

agrees with *Bufo* in the fully developed frontoparietal bones, differing from *Epidalea* (*Bufo calamita* Auct.) and *Pseudophryne* in this respect.

*Phyllomedusa dacnicolor*.

Parotoids exceedingly weak, if present. Fingers very slightly, toes one-third webbed. Labial margin projecting, profile sloping. Tympanum one-half orbit. Eyes not very prominent, transparent, inferior palpebra reticulated with white veins. Mandibular outlines straight. Tongue long, pyriform, openly emarginate posteriorly. Skin above smooth; inferior areolations not extending on pectoral or gular regions. Vomerine teeth in two straight transverse rows between anterior margin of inner nares. A few small pustules on anterior part of sides, which are yellow, like the inferior surfaces. Superior surfaces (narrowly on femur,) violet blue. Upper lip not light bordered; gular region and posterior faces of femora immaculate. From end of muzzle to posterior border of tympanum 10 lines; from angle to angle of mandible 1 in. 1 l.; end of muzzle to vent 3 in. 6 l.; anterior extremity 2 in.; posterior limb 3 in. 10 l.

*Hab.*—Near Colima; from the large Xantusian Coll.

This species diverges widely from the type of *Phyllomedusa* in its webbed toes and almost absent glands, but the glands are only a little stronger in the *P. azurea*. It affords an easy passage to the true *Hylæ*, whose family it enters, by the genus *Agalychnis* Cope. The type of the latter is *Hyla callidryas* Cope, and *H. moreletii* and *holochlora* are the other species. They have the tongue long and extensively free, sometimes emarginate, and the transparent inferior palpebra reticulated with strong white veins. The inner toes are remarkably lengthened and free of movement.

#### On the Limits and Relations of the RANIFORMES.

BY E. D. COPE.

Similar relations to those which exist between the mammalia *Implacentalia* and the remainder of the class, and vice-versa, are apparently repeated in other groups of greater or less rank in the animal kingdom. Among the tortoises, the *Pleurodera* separate themselves most strongly by the union of their ischia with the plastron, the *absence of the arch of the o. prefrontale* which elsewhere descends to the *o. palatinum*, or vomer, and their intergular shield; while they present modifications among themselves characteristic of most of the other families, arranging themselves according to the development of the parieto-mastoid arch, in an ascending series, which terminates in *Bothremys* and *Podocnemys*, where the temporal fossa is entirely roofed in, as in the sea turtles. In the *Lacertilia Acrodonta* we have a group equally removed from others of the order. The acrodont dentition, the great development of the *o. dentale* and final extinction of the *o. operculare*, etc., and the exclusion of the premaxillare from contact with the vomer, are peculiarities not found associated in other lizards, while their parallel representation of the groups of the *Iguanidæ* at least, among the *Pleurodonta*, is well known. In general these also form an ascending series to be measured by the gradual extinction of the *o. premaxillare\** and *o. columellum*, which finally occurs in *Chamæleo*.

The *Raniformes* among *Batrachia Salientia* are in many respects comparable to the *Acrodonta*. They stand at the head of their order, possessing the most compact, powerful and complete organization, and in spite of the constant imitation of the many lower types, there is a certain homogeneity in important points. The structure of the sternum separates them at once, and

\* This bone, said to be single in *Lacertilia*, is divided in all the true *Scincidæ*, in *Phyllurus* among the *Geccotidæ*, and, according to Owen, in *Hatteria*.

presents less variety than in the other suborders. The o. o. coracoidea are distally much dilated horizontally, especially anteriorly, and in close contact on the median line; their axis is transverse. The o. o. epicoracoidea are also transverse, and usually in contact medially, always resting against the anterior angles of the coracoidea. The manubrial and xiphisternal pieces are dilated proximally and become cylindrical or styloid, terminating in a cartilaginous disc. The only other cartilages of the sternum are the intersutural. Frogs with this sternum always have a cylindrical diapophyses of the sacrum, and never a fronto-parietal fontanelle. In the ordinary type of sternum the coracoidea are little or not dilated, and converge posteriorly without meeting, while the epicoracoidea converge anteriorly and are connected with the former by longitudinal arched cartilages; hence I have termed these Arciferi. Among the toothless Batrachia or Bufoniformes (which have dilated sacral diapophyses, except in one genus), some forms show an approach to the Raniform style, while in the Aglossa we find the most exaggerated Arciferous type.

The Raniformes embrace but one family, but this imitates well many genera of Arciferi. The metropolis of the former, as of the Acrodonta, is the Regio Palaeotropica, while the latter have but few representatives out of the R. R. Neotropica and Australis, where but one or two species of the former occur. In both we can trace a series in which the outer metatarsal is gradually liberated from the penultimate, to afford greater extension for the web in the most aquatic types, and among those where these bones are bound, from webless to webbed types. In both we have burrowing and arboreal genera.

