

8.—A REVIEW OF THE CENTRARCHIDÆ, OR FRESH-WATER SUNFISHES, OF NORTH AMERICA.

By CHARLES HARVEY BOLLMAN, A. B.

NOTE.—The present paper was prepared at my suggestion by Mr. Bollman, and at his death it was found to be very nearly ready for the press. It is based on the collections made by the U. S. Fish Commission and on the material in the museum of the Indiana University. All the species of the family, with the exception of *Lepomis albulus* and the doubtful *Emmeacanthus criarchus*, have been examined by Mr. Bollman and most of his conclusions have been abundantly verified. It was Mr. Bollman's intention to add critical notes on the synonymy and observations of the habits of each species. The paper, even without these, will be useful to students of these fishes.

DAVID S. JORDAN.

In this paper are given analytical descriptions with an outline of the synonymy of the different species of the *Centrarchidæ*, popularly known as sunfishes, pond fishes, crappies, pumpkin-seeds, and black bass. This group is recognized, as currently defined, as a family of percoid fishes closely allied to the *Serranidæ*, being distinguished chiefly by the rudimentary condition of the pseudobranchiæ and certain peculiarities in the form of the body. The definition given by Jordan and Gilbert (Synopsis of the Fishes of North America, 1883, p. 462) may be accepted for the purposes of this paper. All the species are confined to the fresh waters of North America. They are especially abundant in the lowland rivers, lakes, and ponds of the eastern United States, where they form one of the most conspicuous elements in the fish fauna. All are carnivorous fishes, and all that are large enough to be worth considering are excellent as food.

The group has been divided by Dr. Gill into three subfamilies very closely related to each other, *Centrarchinæ*, *Lepominæ*, and *Micropterinæ*. Most of the species belong to the *Lepominæ*. The *Micropterinæ* approach most nearly to the *Serranidæ*, and are perhaps most nearly related to the primitive stock from which the group has sprung.

The chief characters of these subfamilies, as well as of the different genera, are given in the following analysis:

ANALYSIS OF THE GENERA OF CENTRARCHIDÆ.

- a. Dorsal fin scarcely larger than anal. (CENTRARCHINÆ.)
 - b. Dorsal spines, 11 or 12; anal spines, 7 or 8; spinous dorsal longer than soft dorsal; body short and deep, compressed. CENTRARCHUS, 1.
 - bb. Dorsal spines, 5 to 8; anal spines, 6; spinous dorsal shorter than soft dorsal; body elongate, compressed. POMOXIS, 2.
- aa. Dorsal fin much larger than anal.
 - c. Body rather short and deep; dorsal fin not deeply divided. (LEPOMINÆ.)
 - d. Tongue and pterygoids with teeth.
 - e. Scales ctenoid; caudal emarginate.
 - f. Anal spines, 5 to 8; operculum emarginate behind.
 - g. Lingual teeth in two patches; gill-rakers about 20; most of the membrane bones of head serrate; lower point of opercle striate, striæ ending in sharp points. ARCHIOLITES, 3.
 - gg. Lingual teeth in a single patch; gill-rakers about 10; only the preopercle serrate at its angle, bones of head otherwise entire; lower point of opercle without pointed striæ.
 - AMBLOPLITES, 4.
 - ff. Anal spines, 3; operculum ending in a black convex flap; preopercle entire; dorsal spines, 10. CHÆNOBRYTTUS, 5.
 - ee. Scales cycloid; caudal convex; anal spines, 5. ACANTHARCHUS, 6.
 - dd. Tongue and pterygoids toothless; mouth small; preopercle entire.
 - h. Operculum emarginate; caudal fin convex.
 - i. Dorsal fin continuous. ENNEACANTHUS, 7.
 - ii. Dorsal fin angulated. MESOGONISTIUS, 8.
 - hh. Operculum more or less prolonged behind into a convex flap; caudal fin emarginate. LEPOMIS, 9.
- cc. Body elongate; dorsal fin low, deeply emarginate. (MICROPTERINÆ.)
 - MICROPTERUS, 10.
 - j. Mouth large; maxillary with a supplemental bone; opercle emarginate behind; preopercle entire; lower pharyngeals narrow, with sharp teeth; caudal lunate.

