



## THE PÆCILIID FISHES OF RIO GRANDE DO SUL AND THE LA PLATA BASIN.

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In a collection of Characins, belonging to the United States National Museum, there were found two specimens of a new Pæciliid from Paraguay. A determination of these made it necessary to look over the entire Pæciliid fauna of the La Plata basin. The results are presented in this paper.

Von Ihering has pointed out the general similarity between the fresh-water faunas of Rio Grande do Sul and the La Plata basin. The Pæciliids bear out his statement. All species recorded from Rio Grande do Sul have also been found in the La Plata basin, and are therefore included in the present paper.

The Pæciliids, better than any other fresh-water fishes, distinguish the Rio Grande do Sul-La Plata basins as a "province" distinct from the Amazonian on the north.

An examination of the teeth and male reproductive organs shows that several forms are generically distinct from their northern relatives. For instance, *Girardinus caudomaculatus* Hensel, which Garman<sup>a</sup> considers identical with *Glaridichthys januarius* (Hensel), proves to be generically distinct from *januarius*, and the latter is shown to be not a *Glaridichthys* but a new genus, unless it is identical with Garman's *Cnesterodon*.

The genera may be distinguished as follows (the extra limital relatives are in parentheses):

a. Teeth bicuspid.

(b. Several series of teeth..... *Characodon*.)

bb. Each jaw with a single series of bicuspid teeth; alimentary canal 3 times as long as the entire fish. D. 16-18; A. 14 or 15; scales small. Anal of male?

*Ilyodon*, 1.

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<sup>a</sup>The Cyprinodonts, p. 42.

## aa. Teeth tricuspid.

(c. Teeth in a single series ..... *Cyprinodon* and *Jordanella*.)

cc. Each jaw with several series of tricuspid teeth, those of the outer row being much the largest; intromittent organ simple, the second of the elongated anal rays ending in a spine; no claspers; all the rays included in a loose membrane, graduated. Alimentary canal about equal to the entire length.

D. 8 or 9; A. 9 or 10; lat. l. 29 ..... *Fitzroya*, 2.

aaa. Each jaw with two or more series of spear, oar, or spoon-shaped teeth, those of the outer series much the largest. D. 7-10; A. 9-12; lat. l. 28-31. Intromittent organ of those in this territory very long; formed by the third, fourth, and fifth rays, the posterior rays much shorter.

d. Intromittent organ without "claspers."