In strict reference to the extension of the webs the following parallels may be drawn:

	<i>Raniformes.</i>	<i>Arciferi.</i>
External metatarsal free.		
Aquatic.	Rana.	Pseudis.
Subfossorial.	Hoplobatrachus.	Myxophyes.
External metatarsal attached.		
Feet webbed.		
Burrowing.	Pyxicephalus.	Tomopterna.
Arboreal.	Leptopelis.	Hyla.
"	Hyperolius.	Hylella.
Subarboreal.	Hylambates.	Nototrema.
Feet not webbed.		
Terrestrial.	Cassina.	Cystignathus.
" spurred	Hemimantis.	Gomphobates.

Comparing the genera in a general physiological sense, we may parallelize further—

Aquatic, with digital dilatations,—	Heteroglossa.	Acris.
Arboreal.	Polypedates.	{ Trachycephalus.
"	Rhacophorus.	Hyla.
		Agalychnis.

It is, however, remarkable that the Raniform tree-frogs nearly always have the external metatarsal bone free, the Arciferous always bound; the terminal phalanges of the latter are constructed on a ball and claw type, in the former they are T-shaped or bifurcate, except in the single West African genus *Leptopelis*, where the South American type is repeated.

Evidently belonging to former times, as their present weak representation and generalized structure seem to indicate, are two families of Arciferi not

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at all imitated among the Raniformia. These are the Discoglossidæ and Astero-phryidæ. In both the vertebræ are opisthocoelian instead of procoelian, and the sacral diapophyses are dilated. The latter approaches closest to the ordinary type, having a simple coccyx with but one condyle, no ribs or fronto-parietal fontanelle, and a styloid xiphisternum. The genera are Megalophrys, Xenophrys, Astero-phrys, Leptobrachium and Cryptotis, one Indian, one Australian, the rest Malaysian. The former family is the most remarkable. It has rudimentary ribs, a xiphisternum divided into two long haemapophyses, a coccyx with diapophyses and two condyles, and, in the recent types, a fronto-parietal fontanelle. The genera are Latonia, Discoglossus, Alytes, and Bombinator, all European. There are no arboreal types in these two families, and their terminal phalanges are straight, conic. They form the nearest living approach to the Batrachia Gradientia.

The Batrachian which have been called Proteroglossa form, I believe, a family—Rhinophrynidæ—among the Bufoniformes.

Description of a GAR-PIKE, supposed to be new—*Lepidosteus (Cylindrosteus) oculatus*.

BY PROFESSOR ALEXANDER WINCHELL.

In the month of February, 1863, the Museum of the University of Michigan received a specimen of an unknown gar-pike, from Duck Lake, Calhoun Co., Michigan. As Prof. Agassiz had made a special study of this genus, and had declared that he was acquainted with twenty-two species, I transmitted to him a brief description of the fish; but, for some reason, I received no reply. I sent the same to Prof. Baird, but obtained no assistance; I then wrote Mr. Putnam, at Cambridge, for references to all the published descriptions of *Lepidosteus*, and, a few months ago, received the information sought; though most of it was already within my reach. On Prof. Agassiz' visit to Ann Arbor, last winter, during my absence this fish was shown to him by Dr. Sager. Prof. Agassiz thought it had been described by Dr. Kirtland, but he could not say in what work the description had appeared: The impression given was, that it had been published in some agricultural work, in Ohio, not generally accessible, and not likely to be seen by ichthyologists. I wrote to Dr. Kirtland on this point but received no reply. I am convinced that this species, if ever described, has not been made known through such a medium that the description can be said to be *published* to the scientific world. I am, therefore, determined to run the slight risk of creating another synonym, by offering the following name and detailed description.

LEPIDOSTEUS (CYLINDROSTEUS) OCLATUS. -Winchell.

General form elongate-spindle-shaped, laterally flattened toward the tail, and vertically flattened from the nape forwards. Greatest height contained  $10\frac{1}{2}$  times in the whole length; greatest width the same. Lower outline nearly straight, slightly ascending at the throat, and more so from a point anterior to the anal to the base of the caudal fin; upper outline gently curved along the back, anteriorly somewhat more rapidly curved to a point over the angle of the mouth; lateral outline gently and equally curved from the extremity of the snout to the base of the tail; greatest vertical diameter through a point about three scales in front of the abdominal fins; greatest transverse diameter through a point about six scales in front of the abdominals.

Number of scales in a diagonal series (between the dorsal and ventral rows) 18, occasionally increased to 19, by the interposition of an additional scale near the ventral row; number of scales in the dorsal row, between the head and the dorsal fin, 48; behind the dorsal fin, 8 or 9. The first diagonal series of scales do not meet on the nape of the neck, being separated by the pair of mutually equivalent scales of the dorsal row, which belong in the second di-  
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