I. CENTRARCHUS.

1829. *Centrarchus* Cuvier & Valenciennes, Hist. Nat. Poiss., III, 62 (*irideus*).

1864. *Eucentrarchus* Gill, Amer. Jour. Sci. and Arts, 92 (*irideus*).

Type: *Labrus irideus* Lacépède.

Etymology: *Κέντρον*, spine; *ἄρχος*, anus.

ANALYSIS OF THE SPECIES OF CENTRARCHUS.

- a. Body ovate, strongly compressed; head small; snout short, shorter than eye; mouth small, oblique; maxillary reaching posterior border of pupil; eye large, 3¼ to 4 in head; opercular spot narrow, much higher than long; scales large, 4 to 6 rows on cheeks; dorsal high, longest spine 1¾ in head; pectorals and ventrals long, reaching anal, ventral spines extending past anus to fin. Green, with series of dark brown spots on sides, below lateral line forming interrupted longitudinal lines; a dark spot below eye; soft dorsal and anal reticulated; young with a black ocellus at base of soft dorsal. Head, 2¼ to 3; depth, 1¾ to 2. D. XI-XII, 12; A. VII-VIII, 15; lat. 1, 38 to 44; L. 6 inches. MACROPTERUS, 1.

1. **CENTRARCHUS MACROPTERUS.**

(Round Sunfish. Plate LXVIII, fig. 1.)

- Labrus macropterus* Lacépède, Hist. Nat. Poiss., III, 447, 1802 (Charleston).
Centrarchus macropterus Jordan, Bull. X, U. S. Nat. Mus., 36, 1877.
Labrus irideus Lacépède, Hist. Nat. Poiss., IV, 716, 1802 (Charleston).
Centrarchus irideus Cuv. & Val., Hist. Nat. Poiss., III, 89, 1829 (Carolina).

Habitat: Lowland streams from southern Virginia southward to Florida and Louisiana; northward in the Mississippi Valley to Illinois.

Etymology: *Μακρός*, long; *πτερόν*, fin.

This species is generally common in the bayous and ponds of the southern streams.

II. **POMOXIS.**

1818. *Pomoxis Rafinesque*, Journ. Acad. Nat. Sci. Phila., 417 (*annularis*).
 1860. *Pomoxys* Holbrook, Ich. S. C., 29 (*emend.*).
 1861. *Hyperistius* Gill, Amer. Journ. Sci. and Arts, 92 (*hexacanthus*).

Type: *Pomoxis annularis* Rafinesque.

Etymology: *Πῶμα*, opercle; *ὀξὺς*, sharp.

ANALYSIS OF THE SPECIES OF POMOXIS.

- a. Dorsal spines 7, rarely 8; anal strongly reticulated; body oblong, elevated, much compressed; head moderate; snout projecting; mouth rather large; maxillary reaching to posterior border of eye; eye large, $3\frac{1}{2}$ to 4 in head; opercular spot small; dorsal elevated, longest spine reaching posterior border of eye; pectorals and ventrals reaching anal, ventral spine extending past anus; scales moderate, 6 to 8 rows on cheeks. Silvery-olive, mottled with clear green; dorsal and anal marked alike; head, 3; depth, 2; D. VII or VIII, 15; A. VI, 17 or 18; lat. l., 40 to 45. SPAROIDES, 2.
- aa. Dorsal spines 6, rarely 5; anal, plain; profile of head more strongly S-shaped than in *sparoides*; nape more gibbous; snout longer than eye; maxillary somewhat shorter; eye smaller, $4\frac{1}{2}$ to 5 in head; scales on cheeks in 4 or 5 rows; lat. l., 36 to 48; rest almost as in *sparoides* ANNULARIS, 3.

2. **POMOXIS SPAROIDES.**

(Calico Bass; Strawberry Bass; Tin-mouth; Grass Bass; Bar Fish. Pl. LXVIII, fig. 2.)

