

DESCRIPTIONS OF FOURTEEN SPECIES OF FRESH-WATER FISHES
COLLECTED BY THE U. S. FISH COMMISSION IN THE SUMMER OF
1888.

BY DAVID STARR JORDAN.

(With Plates XLIII—XLV.)

A large part of the summer of 1888 was spent by the writer in the exploration of the streams of Virginia and North Carolina, under the auspices of the U. S. Fish Commission. In this work I had the efficient assistance of Prof. Oliver P. Jenkins, of De Pauw University, Greencastle, Ind.; Barton W. Evermann, of the State Normal School, Terre Haute, Ind.; and Seth E. Meek, of Coe College, Cedar Rapids, Iowa. The basins of the Shenandoah, James, Roanoke, Kanawha, Holston, French Broad, Catawba, Yadkin, Cape Fear, Neuse, Tar, and Black water Rivers were more or less fully explored, and upwards of 7,000 specimens, mostly of small fishes, were secured.

Among the species obtained fourteen appear to be certainly new to science. Types of each of these species have been sent to the U. S. National Museum. These species are described in advance of the general report by permission of Col. Marshall McDonald, U. S. Commissioner of Fish and Fisheries.

The new species described are the following :

1. *Noturus furiosus* Jordan & Meek.
2. *Noturus gilberti* Jordan & Evermann.
3. *Moxostoma rupiscartes* Jordan & Jenkins.
4. *Notropis (Luxilus) macdonaldi* Jordan & Jenkins.
5. *Notropis kanawha* Jordan & Jenkins.
6. *Hybopsis watauga* Jordan & Evermann.
7. *Fundulus (Xenisma) rathbuni* Jordan & Meek.
8. *Chologaster avitus* Jordan & Jenkins.
9. *Etheostoma (Percina) rex* Jordan & Evermann.
10. *Etheostoma (Hadropterus) roanoka* Jordan & Jenkins.
11. *Etheostoma (Boleosoma) podostemone* Jordan & Jenkins.
12. *Etheostoma (Ulocentra) verecundum* Jordan & Evermann.
13. *Etheostoma (Nanostoma) swannanoa* Jordan & Evermann.

I have also added (14) a redescription of *Etheostoma longimane*, and (15) a description of a new species from Mexico, *Etheostoma australe*.

1. *Noturus furiosus* Jordan & Meek, sp. nov. (Type No. 39932, U. S. Nat. Mus.)
Closely allied to *Noturus miurus*.

Head, $3\frac{3}{4}$ in length; depth, $5\frac{1}{2}$; width of head, $4\frac{1}{3}$. D. 1, 6. A. 14.
Length of largest specimen, $3\frac{1}{2}$ inches.

Body moderately elongate, about as in *N. miurus*. Head broad, depressed, flat between the eyes. Eyes moderate, $1\frac{1}{2}$ in interorbital

width, $4\frac{1}{3}$ in head. Lower jaw included; band of premaxillary teeth not produced backward. Barbels rather long, the maxillary barbel reaching gill opening. Insertion of dorsal considerably nearer adipose fin than snout, its spine $2\frac{1}{3}$ in head; pectoral spine extremely large; longer, stronger, and more heavily armed than in any other North American Catfish; its length $1\frac{1}{4}$ in head. It is provided with antrorse teeth on its outer margin, these growing larger and less retrorse towards the end of the spine. The tip of the spine is, however, free from teeth on either side. Inner margin of spine with seven or eight strong recurved hooks. Humeral process moderate. Adipose fin high, with a deep notch, which extends almost to its base. Caudal long, its tip rounded; anal short, rather high, its base 6 in body, its longest rays 2 in head. Color more varied than in any other of our Catfishes; the pattern similar to that of *N. miurus*. Light brown; entire upper parts and fins punctate with black dots; a dusky area between eyes; a black saddle-like blotch across occiput; a large one before and one behind dorsal and one on adipose fin; a crescent-shaped bar at base of caudal; three distinct black curved streaks across caudal, and two across soft dorsal and anal; these markings less distinct in the young.

This species is the most strongly armed of the North American Catfishes, and according to Professor Jenkins the poison of its axillary gland is more virulent than that of other species.

Numerous specimens were taken in the Neuse River at Millburnie, near Raleigh; one in the Little River at Goldsborough, and one in the Tar River at Rocky Mount. Specimens in the U. S. National Museum from Tarborough, N. C. (James W. Milner, collector), were at first identified by me as *Noturus cleutherus* and afterwards as *Noturus miurus*.

2. *Noturus gilberti* Jordau & Evermann, sp. nov. (Type. No. 39931, U. S. Nat. Mus.)
From Roanoke, Va.

Head, $4\frac{1}{2}$ in length; depth, 7; width of head, $5\frac{2}{3}$. D. 1, 6. A. 15. Length, $3\frac{1}{2}$ to 4 inches.

Body slender, moderately compressed; the body less compressed, the head narrower and less depressed than in *N. insignis*, the snout less obtuse. Eyes quite small, 2 to $2\frac{1}{2}$ in interorbital width, about 5 in head. Band of premaxillary teeth without backward processes. Lower jaw decidedly shorter than upper, the difference about the diameter of the eye; maxillary barbels short, dark, not reaching nearly to the gill opening.

