

49. *Perca flavescens* (Mitchill). *Yellow Perch*.
Abundant in all the lakes examined.
50. *Stizostedion vitreum* (Mitchill). *Wall-eyed Pike*.
Two specimens caught in Gourd-neck Lake.
51. *Cottus bairdi* Girard. *Miller's Thumb*.
Common; Rice Creek, Spencer Creek, and Rapid River; Torch Lake.
52. *Trigloporus thompsoni* Girard.
Fifteen specimens taken from the stomach of a *Salvelinus namaycush*, which was caught in Torch Lake.
53. *Lota lota* (Linnæus). *Ling, Lawyer*.
Common in Torch Lake.
- INDIANA UNIVERSITY, February 18, 1889.

7.—NOTES ON FISHES FROM THE LOWLANDS OF GEORGIA. WITH A DESCRIPTION OF A NEW SPECIES (*OPSOPCEODUS BOLLMANI*).

BY CHAS. H. GILBERT.

During the latter part of June, 1889, Mr. Charles H. Bollman, assisted by Mr. Bert Fesler, undertook the exploration of the lowland streams of the Southern United States in the interests of the U. S. Fish Commission. The work was but fairly begun, when Mr. Bollman was prostrated by an attack of fever, which proved fatal. The following notes are on the material collected by him. The streams examined are thus described by Mr. Bollman:

(a) *Brier Creek at Waynesborough, Ga.*—A cold, sluggish stream, with steep banks, and apparently hard, sandy bottom; about 10 feet deep, and 40 to 50 feet wide, and without shallow spots. The specimens were chiefly obtained in a very small lagoon, with muddy shores, a short distance from the main stream.

(b) *A small stream in the southern suburbs of Savannah.*—This is a small, sluggish stream, about a mile long. At the place seined it was 6 to 10 feet wide and 2 to 4 feet deep, with a very muddy bottom.

(c) *The Ogeechee River at Millen, Ga.*—At this point the river is deep and sluggish, and overhung with dense vegetation. Greatest width, 40 to 50 feet; depth, 4 to 10 feet. On account of the depth and the character of the shores, seining was done in a small running lagoon, a few miles southwest of Millen. Here the water was very muddy, the bottom being of mud in the shallower parts near shore, and of compact sand in the deeper portions. Fishes were most abundant in the shallower water near shore, none except minnows being found in the deeper running part.

(d) *Buckhead Creek, a tributary of the Ogeechee River at Millen.*—The stream was seined at the railroad bridge, 1 mile southwest of Millen. At this point the creek is 40 to 50 feet wide, and 8 feet deep in midstream, with a bottom of hard sand. Most of

the collecting was done in a small arm just above the bridge, with a bottom of mixed sand and mud.

(e) *The Satilla River at Waycross.*—This is a moderately swift swamp-water stream, with a bottom of white sand. The depth was 8 to 10 feet in the channel; the width 50 to 70 feet. Temperature 76° on July 2. The sand-bars were the only places that could be examined, and they yielded almost nothing. The fishes were principally obtained in a small lagoon 3 to 5 feet deep.

1. *Noturus leptacanthus* Jordan.

One specimen obtained in the Ogeechee River.

2. *Ameiurus platycephalus* (Girard).

A few obtained at Millen. A. 21 to 23.

3. *Ameiurus albidus* (LeSueur).

Several specimens obtained at Savannah. I know of no characters distinguishing Southern specimens (*niveiventris*) from Northern (*albidus*, *lophius*) or from Southwestern (*lupus*), and unite them therefore under the oldest name.

4. *Erimyzon sucetta* (Lacépède.)

Three specimens from the Ogeechee River, at Millen, have the scales in 36 to 38 transverse series.

5. *Notropis roseus* (Jordan.)

This species, hitherto known only from a few specimens taken in the Tangipahoa (Notalbany) River in Louisiana, seems to be the most abundant minnow in the lowland streams of Georgia. It was obtained in every stream examined, Brier Creek, the Ogeechee River, and Satilla River, and was everywhere common. It much resembles *N. chalybæus*, with which it is found associated, but may be distinguished at once by the broader head, blunter snout, and less oblique but somewhat larger mouth, the black lateral band less intense, and not including the lower jaw; the anal is quite constantly I, 7, instead of I, 8 as in *chalybæus*. The head is shorter than indicated in the original description, averaging 4½ in length, and the depth is somewhat greater.

