered of

¹ Arch. Mus. Nac. Rio Janeiro, xxvii, 1926, p. 189.

generic importance. In addition to the above-mentioned two species *C. bicegoi* (Mir. Ribeiro), *C. leucosticta* (Boulenger) and *C. boliviana* sp. nov. apparently must also be referred to this genus. A female specimen of *C. leucosticta* (the type) shows a condition intermediate between that of a male *C. spinulosa* and *C. albopunctata*; the tips of the digits have small discs and the fingers are distinctly webbed.

Chiasmocleis boliviana, sp. nov.

Type Specimen: A ♀ in the British Museum from Buena Vista, Santa Cruz, Bolivia.

Snout slightly prominent, longer than the diameter of the orbit; nostril much nearer the tip of the snout than the eye; interorbital space twice as broad as the upper eyelid. Fore limb much longer than its distance from the end of the snout. The hind limb being carried forwards along the body, the tibio-tarsal articulation reaches the tympanic region. Fingers and toes free, with blunt tips which resemble small discs and with prominent subarticular tubercles; first finger much shorter than the second; second and fourth subequal; third long. A distinct inner, but no outer, metatarsal tubercle. Skin smooth above and below; a fold across the head behind the eyes.

Coloration in spirit: Above, pinkish grey, with a broad, darker dorsal stripe which commences between the upper eyelids, narrows behind the head, broadens behind the scapular region, narrows again and finally broadens to embrace the inguinal region; loreal region black; a dark stripe, distinctly outlined above but merging into the color of the belly below, runs from the upper eyelid, through the groin to the anterior surface of the knee; a similar, but more distinct stripe extends from above the vent to the back of the knee; a rounded, distinct, black inguinal spot; a single broad dark band across the forearm, femur, tibia and tarsus; a fine white line from snout to vent. Lower surfaces white with brown spots and vermiculations which become denser towards the flanks, beneath the chin and on the limbs. Lower surfaces of foot and tarsus black.

Length from snout to vent 39 mm.; fore limb 21 mm.; hind limb 51 mm.

The two paratypes in the Museum of Zoology of the University of Michigan agree with the type in all essentials. The ground color in both is pinkish rather than grey and the cross-bars on the limbs of one are indistinct except at their edges.

In color and general appearance this species resembles the various species of *Gastrophryne* which are related to *G. ustum*. It differs in its shoulder girdle (Pl. I, Fig. 5) from other species of *Chiasmocleis* in having the epicoracoids much shorter, but is referred to this genus rather than to the following as the clavicles and procoracoids exhibit the same degree of reduction.

IV. *Elachistocleis*, gen. nov.

The species hitherto known as *Gastrophryne* [*Engystoma*] *ovale* differs from the type species of *Gastrophryne* in the possession of a pair of clavicles (Pl. I, Fig. 6). These are very small and the shoulder girdle may be regarded as being intermediate between that of *Chiasmocleis* (Pl. I, Figs. 4 and 5) and *Gastrophryne*. As no forms are known which bridge the gap in either direction, it appears desirable to split off this, and similar species, as a distinct genus which may be defined thus:

Pupil round. Tongue elliptical, entire, free behind. Palate posteriorly with two transverse, smooth or slightly crenulate ridges, the anterior slightly curved. Clavicle present, minute, curved, not reaching laterally beyond the middle of the coracoid; no omosternum; sternum a cartilaginous plate. Tips of fingers and toes not dilated; terminal phalanges simple.

Type species *Elachistocleis ovale* (Schneid.). This species has been divided into a number of "varieties," the two principal forms which have been recognized being *E. ovale ovale* (Schneid.) and *E. ovale bicolor* (Guerin). These two forms occur side by side in the same area in Bolivia and do not appear to intergrade; it appears probable, therefore, that the two are really distinct species, closely allied and morphologi-

cally almost indistinguishable. There are, however, constant differences in color, though the color of the upper surfaces, which has previously been used to distinguish them, provides no definite distinction. The two forms may be recognized as follows:

- A. Belly immaculate; a very narrow white line along the hinder side of the thighs; no light inguinal spots*E. bicolor*
- B. Belly usually vermiculate; a relatively broad, sometimes interrupted, yellow line along the hinder side of the thighs; inguinal region with more or less defined yellow spots.....*E. ovale*

V. *Gastrophrynoides*

Gastrophrynoides, Noble, Am. Mus. Novit., 212, 1926, p. 22.

The remarkable resemblance which this Bornean genus bears to the following, in which it was formerly included, must be ascribed to parallelism and not to phylogeny.

VI. *Gastrophryne*

Gastrophryne, Fitzinger, Syst. Rept., p. 33 (1843).

Glossostoma, Gunther, Biol. Cent. Amer. Rept., p. 210 (1900).