- Labrus sparoides* Lacépède, Hist. Nat. Poiss., III, 517, 1802.
Centrarchus sparoides Cuv. & Val., III, 88, 1829 (Carolina).
Pomoxis sparoides Girard, U. S. Pac. R. R. Surv., 6, 1859.
Cantharus nigromaculatus Le Sueur ms., 1829 (Cuv. & Val., Hist. Nat. Poiss., III, 88).
Pomoxis nigromaculatus Girard, U. S. Pac. R. R. Surv., 6, 1859.
Centrarchus hexacanthus Cuv. & Val., Hist. Nat. Poiss., VII, 458, 1831.
Pomoxys hexacanthus Holbrook, Ich. S. C., 29, 1860.
Hyperistius hexacanthus Gill, Amer. Jour. Sci. and Arts, 97, 1864.
Hyperistius carolinensis Gill, Amer. Jour. Sci. and Arts, 92, 1864.

Habitat: Eastern United States from the Great Lakes to the Gulf, east to the Hudson River, west to Arkansas; in upland streams and lakes, rarely descending to the lowlands.

Etymology: *Sparus*, a genus of fishes; *εἶδος*, like.

3. POMOXIS ANNULARIS.

(Crappie; Sac-a-Lai; Bachelor; New Light. Plate LXVIII, fig. 3.)

- Pomoxis annularis* Rafinesque, Amer. Mont. Mag., 41, 1818 (Falls of Ohio River).
- Pomoxys annularis* Jordan, Man. Vert., ed. 1, 231, 1876.
- Cichla storeria* Kirtland, Rep. Zool. Ohio, 191, 1838.
- Pomoxys storerius* Gill, Proc. Acad. Nat. Sci. Phila., 1865, 64.
- Pomoxis nitidus* Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Houston River, Ky.).
- Centrarchus nitidus* Günther, Cat. Fish. Brit. Mus., 1, 257, 1859.
- Pomoxys brevicauda* Gill, Proc. Acad. Nat. Sci. Phila. 1865, 64 (North Grand River, Mo.).
- Pomoxys intermedius* Gill, Proc. Acad. Nat. Sci. Phila. 1865, 64.
- Pomoxys protacanthus* Gill, Proc. Acad. Nat. Sci. Phila. 1865, 64 (Tarboro, N. C.).

Habitat: Eastern United States south of the Great Lake region, east of the Alleghanies north to the Great Lakes, west to Kansas and Texas (in lowland streams).

Etymology: Latin, ringed.

III. ARCHOPLITES.

1861. *Archoplites* Gill, Proc. Acad. Nat. Sci. Phila., 165 (*interruptus*).

Type: *Centrarchus interruptus* Girard.

Etymology: Ἀρχός, anus; ἄπλιτος, armed.

ANALYSIS OF THE SPECIES OF ARCHOPLITES.

- a. Body oblong ovate, compressed, profile angulated; head large; snout scarcely longer than eye; mouth large; maxillary reaching posterior border of eye; eye moderate, 4½ to 5 in head; scales moderate, smaller on breast and back, 8 to 9 rows on cheeks; dorsal spines rather high, longest reaching posterior border of pupil; pectorals and ventrals not reaching anal. Blackish above, sides silvery, with about 7 dark interrupted bars; a black opercular spot; fins nearly plain; head, 2¾ to 2⅞; depth, 2¼ to 2½; D. XII-XIII, 10; A. VI-VII, 10; lat. l., 40 to 51; L., 12 inches..... INTERRUPTUS, 4.

4. ARCHOPLITES INTERRUPTUS.

(Sacramento Perch. Plate LXIX, fig. 1.)

- Centrarchus interruptus* Girard, Proc. Acad. Nat. Sci. Phila. 1854. 129 (San Joaquin and Sacramento Rivers).
- Ambloplites interruptus* Girard, U. S. Pac. R. R. Surv., 10, 1859.
- Archoplites interruptus* Gill, Proc. Acad. Nat. Sci. Phila. 1861, 165.
- Centrarchus maculosus* Ayres, Proc. Cal. Acad. Nat. Sci. 1854, 8.

Habitat: Sacramento and San Joaquin Rivers, California.

Etymology: Latin, interrupted.

This species is common in the larger streams of California and is the only Percoid west of the Rocky Mountains.

IV. AMBLOPLITES.

1820. *Ambloplites* Rafinesque, Ich. Oh., 33 (*iotheloides* = *rupestris*).

Type: *Lepomis ichtheloides* Raf. (= *Bodianus rupestris*).

Etymology: Ἀμβλόπις, blunt; ἐπίτηξ, armed.

ANALYSIS OF THE SPECIES OF AMBLOPLITES.