Origin of dorsal fin considerably nearer to the snout than to the adipose fin, its spine scarcely longer than eye, about 5 in head. Pectoral spine extremely short, stoutish, its inner margin with sharp teeth on the basal part, its outer margin nearly entire, roughish toward the tip. Adipose fin very low, separated from the caudal by a broad shallow notch, which extends almost or quite to the base of the fin. The adipose fin is as free from the caudal as in *N. cleutherus*. Anal fin short and high, its base $6\frac{1}{2}$ in body, its longest ray $1\frac{1}{2}$ in head. Caudal fin broad,



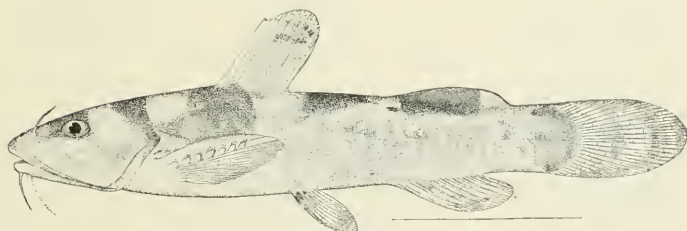
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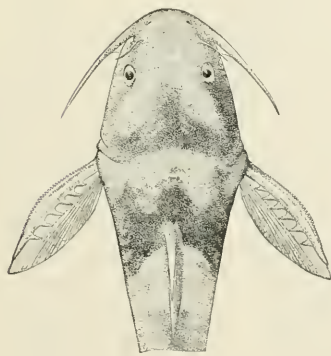
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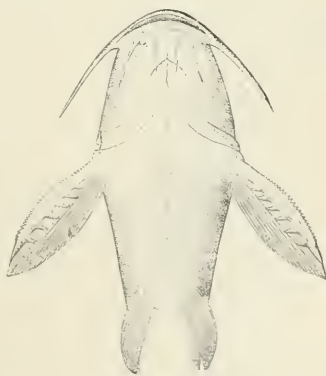
2b



1



1a



1b

Figs. 1, 1a, 1b. *Noturus furiosus*, n. sp. (Page 351.)
Figs. 2, 2a, 2b. *Noturus gilberti*, n. sp. (Page 352.)

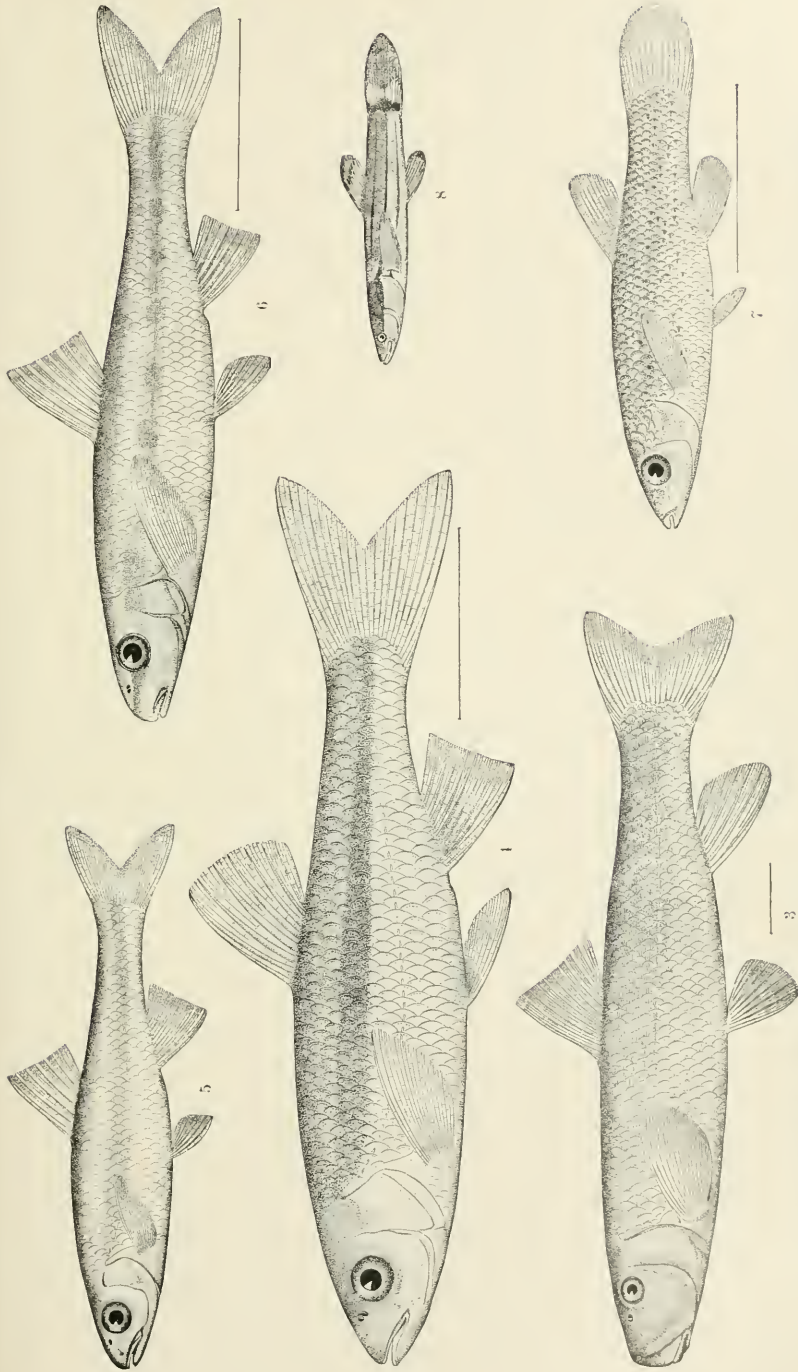


FIG. 6. *Hybopsis truttacga*, n. sp. (Page 355.)
 FIG. 7. *Pseudorasbora rathbuni*, n. sp. (Page 356.)
 FIG. 8. *Chologaster arcitus*, n. sp. (Page 356.)