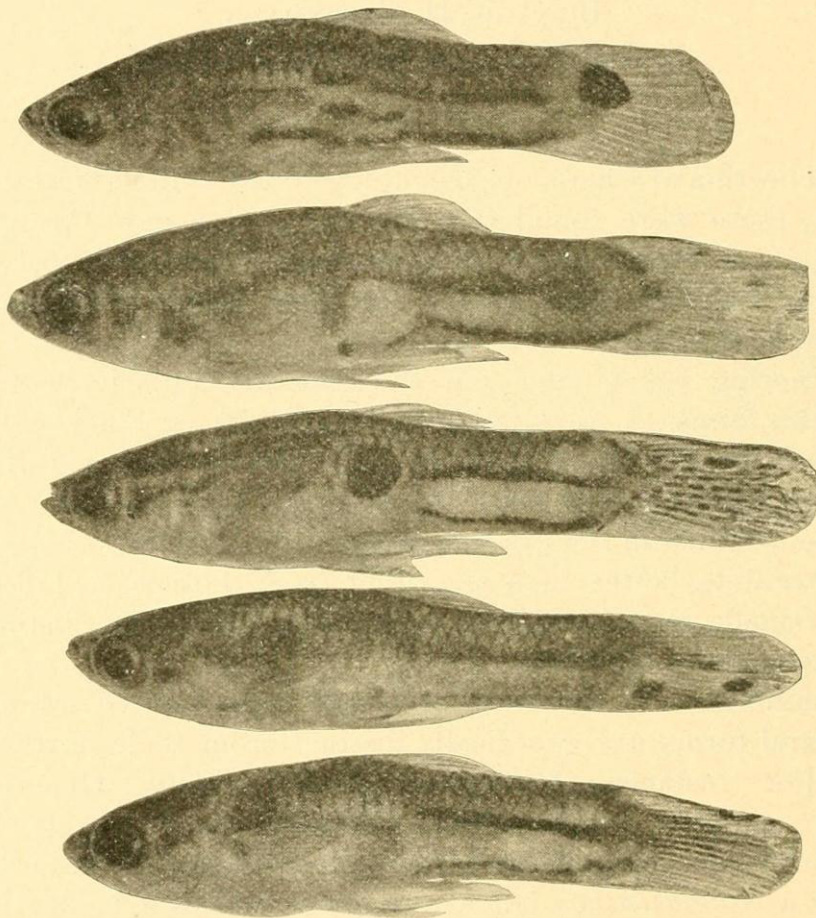


FIG. 1.—ACANTHOPHACELUS RETICULATUS, SHOWING COLOR VARIATION IN THE MALE.

(e. Intromittent organ short, with numerous recurved hooks on both margins; a prepuce (see figs. 1 and 2) ..... *Acanthophaelus*.)<sup>a</sup>ee. Intromittent organ with the prolonged anal rays rolled up to form a tube; alimentary canal about twice the length of the fish... *Phalloptychus*, 3.eee. Intromittent organ "blade like," without hooks..... *Cnesterodon*, 4.

dd. Anal not rolled up; tip of intromittent organ with claspers and without prepuce.

(f. Claspers consisting of three finger-like processes at tip of first prolonged ray of the anal (see figs. 3, 4, and 5).

*Glaridichthys*, *Toxus*, and *Girardinus*.)<sup>a</sup>Type, *Pecilia reticulatus* Peters. ἄκανθα, spine; φάκελος, bundle.

ff. Claspers consisting of antler-like processes at tip of second prolonged ray of the anal. Alimentary canal more than twice the entire length.

*Phalloceros*, 5.

aaaa. Each jaw with bands of conical teeth; anal of male not modified.

g. Origin of dorsal in advance of anal. Anal 10–16; D. 9–18. Depressed forward. An air bladder..... *Fundulus*, 6.

gg. Origin of dorsal behind that of anal.

h. A. 8–15; D. 6–11; lat. l. 29–44. Body subcylindrical. No air bladder..... *Rivulus*, 7.

hh. Anal 20–29; D. 17–23; lat. l. 30–48. Head and body compressed. *Cynolebias*, 8.

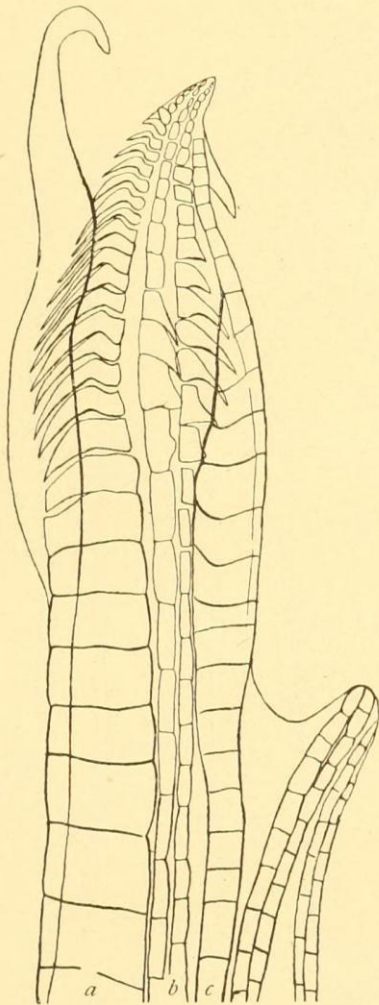


FIG. 2.—TIP OF INTROMITTENT ORGAN OF ACANTHOPHACELUS RETICULATUS. *a*, THIRD ANAL RAY, *b*, FOURTH ANAL RAY; *c*, FIFTH ANAL RAY.