- a. Scales on cheeks not rudimentary; body oblong, heavy, moderately compressed; head large; snout projecting, shorter than eye; mouth large; maxillary reaching to posterior border of eye; opercular spot small, black, confined; eye large, 3½ to 4 in head; scales large, 6 to 8 rows on cheeks; dorsal spines moderately elevated, longest reaching to posterior border of pupil; ventrals and pectorals not reaching anal, ventral spine 1½; olive green, tinged with brassy; a dark spot on each scale, these forming interrupted long stripes; a dark spot below eye; vertical fins reticulated; head, 2½ to 2¾; depth, 2 to 2½; D. XI, 10; A. VI, 10; lat. l., 38 to 42; L., 12 inches.....RUPESTRIS, 5.
- aa. Scales on cheeks rudimentary in the adult (stripes more interrupted and fins less reticulated), otherwise as in *rupestris*CAVIFRONS, 5b.

5. AMBLOPLITES RUPESTRIS.

(Rock Bass; Red Eye. Plate LXIX, fig. 2.)

Bodianus rupestris Rafinesque, Amer. Mont. Mag., 120, 1817.
Ambloplites rupestris Gill, Proc. Acad. Nat. Sci. Phila. 1860, 20.
Ithelis erythroptis Rafinesque, Ich. Oh., 29, 1829 (Ohio River).
Lepomis ichtheloides Rafinesque, Ich. Oh., 32, 1819 (Ohio River).
Ambloplites ichtheloides Agassiz, Amer. Journ. Sci. and Arts, 299, 1854 (Huntsville, Ala.).
Cichla anca Le Sueur, Journ. Acad. Nat. Sci. Phila. 1822, 214.
Centrarchus aneus Cuv. & Val., Hist. Nat. Poiss., III, 84, 1829 (Lake Ontario).
Ambloplites aneus Agassiz, Amer. Journ. Sci. and Arts, 299, 1854.
Centrarchus pentacanthus Cuv. & Val., Hist. Nat. Poiss., III, 88, 1829 (Wabash R.).

Habitat: Lake Champlain to Manitoba, south to Louisiana in rivers and lakes west of the Alleghany Mountains.

Etymology: Latin; living among rocks.

5b. AMBLOPLITES RUPESTRIS CAVIFRONS.

Ambloplites cavifrons Cope, Journ. Acad. Nat. Sci. Phila. 1868, 217 (Roanoke R.).

Habitat: Roanoke River.

Etymology: *Cavus*, hollow; *frons*, forehead.

An examination of an adult of this form from Roanoke River shows that *cavifrons* should probably be maintained as a distinct subspecies. There is nothing peculiar or different in any respect from *rupestris* about the physiognomy of *cavifrons*, the sole tangible difference being in the scaling of the head.

V. CHÆNOBRYTTUS.

1864. *Chænobryttus* Gill, Amer. Journ. Sci. and Arts, 92 (*Calliurus melanops* Girard).

1876. *Glossoplites* Jordan, Man. Vert., ed. 1, 223 (*melanops*).

Type: *Calliurus melanops* Girard (= *Pomotis gulosus* Cuv. & Val.)

Etymology: *Χαίρω*, to yawn; *bryttus*, i. e., *leponis*.

ANALYSIS OF THE SPECIES OF CHÆNOBRYTTUS.

- a. Body elongate, heavy, short and thick; head large; snout about equal to eye; mouth large; maxillary reaching posterior border of eye; eye large, 4 to 4½ in head; opercular spot about as large as eye, black confined, margined; scales moderate, 6 to 8 rows on cheeks; dorsal spines low, largest reaching to middle of pupil; pectorals not reaching anal; ventrals nearly reaching anus, ventral spine about 2 in distance between origin of ventrals and anus. Dark olive-green, sides brassy, with numerous blotches of blue and coppery red; belly yellow, spotted with red; iris bright red; 3 or 4 dark-red bars back and below eye across cheeks and opercles; vertical fins reticulated; soft dorsal and anal with a faint spot. Head, 2½ to 2¾; depth, 2 to 2½; D. X, 10; A. III, 9; lat. 1., 38 to 44; L., 10 inches.

GULOSUS, 6.