FIG. 3. *Maxosoma rufiscartes*, n. sp. (Page 353.)
 FIG. 4. *Notropis macdonaldi*, n. sp. (Page 354.)
 FIG. 5. *Notropis kauauiha*, n. sp. (Page 354.)

not rounded, but obliquely truncate, almost emarginate, the lower lobe slightly the longer. Color dark yellowish-brown, finely punctulate above, paler below; base of caudal and most of the lower lobe black; sometimes all black except the tip of the upper lobe; dorsal black at base, pale above.

This species is one of the most distinct in the genus. It is nearest related to *N. exilis*, *N. nocturnus*, and *N. leptacanthus*, but it is well separated from all of these.

Many specimens were obtained in the Roanoke River, at Roanoke, Salem, and Alleghany Springs. It is found in company with the "Mad Tom," *Noturus insignis*. It is less abundant than the latter, however, and reaches a smaller size.

We have named this species for our friend and colleague Dr. Charles H. Gilbert.

3. *Moxostoma rupiscartes* * Jordan & Jenkins, sp. nov. (Type No. 39927, U. S. Nat. Mus.)

Closely allied to *Moxostoma cervinum*, differing chiefly in its smaller scales and more uniform coloration. It reaches a larger size; its lips are larger, and the form of its dorsal fin is some what different.

Head, $4\frac{1}{2}$ in length; depth, $5\frac{1}{2}$ to 6. D. 11. A. 8. Scales 6-50-6. Length of largest specimen, 11 inches.

Body long and low, slender, subterete anteriorly, compressed behind. Head very short, broad, flat between the eyes. Snout bluntish, projecting beyond mouth; its length $2\frac{1}{3}$ in head. Eye moderate, $4\frac{1}{2}$ in head; interorbital width $2\frac{1}{2}$ in head. Lips full, the lower truncate behind, plicate in young, the folds in adult so broken as to form coarse papillæ; scales small, a little smaller anteriorly, 18 before dorsal (scales 43 in *M. cervinum*, 15 before dorsal). Dorsal fin low and small, its free edge concave, the first ray slightly produced, $1\frac{1}{2}$ in head. Caudal short, lunate, its lobes equal and bluntish, the upper $1\frac{1}{3}$ in head; pectorals long, $1\frac{1}{10}$ in head; ventrals short, $1\frac{1}{2}$; anal $1\frac{1}{3}$. Air-bladder in three parts.

Color—Adult, dark olive-brown above, paler below, the dark color of back extending irregularly downward, not sharply divided from the paler of belly; fins all dusky. In the adult the pale streaks along the rows of scales are entirely obliterated. Young grayish, becoming gradually paler below; faint pale streaks along the rows of scales; a faint dusky spot above base of pectoral; tips of dorsal and caudal more or less dusky (inky-black in *M. cervinum*).

Many specimens of this species were obtained in the Catawba River at Marion, in Buck's Creek at Pleasant Garden, in John's River near Morganton, in North Carolina; and in Pacollet River at Clifton, and Tiger River at Cleveland Shoals, both these localities being in the

* *Rupiscartes* (a hybrid word), used by Swainson to mean rock-jumper, a species of *Salarias* which jumps on rocks, like a lizard.

vicinity of Spartanburgh, S. C. About Spartanburgh, this is one of the common food-fishes.

Specimens of *Moxostoma rupiscartes* (identified by me as *M. cervinum*) have been taken by me in the Saluda River at Greenville, S. C., in the Chattahoochee at Gainesville, Ga., and in the Ocmulgee at Flat Shoals, Ga. In the James, Roanoke, Tar, and Neuse Rivers we found the genuine *M. cervinum*.

4. *Notropis macdonaldi* Jordan & Jenkins, sp. nov. (Type No. 39859, U. S. Nat. Mus.)

Subgenus Luxilus Rafinesque, allied to *N. zonatus* (Agassiz), and less closely to *N. megalops* Rafinesque.

Head contained $3\frac{3}{4}$ times in length to base of caudal; depth, $4\frac{3}{4}$. D. 8. A. 9 or 10. Scales, 7-39-2. Length of largest specimen 5 inches.

Form more elongate than that of *N. megalops*, the head longer and more pointed, the form of body and head much as in *N. zonatus*, but the body still more slender. Body elongate, compressed, the back a little elevated; anterior profile gently curved from snout to front of dorsal, a little more convex on snout. Eye moderate, a little shorter than snout; in adult, $4\frac{1}{2}$ in head. Mouth large, terminal, oblique, the lower jaw somewhat projecting; maxillary extending to opposite front of eye, as in *zonatus*, its length $2\frac{2}{3}$ in head. In *N. megalops* of the same size the snout is much more obtuse, and the maxillary is less than one-third of head.

Scales less crowded than in *N. megalops*, the exposed surfaces less narrowed; scales before dorsal small, in 17 to 20 rows. Lateral line de-curved. Insertion of dorsal somewhat behind that of ventral, nearer to base of caudal than to snout. Fins moderate; free margin of anal concave; pectoral not quite reaching ventrals, the latter scarcely to vent. Teeth, 2, 4-4, 2, with narrow grinding surface and a hook.