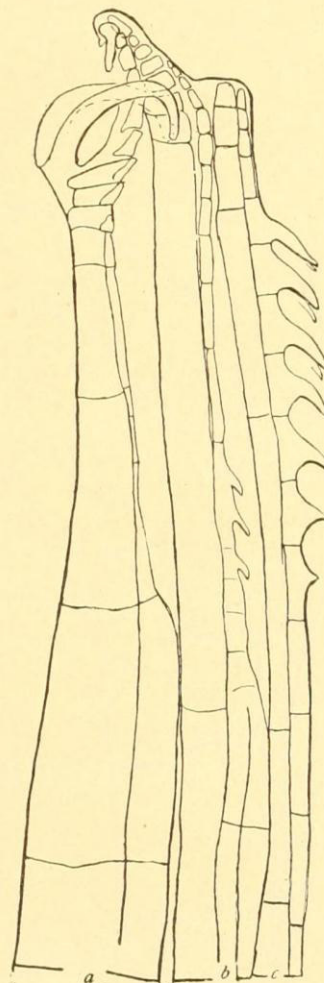


FIG. 3.—TIP OF INTROMITTENT ORGAN OF GLARIDICHTHYS UNINOTATUS. *a*, THIRD ANAL RAY, *b*, FOURTH ANAL RAY; *c*, FIFTH ANAL RAY.

1. ILYODON<sup>a</sup> Eigenmann, new genus.

Intestine about 3 times as long as the body; dorsal and anal posterior. D. 16–18; A. 14 or 15; teeth bicuspid, in a single series; scales small.

<sup>a</sup> ἰλύς, ooze; ὄδους, tooth.

This genus appears to be allied to *Characodon*, from which it differs in having a much more elongate alimentary canal and a single series of teeth.

*Type of genus.*—*Ilyodon paraguayense*, new species.