? *Dasytops*, Mir. Ribeiro, Bol. Mus. Nac. Rio Janeiro, 4, 1924, p. 255.

The articulation of the suprascapular with the prootic by a cartilaginous process, which is said to distinguish *Dasytops* from *Gastrophryne*, does not appear to be a valid generic character; in the type species of *Gastrophryne* (*G. carolinense* Holbrook) a similar cartilaginous process of the suprascapular may be present. In addition to *G. carolinense* the following species have been examined and must be retained in the genus: *G. ustum* (Cope), *G. aterrimum* (Gunther) and *G. dumerilii* (Mir. Ribeiro) (= *G. microps* auct.). The shoulder girdle of the type specimen of *G. elegans* is, unfortunately, badly damaged so that the systematic position of the species cannot be definitely ascertained; its palatal ridges, unlike those of *G. carolinense*, which are smooth, are distinctly crenulate.

The foregoing genera, with the exception of *Gastrophrynoides*, which has no place in this system, show successive stages in the reduction of the shoulder girdle and may be re-

garded as forming an orthogenetic series derivable from some such genus as *Otophryne*, in which the shoulder girdle retains its primitive form (Pl. I, Fig. 1). The Brevicipitidae in the Asiatic, East Indian and Malagasy regions, as has previously been pointed out,¹ have independently gone through a similar series of structural changes, the most specialized genera having lost all the ventral elements of the shoulder girdle except the coracoids. In each of these regions, however, more than one evolutionary line can be traced, with corresponding, but not identical, stages on each line and with stages which in the American region remain to be discovered or have been suppressed.

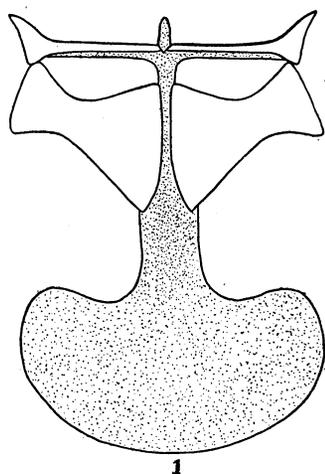
¹ Noble & Parker, *Am. Mus. Novit.*, 232, 1926.



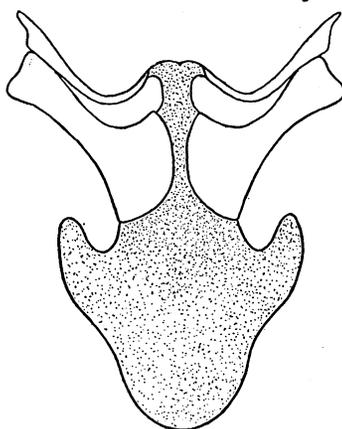
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PLATE I

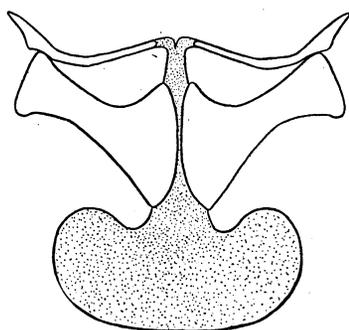
- Fig. 1. *Otophryne robusta*.
- Fig. 2. *Emydops hypomelas* (after Mir. Ribeiro).
- Fig. 3. *Hypopachus variolosus*.
- Fig. 4. *Chiasmocleis albopunctata*.
- Fig. 5. *Chiasmocleis boliviana*.
- Fig. 6. *Elachistocleis ovale*.



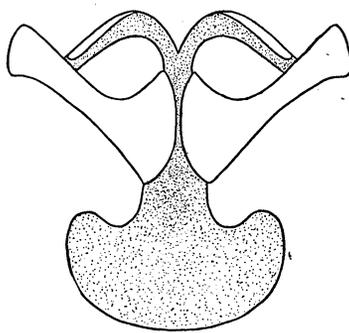
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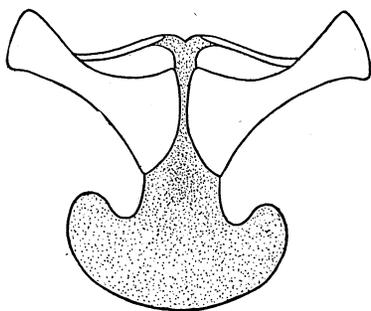
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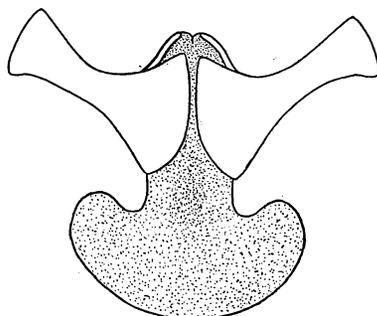
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