Color in spirits, greenish, with a broad, diffuse lateral band of plumbeous silvery; a dark streak along back; no caudal spot; fins plain. In life the snout and chin are red, as are also the axils of pectorals and ventrals; the space between the rami of the lower jaw retains the orange color in alcohol. The scales of the upper part of the body and head are profusely punctate with black. The boundaries of the scales are not very well defined.

Numerous specimens of this species were obtained from the Shenandoah River at Waynesboro, Va., from North River, at Loch Laird, Va., and from Buffalo Creek, near Lexington, Va. The two streams last mentioned flow into the James below the Natural Bridge.

We have named this species in honor of Col. Marshall McDonald, the efficient head of the U. S. Fish Commission.

5. *Notropis kanawha* Jordan & Jenkins, sp. nov. (Type No. 39928, U. S. Nat. Mus.) Allied to *N. illecebrosus* (Girard).

Head, $4\frac{2}{5}$ in length; depth $4\frac{2}{5}$. D. 8. A. 9. Scales $4\frac{1}{2}$ -37-2, 16 scales before dorsal. Teeth 4-4, hooked, with grinding surface. Length of type, $3\frac{1}{2}$ inches.

Body rather elongate, moderately compressed, the back a little elevated. Snout bluntish, not very short, $3\frac{1}{2}$ in head, its profile gently decurved; jaws equal; mouth rather oblique, the maxillary 3 in head, reaching to opposite front of eye; interorbital space flattish, a little broader than eye; eye large, $3\frac{1}{2}$ in head, smaller than in *N. scabriceps*, which this species resembles in many respects. Preorbital broad; first suborbital narrow; scales large; lateral line gently decurved. Fins all rather high; pectorals nearly reaching ventrals. Insertion of dorsal distinctly behind ventrals, midway between nostril and base of caudal.

Color translucent green; sides bright silvery, with few punctulations. No caudal spot.

This species was found to be rather common in Reed Creek, a tributary of the Kanawha, near Wytheville, Va.

6. *Hybopsis watauga* Jordan & Evermann, sp. nov. (Type No. 39929, U. S. Nat. Mus.)

Allied to *H. dissimilis* (Kirtland), but with smaller scales, the body more slender, the coloration less varied.

Head, $4\frac{1}{3}$ in length; depth, $5\frac{1}{2}$ to 6. D. 7. A. 7. Scales 4-52-4, 20 to 24 before dorsal. Length of type, 4 inches.

Body elongate, subterete, the back little elevated; head rather long and low, flat on top, the anterior profile blunt, decurved. Lips thick; barbel evident; mouth horizontal, wholly inferior, the maxillary reaching to opposite posterior nostril, 4 in head. Snout, $2\frac{3}{4}$ in head. Eye very large, placed high, its diameter $3\frac{1}{4}$ in head, a little less than length of snout; preorbital long and broad. Scales small, those before dorsal and on belly reduced in size; breast naked. Insertion of dorsal before that of ventrals, slightly nearer snout than base of caudal. Pectoral long, $1\frac{1}{8}$ in head; other fins all small. Lower pharyngeals weak; the teeth 4-4, small, short, hooked, with slight grinding surface.

Color olivaceous above, side with a dark bluish lateral stripe not so wide as eye, passing around the snout; on this stripe are eight to twelve rounded blackish spots, diffuse and not so large as eye, one of these at base of caudal; a dark speck on front of opercle; a few dark spots each as large as a scale on back, especially on back of tail. Fins pale.

Comparing this species with *H. dissimilis* we find the scales smaller (40 to 44 in *H. dissimilis*, 18 before dorsal), the body more elongate (depth usually 5 in the latter), and the color less variegated. In most specimens of *H. dissimilis* the back and sides are covered with irregular dark spots, some of the scales being dusky. About six specimens of this species were taken in the north fork of the Holston River at Saltville, Va., and two in the Watauga River at Elizabethtown, Tenn. This species is probably widely diffused, having been hitherto confounded with *H. dissimilis*. The specimens from the White River, Eureka Springs, Ark., scales 49 or 50, should be referred to *H. watauga*. The other specimens of this type accessible to the writer belong to *H. dissimilis*. These represent the following localities: Spring Creek, Hot

Springs, N. C. : Swannanoa River, Asheville, N. C. ; White River, Gosport, and Indianapolis, Ind. ; Rock River, Ogle County, Ill. ; Des Moines River, Ottumwa, Iowa ; Saline River, Benton, Ark. ; Washita River, Arkadelphia, Ark.

7. *Fundulus rathbuni* Jordan & Meek, sp. nov. (Type No. 39860, U. S. Nat. Mus.)
Subgenus *Xenisma* Jordan, allied to *Fundulus stellifer* Jordan.

Head, $3\frac{1}{2}$ in length to base of caudal ; depth $4\frac{1}{2}$. D. 11. A. 11. Scales, 38-12. Length, $2\frac{1}{2}$ inches. Body moderately elongate, rather robust, little compressed ; the back broad, not elevated. Head moderately broad and depressed above ; snout rather sharp, as long as eye, which is $3\frac{3}{4}$ in head ; scales of medium size, the humeral scale not enlarged ; two rows of scales on cheek. Fins all low and small ; dorsal inserted posteriorly, its first ray opposite first of anal or slightly behind it ; longest ray of dorsal $1\frac{3}{4}$ in head ; anal larger than dorsal ; pectoral short, $1\frac{1}{2}$ in head ; ventrals very short, reaching vent.