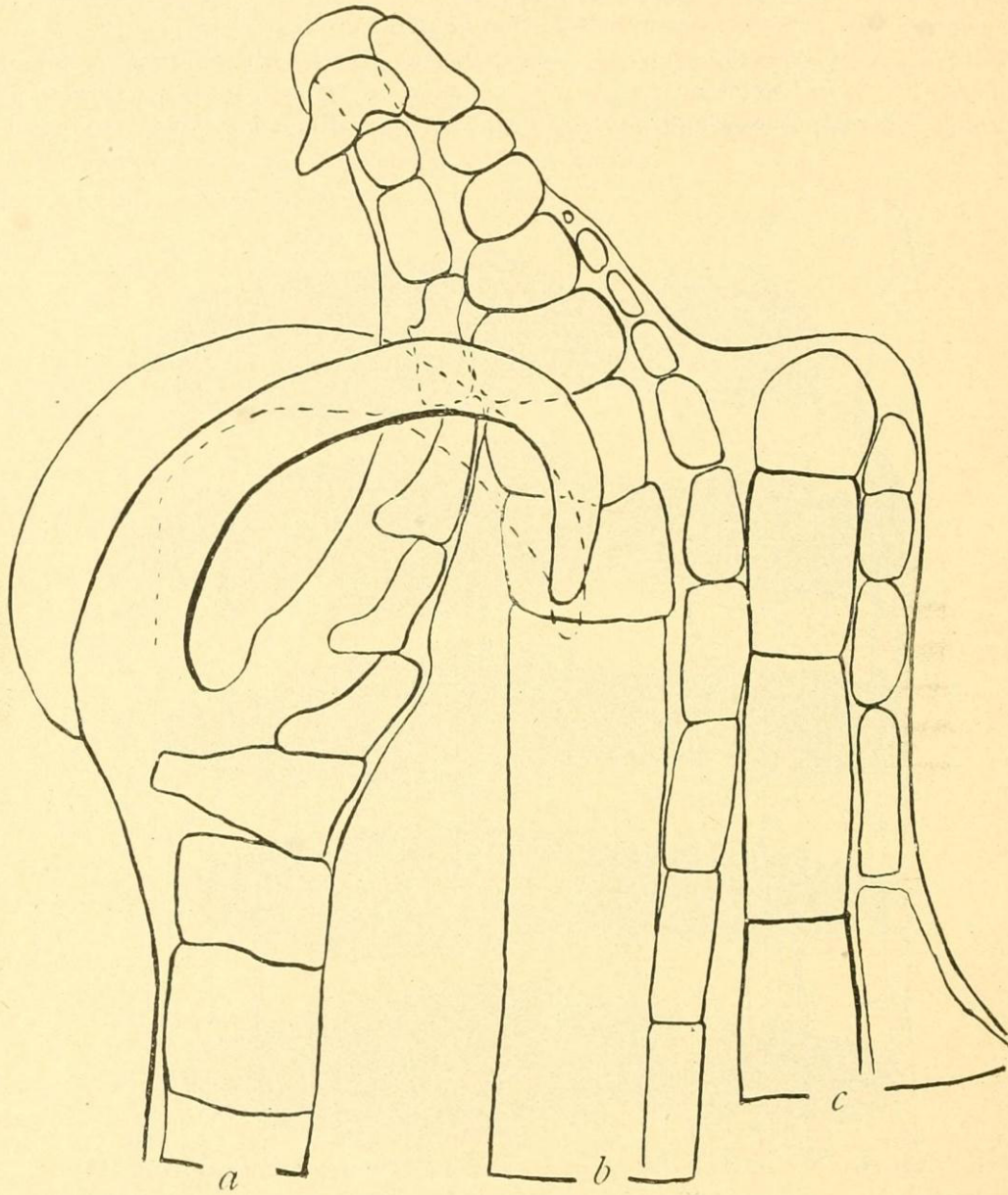


FIG. 4.—ENLARGED TIP OF THE INTROMITTENT ORGAN OF *GLARIDICHTHYS UNINOTATUS*. *a*, THIRD ANAL RAY; *b*, FOURTH ANAL RAY; *c*, FIFTH ANAL RAY.

1. *ILYODON PARAGUAYENSE* Eigenmann, new species.

*Type.*—Cat. No. 55642, U.S.N.M., a specimen 63 mm. long. Paraguay. E. Palmer.

Cotype 64½ mm. long. Paraguay. E. Palmer.

These two specimens were mixed in with some Characins. They are flattened out of shape as though they had been in a press.

D. 16-18; A. 14-15; scales about 45; head 4; depth probably about the same. Teeth close set, graduated, about 10 on each side of the

lower jaw, about 12 on each side of the upper. Eye a little more than 3 in the head. Origin of dorsal about equidistant from tip of snout to tip of caudal; origin of anal but little posterior to origin of dorsal; caudal slightly emarginate; anal basis less than half the dorsal basis. Pectorals reaching  $\frac{2}{3}$  to ventrals, about  $1\frac{1}{2}$  in head; height of anal  $2\frac{1}{2}$  in head. Dorsal, caudal, and anal with conspicuous subterminal black bands, the tips hyaline; middle and base of caudal dusky; base of anal hyaline, or with a second dark band; base of dorsal dusky; pectorals and ventrals colorless.

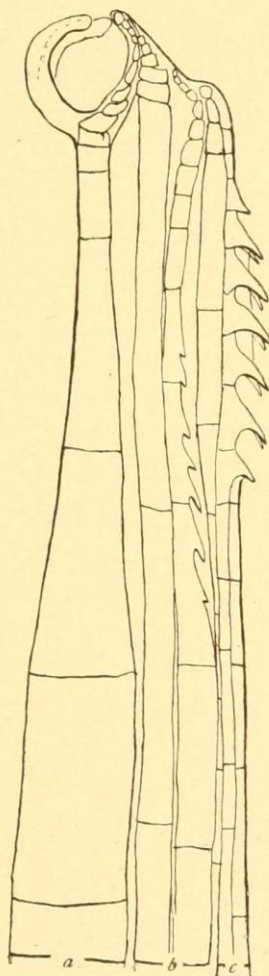


FIG. 5.—DISTAL PARTS OF THE INTROMITTENT ORGAN OF GIRARDINUS METALLICUS. *a*, THIRD ANAL RAY; *b*, FOURTH ANAL RAY, *c*, FIFTH ANAL RAY.

## 2. FITZROYA Günther.<sup>a</sup>

*Fitzroya* GÜNTHER, Cat. Fishes Brit. Mus., VI, 1866, pp. 299, 307 (*multidentata*).

*Jenynsia* GÜNTHER, Cat. Fishes Brit. Mus., VI, 1866, pp. 300, 331 (*lineata*).

*Type of genus.*—*Lebias multidentata* Jenyns.

<sup>a</sup> *Fitzroya multidentata* has several series of tricuspid teeth. *Jenynsia lineata* is said to have but a single series. Garman considers the species identical.

## 2. FITZROYA LINEATA Jenyns.

*Habitat.*—Rio Grande do Sul; Montevideo and Maldonado to the Province Salta, Argentina.

3. PHALLOPTYCHUS<sup>a</sup> Eigenmann, new genus.

An outer series of spoon-ear shaped teeth and bands of much smaller teeth behind them.