6. CHÆNOBRYTTUS GULOSUS.

(War-mouth. Plate LXIX, fig. 3.)

Pomotis gulosus Cuv. & Val., Hist. Nat. Poiss., III, 498, 1829 (New Orleans).

Centrarchus gulosus Cuv. & Val., Hist. Nat. Poiss., VII, 459, 1831.

Calliurus gulosus Agassiz, Amer. Journ. Sci. and Arts, 300, 1854 (Huntsville, Ala.).

Chænobryttus gulosus Cope, Proc. Acad. Nat. Sci. Phila., 1865, 84 (Michigan).

Lepomis gulosus Cope, Journ. Acad. Nat. Sci. Phila. 1868, 223.

Centrarchus viridis Cuv. & Val., Hist. Nat. Poiss., VII, 460, 1831 (New Orleans).

Chænobryttus viridis Jordan and Copeland, Bull. Buff. Soc. Nat. Hist., 137, 1876.

Calliurus punctulatus Agassiz, Amer. Journ. Sci. and Arts, 300, 1854 (Huntsville, Alabama).

(?) *Pomotis pallidus* Agassiz, l. c., 1854 (Huntsville, Alabama).

Calliurus floridensis Holbrook, Journ. Acad. Nat. Sci. Phila. 1855, 53 (St. John's River, Florida).

Bryttus floridensis Günther, Cat. Fish. Brit. Mus., 260, 1859.

Chænobryttus floridensis Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 137, 1876.

Calliurus melanops Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Leon River, Rio Medina, Dry Creek, and San Pedro Creek, Texas).

Bryttus melanops Günther, Cat. Fish. Brit. Mus., 260, 1859.

Chænobryttus melanops Gill, Amer. Journ. Sci. and Arts, 92, 1864.

Glossoplites melanops Jordan, Man. Vert., 223, 1876 (Illinois River).

Lepomis gillii Cope, Journ. Acad. Nat. Sci. Phila. 1868, 225 (James River, Va.).

Chænobryttus gillii Cope, Proc. Amer. Phil. Soc., 425, 1870. (All streams of North Carolina east of the Alleghanies; not found in the French Broad).

Glossoplites gillii, Jordan, Man. Vert., ed. 1, 233, 1876.

Chænobryttus gillii Cope, Proc. Amer. Phil. Soc., 252, 1870 (French Broad).

Lepomis charybdis Cope, Journ. Acad. Nat. Sci. Phila. 1868, 224 (Texas).

Chænobryttus antistius McKay, Proc. U. S. Nat. Mus. 1881, 88 (Lake Michigan).

Chænobryttus gulosus antistius Jordan, Cat. Fish. N. A., 76, 1885.

? *Lepomis lirus* McKay, Proc. U. S. Nat. Mus., 1881, 89 (based on *Pomotis pallidus* Agassiz).

Habitat: Eastern United States from the Great Lakes to Virginia, southwest to the Gulf; east of the Alleghanies; north to Virginia; west to Kansas and Texas.

Etymology: Latin; big mouthed.

I have been unable to find any stable differences between the *antis-tius* of McKay and the *gulosus* of Cuv. and Val. The differences mentioned in Jordan and Gilbert's Synopsis gradually fade into each other, and all the many specimens of war-mouth examined doubtless belong to one species. The *Pomotis pallidus* of Agassiz, which has become the *Lepomis lirus* of McKay, I can not identify, and I suggest that it may be the same as *Chanobryttus gulosus*.

VI. ACANTHARCHUS.

1864. *Acantharchus* Gill, Amer. Journ. Sci. and Arts, 92 (*pomotis*).

Type: *Centrarchus pomotis* Baird.

Etymology: *Ἀκανθα*, spine; *ἄρχος*, anus.

ANALYSIS OF THE SPECIES OF ACANTHARCHUS.

- a. Body oblong, robust, moderately compressed; head large; snout shorter than eye; mouth large; maxillary extending past eye, $2\frac{1}{2}$ in head; eye moderate, 4 to $4\frac{1}{2}$ in head; opercular spot smaller than eye; scales moderate, 5 to 6 rows on cheeks; dorsal spines low, longest reaching to middle of pupil; ventral and pectorals reaching anal, the latter short, $1\frac{1}{2}$ in head, ventral spine $1\frac{1}{4}$ in distance between origin of ventrals and anus. Dark greenish, usually with five longitudinal black bands along sides; cheeks with three dark bars; vertical fins dark at base; head $2\frac{1}{4}$ to $2\frac{3}{4}$; depth, 2 to $2\frac{1}{2}$; D. XI, 10; A. V, 10; lat. 1., 38 to 44 POMOTIS, 7.