Coloration in life pale green, with small irregular horizontally oblong dark-brown spots scattered over head and body. Sexes not very different. Males with scales of body edged with black and with a pale lengthwise streak along upper part of each row of scales. Young with very obscure dark cross-bars. Fins plain, yellowish in male, speckled at base only.

Numerous specimens were obtained in Reedy Fork, Allemanee Creek, Buffalo Creek, and other tributaries of the Cape Fear River, about Greensborough, N. C. A few were also obtained in Jumping Run, a small clear tributary of the Yadkin River, north of Salisbury, N. C. Like the related species, the present one seems to prefer clear upland brooks and springs.

This interesting species is named for Mr. Richard Rathbun, of the U. S. Fish Commission.

8. *Chologaster avitus* Jordan & Jenkins, sp. nov. (Type 39864, U. S. Nat. Mus.)
Closely allied to *Chologaster cornutus* Agassiz, but more slender, with shorter pectorals and different coloration.

Head, $3\frac{2}{3}$ in length ; depth, $5\frac{1}{2}$ to $6\frac{1}{2}$. D. 8 or 9. A. 8 or 9. Scales about 68. Length, $1\frac{1}{3}$ inches.

General form of the Cave Blind fish, but much more slender, the head narrower, sharper, and less depressed ; mouth oblique, terminal, the lower jaw projecting ; maxillary extending nearly to front of eye ; eye small, but evident, about half length of snout. Gill membranes separate, nearly free from the isthmus, covering the vent. Pectoral fin $1\frac{1}{2}$ in head ; $1\frac{2}{3}$ in distance to front of dorsal ; caudal pointed, about as long as head.

Color very dark brown above, the lower half of body abruptly white, all parts, black or white, sprinkled over with black points ; side with three narrow, sharply defined, black lengthwise stripes, the lower sometimes breaking up into dots behind, the middle stripe broadest, forming the lower margin of the dark color of back, this stripe extending

on side of head across eye and snout; upper band a little nearer to line of back than to middle band; a large, irregular black blotch at base of caudal; behind this a white blotch of varying size, sometimes reduced to two small spots, sometimes forming a broad white bar, covering nearly half the fin; behind this blotch the caudal fin is jet black. Dorsal white, more or less spotted or edged with black.

About forty specimens of this very interesting species were taken in the outlet of Lake Drummond in the Dismal Swamp, near Suffolk, Va. The species probably abounds throughout the Dismal Swamp.

Our specimens agree in most respects with Putnam's description of *Chologaster cornutus* Agassiz. This species is still known only from three specimens obtained in a ditch in a rice field at Waccamaw, S. C. The differences are probably, however, of specific value.

Compared with its blind relative and perhaps descendant, *Typhlichthys subterraneus* Girard, *Chologaster avitus* is much more slender, with narrower, sharper, and less depressed head, sharper fins, and with the gill membranes less connected to the isthmus. The "horns" on the snout mentioned by Agassiz seem to be the flaps of the nostrils. These are much better developed in *Chologaster* than in *Typhlichthys subterraneus*.

9. *Etheostoma rex* Jordan & Evermann, sp. nov. (Type No. 39858, U. S. Nat. Mus.)
Subgenus *Percina* Haldeman, closely allied to *E. caprodes*.

Head, $3\frac{5}{6}$ in length; depth, $4\frac{3}{5}$. D. XIV-15. A. II, 11. Scales 11-83 to 85-19. Length of largest specimen, $5\frac{1}{2}$ inches.

Body elongate, little compressed, the form more robust than in *E. caprodes*, the back more elevated; head stouter, the snout more acuminate and the mouth a little larger than in *E. caprodes*; the head similarly formed. Cheeks with five rows of small scales; opercles and nape closely scaled; breast naked; gill membranes nearly separate; pseudobranchiæ very small; median scales on ventral line moderately enlarged. Fins higher than in *E. caprodes*, the longest ray of the soft dorsal slightly more than half head.

Adult in spirits mottled green above, yellowish below; four dark cross-blotches on back; about ten roundish dark blotches on sides, these almost confluent into a band; a small black spot at base of caudal; no trace in young or old of parallel cross-bands on side of back, the young with the back covered with zigzag markings, the sides with ten short vertical inky-black blotches about as high as the eye. Second dorsal and caudal in adult yellowish, with oblique cross-stripes of black spots; first dorsal yellowish, mottled, with a median dusky band; pectorals yellow, banded with olive; anal faintly spotted with black.

In life, the adult example was olive-green, straw-color below; back with five obscure dusky cross-blotches; nine obscure dark olive cross-blotches on sides; a small dark caudal spot. Snout and nape dashed with orange; cheeks yellow; first dorsal pale olive, with darker olive spots at base; a broad band of brilliant orange toward margin, the edge

dusky. Soft dorsal and caudal light yellow, with bands of black spots. Anal pale yellow, with two rows of olive spots; pectorals and ventrals yellow, with olive spots; ventrals edged with orange.

The smaller specimen had the dark blotches on side inky-black, the back more sharply mottled, and the orange on dorsal very faint.

Two specimens of this species were taken in swift water in the Roanoke River, near the city of Roanoke. The largest of these is $5\frac{1}{2}$ inches in length, almost as large as the largest of *E. caprodes*. It is probable that this species reaches a larger size than any other of the Darters. It is very close to *E. caprodes*, differing chiefly in the presence of red and green markings, in the larger scales, and in the more robust form.