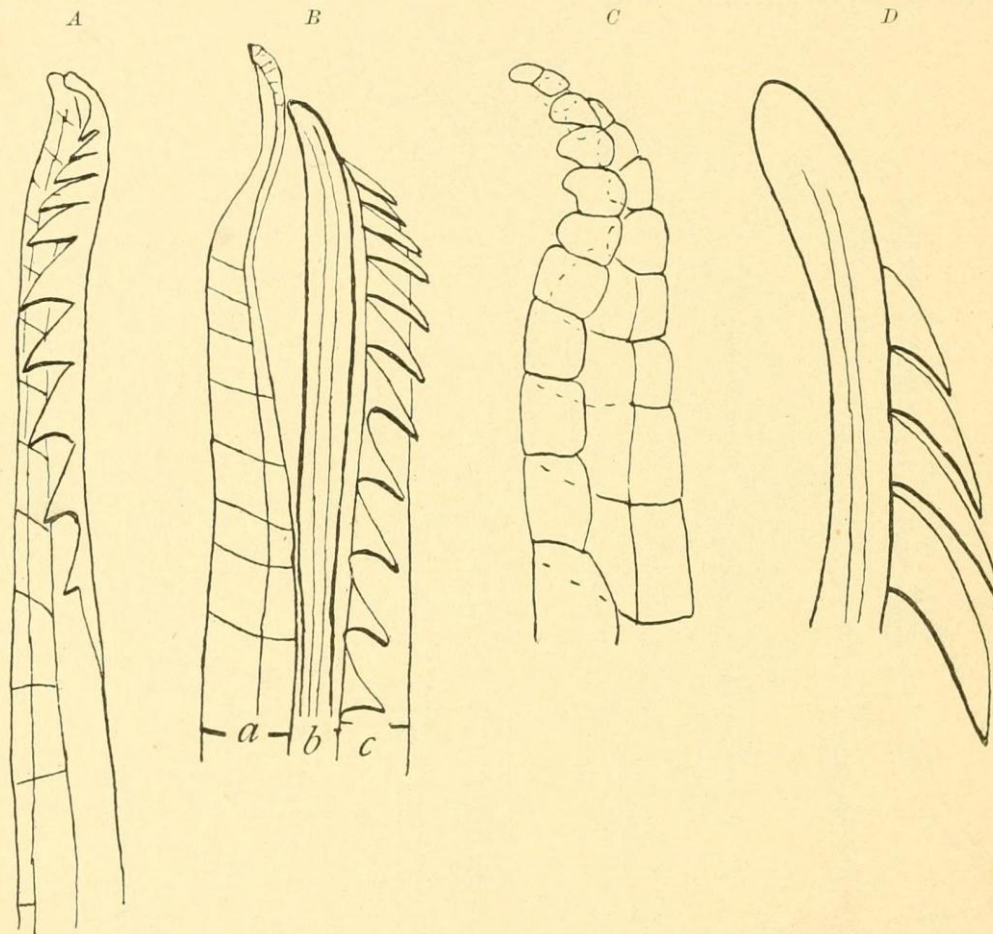


FIG. 6.—DISTAL PARTS OF THE INTROMITTENT ORGAN OF PHALLOPTYCHUS JANUARIUS. A, THE ORGAN AS IT IS NORMALLY FOUND; B, UNFOLDED; (a, THIRD ANAL RAY; b, FOURTH ANAL RAY; c, FIFTH ANAL RAY). C, THIRD ANAL RAY,  $\frac{3}{4}$  VIEW; D, FIFTH ANAL RAY, ENLARGED.

First and second anal ray of the male minute, the third, fourth, and fifth much prolonged. The anterior part of the third ray folded back, the fifth, and part of the fourth folded forward, forming a slender tube at tips; no claspers, the organ ending in a simple point; third ray without hooks or spines, fourth with very strong, retrorse hooks behind these being turned forward in the folded organ. (See fig. 6.)

Intestine about twice length of fish.

*Type of genus.*—*Girardinus januarius* Hensel.

<sup>a</sup> φαλλός intromittent organ, πτύσσω (πτύξ) to fold.

## 3. PHALLOPTYCHUS JANUARIUS (Hensel).

*Habitat.*—Southeastern Brazil to Maldonado and Paraguay.