6. *Notropis chalybæus* (Cope).

Abundant in the Ogeechee River at Millen.

7. *Opsopœodus emiliæ* Hay.

Two specimens taken in a lagoon of the Ogeechee River at Millen. Agreeing with the original description in having the lat. l. complete. All northern specimens examined have it incomplete, and may belong to a distinct geographical variety (*megalops* Forbes).

8. *Opsopœodus bollmani* sp. nov.

Differing from *O. emiliæ* in the nearly horizontal mouth with lateral cleft, and in the conspicuous round black spot at base of caudal.

Head small, snout compressed, slender, somewhat rounded at tip, resembling *Hybopsis labrosus*. Mouth small, subterminal, usually slightly overhung by the snout, the cleft slightly oblique; maxillary reaching vertical from posterior nostril, shorter than snout, 4½ in head. Eye equaling snout, 3¾ in head, less than interorbital width.

Pharyngeal teeth 5-5 or 4-5, with well-developed grinding surface, one edge of which is conspicuously serrated, though less strongly so than in *emiliæ*. The pharynx

geal bones are, as in the latter, very small and weak, scarcely half the size usual in *Notropis*; the base of the bone is abruptly dilated at outer third, as in *emilia*.

Origin of dorsal behind insertion of ventrals, slightly nearer base of caudal than tip of snout; anterior dorsal and anal rays longest, the outer margins of these fins concave. Caudal strongly forked, the lobes acute. Pectorals not reaching ventrals, the latter to, or nearly to, vent.

Lateral line incomplete, present on 7 or 8 of the anterior scales only.

Head $4\frac{1}{2}$ to $4\frac{3}{4}$ in length; depth $4\frac{2}{3}$ to 5. D. I, 8; A. I, 8. Scales $37\frac{1}{2}$; the breast scaled.

Color in spirits: Dusky olive, lighter below, the scales conspicuously margined with dusky, giving a checkered appearance to sides. A dusky lateral band passing through eye, and downwards to mouth, including tip of lower jaw; above this a conspicuous V-shaped light area on snout. A round, black blotch on base of caudal, nearly as large as eye. A dark dorsal streak, and one backwards from anal. Fins dusky; in males, a black blotch on first two dorsal rays, the marginal third of fin dusky; anal and ventrals broadly margined with blackish.

Five specimens, the longest 2 inches long, were obtained in a lagoon of Buckhead Creek, at Millen, Ga.

9. *Notemigonus chrysoleucus bosci* (Cuv. & Val.).

Brier Creek and the Ogeechee River; abundant. A. 14 to 17.

10. *Chologaster cornutus* Agassiz.

Chologaster avitus Jordan and Jenkins, Proc. U. S. Nat. Mus., 1889, p. 356.

A single specimen less than one inch long, from Millen, Ga. Agreeing wholly with Dr. Jordan's specimens from Dismal Swamp, except that the caudal fin is more largely dusky, the sub-basal white band being represented only by a translucent area on upper and lower rays near base. There can be little doubt that this is identical with the *cornutus* of Agassiz, differing from the original description only in being more slender.

11. *Fundulus heteroclitus* (Linn.)

Not abundant; taken in a small stream in the suburbs of Savannah, Ga.

12. *Zygonectes nottii* Agassiz. "Star-headed minnow."

Fundulus zonatus Cuv. & Val., XVIII, 196. *Haplochilus zonatus*, Günther, VI, 316; not *Esox zonatus* Mitchill.

Zygonectes lincolatus, Agassiz, Amer. Journ. Sci. Arts, 1854, 353.

Zygonectes craticula, Goode & Bean, Proc. U. S. Nat. Mus., V, 433.

Zygonectes zonifer, Jordan & Meek, Proc. U. S. Nat. Mus., VII, 482.