10. *Etheostoma roanoka* Jordan & Jenkins, sp. nov. (Type 39566, U. S. Nat. Mus.)

Subgenus *Hadropterus* Agassiz, allied to *Etheostoma evides*.

Head, $3\frac{3}{4}$ to 4 in length; depth, $4\frac{1}{3}$ to $4\frac{3}{4}$. D. X or XI-11. A. II, 8 or 9. Scales, 5-48-6, the number in lateral line varying from 41 to 50. Length, $2\frac{1}{2}$ inches.

Body decidedly robust, moderately compressed, the back elevated. Head broad, heavy, tapering forward, the snout moderately blunt at tip, then nearly straight from before eye backward to occiput. Pre-maxillaries not protractile. Maxillary $3\frac{2}{5}$ in head, reaching front of pupil. Mouth small, little oblique, low, the lower jaw included all around; teeth rather strong. Eye about as long as snout, $4\frac{1}{4}$ to $4\frac{3}{4}$ in head. Cheek scaleless, usually two or three small scales on upper part of opercle, the head often quite naked; nape and breast naked; middle line of belly with about eight moderately enlarged scales; preopercle entire; opercular spine moderate; gill membranes very slightly connected; lateral line complete; dorsal fins moderate, contiguous; anal large, its spines large, the first strongest; pectoral about as long as head, reaching beyond ventrals to vent. Caudal slightly lunate.

Color straw-yellow, the males dark green; sides with ten or eleven vertical cross-bars, more or less confluent into a lateral band. In the males, these bands are of a deep blue-green and vaguely defined. In the females, they are distinctly diamond-shaped and confluent along their middle, forming a broad band, with both edges serrate; male with lower parts and paler parts of head bright sulphur-yellow; back barred and mottled with dark; nape with a pale spot; head dark blue in males, with a black bar forward and one downward from eye; lips orange. Fins in male nearly plain blue-black: first dorsal with a median band of very bright yellow, its base with a black band, its edge narrowly black; second dorsal and anal faintly barred; some orange-yellow on ventrals, anal, and soft dorsal; two yellow spots at base of caudal, the upper forming a curved streak above the last of the dark lateral spots. Females paler, yellowish below, the markings black and less diffuse, the second dorsal and caudal sharply barred.

This beautiful species is very abundant in the Roanoke River in swift waters, especially among rocks covered with river-weed. Many speci-

mens were taken at Alleghany Springs, Salem, and Roanoke. It was also found abundant in the Neuse River, at Millburnie, near Raleigh, and two specimens were obtained from the Tar River, at Rocky Mount, N. C.

The North Carolina specimens have mostly larger scales (lateral line 45, 45, 41, 45, 48, 44, 42, 47, in eight specimens; 50, 43, 47, 50, in four Roanoke specimens), but are otherwise similar.

E. roanoka differs from *E. evides* chiefly in the larger scales. (Scales usually 60 to 65 in *E. evides*.)*

11. *Etheostoma podostemone* Jordan & Jenkins, sp. nov. (Type No. 39863, U. S. Nat. Mus.)

Subgenus *Boleosoma*, allied to *E. longimane*, differing chiefly in the larger scales and smaller mouth.

Head, $4\frac{2}{5}$ in length; depth, $5\frac{3}{8}$. D. X-13. A. I, 8. Scales, 4-35-6. Length, 2 inches.

Body rather stout, somewhat compressed, the back elevated. Head short, rather bluntly rounded in profile, the rather wide, blunt snout overhanging the small, inferior mouth. Upper jaw protractile; maxillary short, freely movable, just reaching front of eye, and scarcely as long as eye; eye $3\frac{3}{4}$ in head, a little longer than snout; mouth very small, inferior, contracted; teeth small; gill membranes broadly united. Cheeks, nape, and breast naked; opercles with a few large scales; preopercle entire; middle line of belly naked anteriorly, with ordinary scales behind. Lateral line complete. Dorsal fins moderate; anal fin lower and smaller than soft dorsal; anal spine short; first anal ray simple, a little longer than the spine and articulate toward tip; caudal truncate; pectorals rather long, one-fourth longer than head, reaching beyond ventrals to vent.

Color light yellowish-green, with seven or eight small dark quadrate spots along side; five or six larger ones along back; scales of back mostly with dark centers; a dark bar below eye; a little spot behind eye; a dark opercular bar and a dark bar before and behind pectorals; lower side of head with some dark spots; pectorals, both dorsals and caudal, with cross-bands of dark olive spots; dorsal in life also spotted with brownish-red; caudal also with a subterminal dark band; ventrals and anal nearly plain.

Many specimens of this species were obtained from the Roanoke River at Roanoke, Salem, and Alleghany Springs. They abound in swift water, especially among rocks covered with river-weed (*Podostemon ceratophyllus*). They are especially plentiful in the clear waters of Bottom Creek, about 5 miles above Alleghany Springs, Va. This swift mountain stream is one of the chief sources of the Roanoke.

This species is nearly allied to *E. longimane*, and like that species is intermediate between the groups known as *Boleosoma* and *Ulocentra*.

* Scales 52, 54, 55, 55, 60, 62, 65, 60, 62, 53, 62, 63, 52, 58, in fourteen specimens of *E. evides* from tributaries of the French Broad. In Indiana specimens the number rarely goes below 60.