## 4. CNESTERODON Garman.

*Cnesterodon* GARMAN, The Cyprinodonts, 1895, p. 43, pl. v, fig. 13, and pl. VIII, fig. 16. (*decemmaculatus*.)

## 4. CNESTERODON DECEMMACULATUS (Jenyns).

*Habitat.*—Rio Grande do Sul to Maldonado and Bolivian Chaco.

5. PHALLOCEROS<sup>a</sup> Eigenmann, new genus.

Each jaw with an outer series of spoon-ear-shaped teeth, somewhat expanded at tip and bent backward, close set, their margins in contact near their tips; much smaller teeth, triangular at tips, slightly contracted at base, forming one or more series behind the larger teeth.

Anal in the males inserted about midway in length of body, the first two rays minute, the third, fourth, and fifth united, of nearly equal length and separated by a slight notch from the remainder of the fin, which is very low; the third ray (*a*) much the heaviest; fourth ray (*b*) ending in an antrorse point, and with two large, antler-like structures just below; a series of retrorse hooks on its posterior face protected by the fifth ray (*c*).

Intestine about twice as long as the entire fish; dorsal in female slightly posterior to insertion of anal.

*Type of genus.*—*Girardinus caudomaculatus* Hensel.

## 5. PHALLOCEROS CAUDOMACULATUS (Hensel).

*Habitat.*—Rio Grande do Sul to Paraguay.

Paraguay specimens have the dentaries firmly joined; teeth of outer row moderately expanded, the inner, smaller teeth in rather broad bands on the sides; in a single series or much narrower band in the middle.

In Rio Grande do Sul specimens the smaller teeth form a single series mesially, and imperfectly two series laterally. (See fig. 7.)

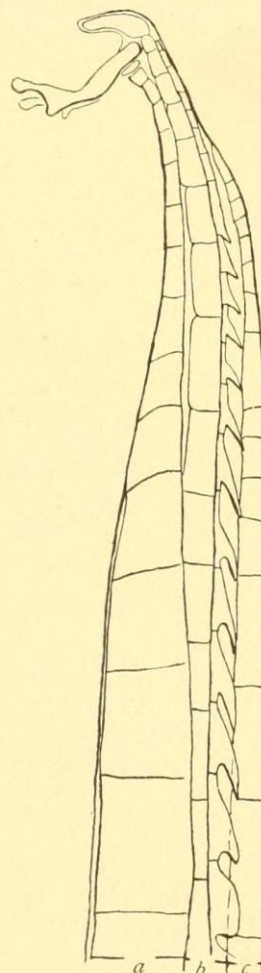


FIG. 7.—DISTAL PARTS OF THE INTROMITTENT ORGANS OF PHALLOCEROS CAUDOMACULATUS. *a*, THIRD ANAL RAY; *b*, FOURTH ANAL RAY; *c*, FIFTH ANAL RAY.

<sup>a</sup> φαλλός, intromittent organ; κέρας, horn.

6. *FUNDULUS* Lacépède.<sup>a</sup>6. *FUNDULUS BALZANII* (Perugia).

*Habitat*.—Villa Maria (Matto Grosso), Rio Paraguay.

7. *FUNDULUS PARAGUAYENSIS* <sup>b</sup> Eigenmann and Kennedy.

*Habitat*.—Arroyo Trementina, Paraguay. (See fig. 8.)

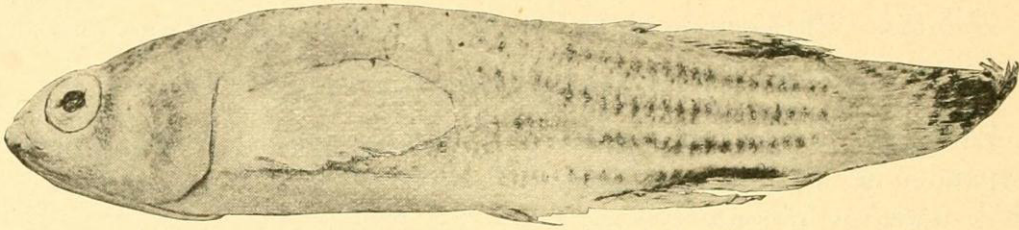


FIG. 8.—*FUNDULUS PARAGUAYENSIS*, TYPE.