Abundant in lagoons connected with the Ogeechee River, and its tributary Buckhead Creek, at Millen. A few also taken at Savannah.

I agree with Prof. O. P. Hay in identifying *craticula* with *nottii*. The "fainter interrupted lines" are in females visible only towards the back, in males more conspicuous, and present also on middle of sides.

Zygonectes zonifer was based on males of this species. The vertical bars vary in width and also in number, ranging from eight to fourteen.

Zygonectes guttatus Agassiz (l. c.) seems to be identical with *Zygonectes escambiae* Bollman (Proc. U. S. Nat. Mus. 1886, 463), and must supersede the latter.

13. *Gambusia patruelis* Baird & Girard.

Brier Creek at Waynesborough; Savannah; lagoons of the Ogeechee River at Millen; Satilla River at Waycross; everywhere abundant.

14. *Mollienesia latipinna* Le Sueur.

Abundant at Savannah.

15. *Lucius americanus* (Gmelin.)

Brier Creek, Ogeechee River.

16. *Lucius reticulatus* (Le Sueur.)

Brier Creek, Ogeechee River, Satilla River.

17. *Anguilla anguilla chrysispa* (Rafinesque.)

Abundant at Savannah.

18. *Labidesthes sicculus* Cope.

Ogeechee and Satilla Rivers; abundant.

19. *Aphredoderus sayanus* (Gilliams.)

Several specimens taken in the Ogeechee River at Millen, and the Satilla at Waycross. In the smallest ($\frac{1}{2}$ inch long) the vent is midway between base of ventrals and front of anal

20. *Elassoma evergladei* Jordan.

A single specimen from the Satilla River at Waycross, answering well the original description, but with the anal III, 7, instead of III, 5. D. IV, 9. Lat. l. 27. Fins all high, the ventrals reaching slightly beyond origin of anal, the longest dorsal ray $1\frac{1}{2}$ in head. In spirits, faint traces of 6 or 7 dusky cross-bars; a white area on base of caudal. In life, "a blue band under eye and a number on sides. D. spines with blue."

21. *Centrarchus macropterus* (Lacépède.)

Found very abundant in a lagoon at Millen.

22. *Enneacanthus gloriosus* (Holbrook.) (= *E. simulans* Cope.)

A single specimen from Millen, Ga.

23. *Enneacanthus obesus* (Baird.)

One specimen from Millen.

24. *Lepomis punctatus* (Cuv. & Val.)

Many specimens from Millen and Waycross.

25. *Lepomis auritus* (Linnaeus.)

Millen.

26. *Lepomis megalotis* (Rafinesque.)

Abundant at Waynesborough and Millen.

27. *Lepomis pallidus* (Mitchill.)

Waynesborough, Millen, and Waycross.

28. *Etheostoma nigrum olmstedii* (Storer.)

Many small specimens were taken in Buckhead Creek at Millen, Ga. D. IX or X, 13 to 15; A. I, 7 to 9. Lat. l. 47 to 52. Cheeks naked or partly scaled, breast naked; nape with few scales or none.

29. Etheostoma nigrofasciatum (Agassiz.)

One specimen from Millen.

30 Etheostoma fusiforme (Girard.)

Many specimens from Millen and Waycross. These differ from the western and southwestern form (*gracile*), in the scaly breast, the absence of the conspicuous black bar near base of spinous dorsal, and the dull coloration of the sides.

D. IX or X—10 or 11; A. II, 7 or 8. Lat. l. 47 to 55, pores present on 20 to 30 scales.

31. Etheostoma squamiceps Jordan.

A single specimen from the Ogeechee River at Millen. This species varies excessively in squamation of head, and in size of fins. The specimen before me has cheeks and opercles scaly, the nape, breast, and top of head naked. D. X—11; A. II, 9. Lat. l. 45, the pores wanting on 6 scales. Branchiostegal membranes rather broadly joined across the throat, the width on median line equaling three-fourths diameter of eye. Color as usual; caudal with three conspicuous black spots at base.

UNIVERSITY OF INDIANA, *October 24, 1889.*