12. *Etheostoma verecundum* Jordan & Evermann, sp. nov. (Type No. 39862,

U. S. Nat. Mus.)

Subgenus *Ulocentra* Jordan, apparently allied to *E. stigmæum* and to *E. histrio*.Head, $4\frac{1}{2}$ in length; depth, $4\frac{1}{2}$. D. XI, 11. A. II, 7. Scales, 6-47-9. Length, $2\frac{1}{5}$ inches.

Form of head and body much as in *E. zonale*, the body subfusiform, little compressed, the back somewhat elevated. Head small; snout short, very convex in profile; eye large, longer than snout, $3\frac{1}{4}$ in head. Mouth small, inferior, horizontal; premaxillaries protractile, but with traces of an obsolete mesial frenum; maxillary extending to just beyond front of eye, $3\frac{3}{4}$ in head. Gill membranes broadly united; preopercle entire; cheeks, opercles, and nape scaly; breast naked; lateral line complete. Fins all very low; dorsal fins scarcely joined; caudal slightly lunate; pectorals as long as head, reaching tips of ventrals, not to vent.

Color in spirits greenish-yellow, much mottled with darker green; six or seven distinct quadrate green spots along lateral line; traces of three dark spots in a vertical row at base of caudal; a dark bar below and before eye; top of head dark. Ventrals and anal plain, other fins barred with dark olive; spinous dorsal with orange in front and orange spots on its last rays; tip of last spines dark.

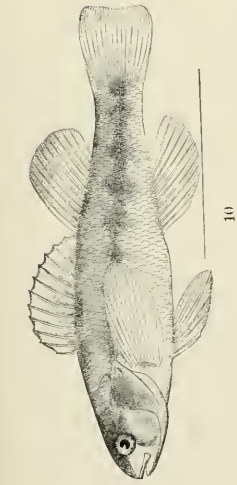
A single specimen of this species was taken in the Middle Fork of the Holston River, about 5 miles south of Glade Spring, Va.

13. *Etheostoma swannanoa* Jordan & Evermann, sp. nov. (Type No. 39861, U. S. Nat. Mus.)Subgenus *Nanostoma* Putnam. Allied to *E. blennioides* Gilbert & Swain.Head, $4\frac{1}{2}$ in length; depth, 6. D. XI or XII, 12 to 14. A. II, 9. Scales, 6-48 to 57-* 7 or 8. Length, $2\frac{1}{2}$ to 3 inches.

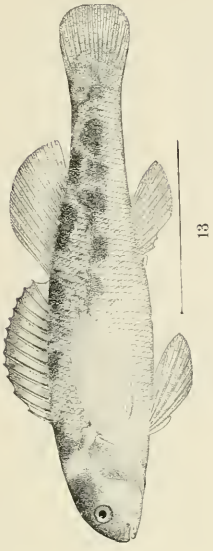
Form of *Etheostoma simotermum*. Body robust, somewhat compressed, the back elevated; head very short, deep, the anterior profile strongly convex; snout short and blunt; eye large, placed high, 4 in head; mouth very small, horizontal, inferior, the lower jaw included all around. Premaxillaries not protractile; maxillary short, not adnate, reaching to opposite front of eye, 4 in head; teeth small. Cheeks, opercles, and breast naked; nape naked in one specimen; scaly in the others. Lateral line complete; belly evenly scaled. Gill membranes broadly connected. Fins rather low; dorsals contiguous; pectorals long, one-third longer than head, reaching beyond ventrals to vent.

Males, in spirits, dusky green, the belly paler; back irregularly mottled and blotched with black and strewn with specks of saffron yellow; six distinct black cross-blotches on dorsal line; eight to ten roundish or quadrate black blotches on sides, a smaller spot behind the last of these at base of caudal, these lateral blotches somewhat connected. Head dusky above; a faint bar below eye; axil black; fins nearly plain.

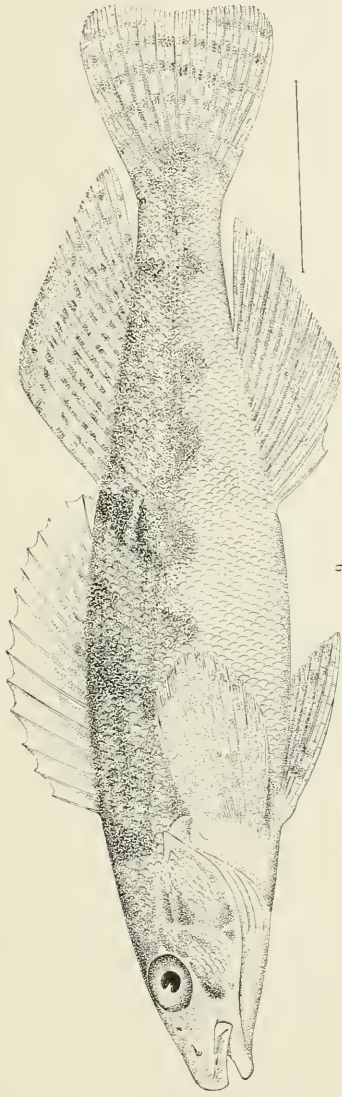
* Scales 50, 42, 53, 53, 54, 55, 56, 57, in eight specimens, the last three being from Holston River.