7. *RIVULUS* Poey.8. *RIVULUS PUNCTATUS* Boulenger.

*Habitat*.—Colonia Risso, near the Rio Apa.

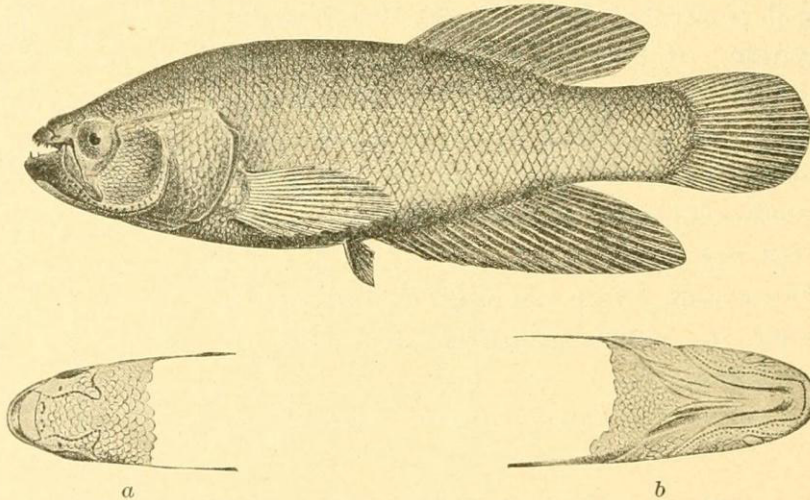


FIG. 9.—*CYNOLEBIAS POROSUS*, TYPE. *a*, HEAD FROM ABOVE; *b*, HEAD FROM BENEATH.

8. *CYNOLEBIAS* Steindachner.

*Cynolebias* STEINDACHNER, Ichthyol. Beitr., p. 124, pl. x, fig. 3. (*porosus*.)

*Type of genus*.—*Cynolebias porosus* Steindachner. (See fig. 9.)

<sup>a</sup> I am not certain that these species belong to the genus *Fundulus*.

<sup>b</sup> It is possible that this species may prove to be a synonym of *balzanii*. They differ as follows:

\* D., 9; A., 14; scales, 4-34-5; depth, 4; head, 3; eye, 3 in head; caudal plane; dorsal and anal with three series of spots.....*balzanii*

\* D. 10; A. 12; lat. l., 34; depth, 4; head, 3½; eye, 3½ in head; caudal with numerous crossbars; dorsal and anal, with four dark longitudinal bands.

*paraguayensis*



9. CYNOLEBIAS BELLOTTII Steindachner.

*Habitat.*—La Plata. (See fig. 10.)

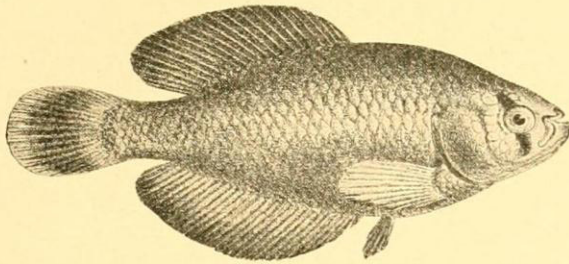


FIG. 10.—CYNOLEBIAS BELLOTTII. a, HEAD OF SAME.

10. CYNOLEBIAS ELONGATUS Steindachner.

*Habitat.*—La Plata.

11. CYNOLEBIAS MACULATUS Steindachner.

*Habitat.*—La Plata. (See fig. 11.)

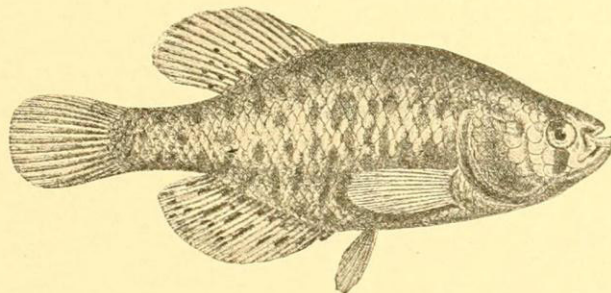


FIG. 11.—CYNOLEBIAS MACULATUS.

12. CYNOLEBIAS ROBUSTUS Günther.

*Habitat.*—La Plata.

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