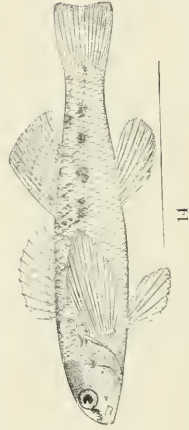
10



13



9



14



11



12

FIG. 9. *Ethicostoma rec.*, n. sp. (Page 357.)
 FIG. 10. *Ethicostoma ranakō,* n. sp. (Page 358.)
 FIG. 11. *Ethicostoma podostemonis,* n. sp. (Page 359.)
 FIG. 12. *Ethicostoma reccetianum,* n. sp. (Page 360.)
 FIG. 13. *Ethicostoma srananum,* n. sp. (Page 361.)
 FIG. 14. *Ethicostoma longicaudum* Jor. (Page 361.)

FIG. 9. *Ethicostoma rec.*, n. sp. (Page 357.)
 FIG. 10. *Ethicostoma ranakō,* n. sp. (Page 358.)
 FIG. 11. *Ethicostoma podostemonis,* n. sp. (Page 359.)

In life, male olive-green, light green below; markings all dark green; base and lower edge of pectoral tinged with saffron; base and tip of first dorsal bright snuffy-brown; second dorsal and caudal olive, speckled; lower fins pale yellow.

Female and younger specimens have the body more speckled; the pectorals and caudal barred with dark.

Ten specimens of this well-marked species were obtained. Two from the South Fork of the Holston River at Holstein Mills, Va.; two from the Middle Fork of the Holston at Marion, Va., and six from the South Fork of the Swannanoa River, at Black Mountain, N. C. The species apparently frequents only clear mountain streams.

14. *Etheostoma longimane* * Jordan. (No. 39865, U. S. Nat. Mus.)

Subgenus *Boleosoma* De Kay.

Head, $4\frac{2}{5}$ in length to base of caudal; depth, 5. D. x-13. A. i, 8. Scales 5-44-7. Largest specimen (Loch Laird, Va.), $2\frac{1}{2}$ inches long.

Body moderately elongate, not much compressed; head rather long, somewhat blunt anteriorly, convex above the eyes; profile of the snout steep and nearly straight; premaxillaries protractile; lower jaw included; maxillaries reaching front of orbit, about as long as eye, which is four in head, and about as long as snout; teeth rather strong; gill membranes a little connected; cheeks naked; opercles with some scales; nape and breast naked.

Lateral line complete; scales rather large; belly naked anteriorly, with ordinary scales posteriorly. Pectorals very long, reaching front of anal, about $1\frac{1}{2}$ times as long as head; ventrals long, but not reaching tips of pectorals nor front of anal. Dorsal spines high, the longest $1\frac{1}{5}$ in head; soft dorsal very high, $1\frac{1}{10}$ in head; anal smaller than soft dorsal; anal spine short, the first ray longer than the spine, simple, but articulate towards the tip. Caudal lunate.

Color in spirits straw-color, many scales on the back darker; ten dark spots on sides, rather irregular and small; one at base of caudal and one on front of opercle; back with five or six dark cross-blotches. Both dorsals with dark spots; caudal and pectoral somewhat barred; three or four dark bars only on caudal; ventrals and anal plain; a stripe forward from eye, but only a very faint dark shade below eye; a little black spot on base of pectoral above; sometimes faint dark dashes on lower part of side, alternating with the dark blotches.

In life this species is clear green, with markings of darker green or black.

This interesting species is common in tributaries of the James River in Virginia, abounding in rocky, swift waters, especially among river weeds. It is technically a "*Boleosoma*," but it is not very closely related to the *nigrum* group, but allied rather to those called *Ulocentra*.

*Originally described in Proc. Ac. Nat. Sci. Phila. 1882, p. 179, from specimens (No. 24619, Mus. Comp. Zool.) taken in a tributary of James River. The present description is drawn from better material.

Our specimens are from North River at Loch Laird, Va.; from Buffalo Creek, near Lexington, Va.; and from Elk Creek, near Natural Bridge. All of these streams flow into James River.

In this connection may be described the following species from Mexico:

15. *Etheostoma australe* Jordan, sp. nov. (Type 24625, Mus. Comp. Zool.)

Subgenus *Etheostoma*. Allied to *E. cornutum* Storer.

Head, $3\frac{3}{4}$ in length; depth, $4\frac{1}{4}$. D. XI, 11. A. I. S. Lat. l. 59. Length, 2 inches.

Form of *E. cornutum*, mouth rather small, the lower jaw included; maxillary reaching front of pupil; eye small, about as long as the sharp, pointed snout, $4\frac{1}{2}$ to 5 in head; gill membranes slightly connected; cheeks, opercles, nape, and breast naked; lateral line incomplete. Fins in males rather high; anal fin with a single spine (in all three specimens), this spine long and quite strong.

Color in spirits: Males with ten oblique white cross-bands, probably scarlet in life, these alternating with white blotches on back; a dark spot below eye and a dark humeral spot. Female specimen (with eggs) speckled with dark cross-blotches on back; scales punctulate.

I have examined three specimens of this species collected in the Chihuahua River, Mexico, by John Potts. These specimens are among the original types of *Diplesion fasciatus* Girard (Proc. Ac. Nat. Sci. Phila., 1859, 101). The name *fasciatus* can not, however, be retained, as the prior *Catnotus fasciatus* Girard (*op. cit.*, p. 67) belongs also to the subgenus *Etheostoma*, being a synonym of *Etheostoma flabellare*.

U. S. FISH COMMISSION, October 5, 1888.