7. ACANTHARCHUS POMOTIS.

(Mud Bass. Plate LXX, fig. 1.)

Centrarchus pomotis Baird, Ninth Smith. Rept., 325, 1854 (New Jersey, New York).
Acantharchus pomotis Gill, Amer. Journ. Sci. and Arts, 92, 1864.

Habitat: East of the Alleghany Mountains, from New York to South Carolina, only in the lowland streams.

Etymology: *Pomotis*, an old name of *Lepomis*.

VII. ENNEACANTHUS.

1864. *Enneacanthus* Gill, Amer. Journ. Sci. and Arts, 92 (*obesus*).

1868. *Hemioplites* Cope, Journ. Acad. Nat. Sci. Phila., 218 (*simulans*=*gloriosus*.)

1877. *Copelandia* Jordan, Proc. Acad. Nat. Sci. Phila., 56 (*eriarcha*).

Type: *Pomotis obesus* Baird.

Etymology: *Ἐννεα*, nine; *ἄκανθα*, spine.

ANALYSIS OF THE SPECIES OF ENNEACANTHUS.

- a. Opercular spot large, more than half eye; sides with 5 to 8 distinct vertical bars; body oblong-ovate, compressed; head small; snout shorter than eye; mouth small; maxillary extending to middle of pupil; eye large, 3 to $3\frac{1}{2}$ in head; opercular spot bordered below, black not confined; scales moderate, 3 to 4 rows on cheeks; dorsal moderately high; longest spine extending beyond pupil; pectorals and ventrals reaching anal, ventral spine reaching anus. Olivaceous, with 5 to 8 distinct black crossbars; spots on body or fins purplish or golden; cheeks with lines and spots; a dark bar below eye; head $2\frac{3}{4}$ to 3; depth, $1\frac{1}{2}$ to $2\frac{1}{4}$; D. IX, 10; A. III, 10; lat. 1., 32 to 33; L., 3 inches.

OBESUS, 8.

- aa. Opercular spot smaller than half eye; body without crossbars.
- b. Ventral spines reaching anus; body more robust and elongated than in *obesus*; dark olive; sides of head, whole body, and vertical fins, in the males, with round, bright, blue spots arranged in irregular rows; females duller, with larger and fainter spots more regular in position; ear flap small, with a blue border and a pearly spot in front; a dark bar below eye; D. IX to X, 10; A. III to IV, 9; lat. 1., 30. GLORIOSUS, 9.
- bb. [Ventral spines reaching anal. Olivaceous; vertical fins with round, pale spots; D. X, 7; A. IV, 8; lat. 1., 33; doubtful species, probably identical with *gloriosus* ERIARCHUS, 10.]

8. ENNEACANTHUS OBESUS.

Pomotis obesus Baird, Ninth Smith. Rept., 324, 1854 (Beaseley's Point, N. J.).
Bryttus obesus Girard, Proc. Acad. Nat. Sci. Phila. 1859, 53.
Enneacanthus obesus Gill, Amer. Journ. Sci. and Arts, 92, 1864.
Bryttus fasciatus Holbrook, Jour. Ac. Nat. Sci. Phila. 1855, 51 (St. John's R., Fla.).
Enneacanthus fasciatus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 137, 1876.
Pomotis guttatus Morris, Proc. Acad. Nat. Sci. Phila. 1859, 3 (Philadelphia).
Enneacanthus milnerianus Cope ms. 1878 (description never published).

Habitat: Massachusetts to Florida, in lowland streams.

Etymology: Latin; *obesus*, fat.

9. ENNEACANTHUS GLORIOSUS.

Bryttus gloriosus Holbrook, Journ. Acad. Nat. Sci. Phila. 1855, 51 (Cooper River, S. C.; Georgia).
Enneacanthus gloriosus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 137, 1876.
Hemiplites simulans Cope, Journ. Acad. Nat. Sci. Phila. 1868, 218 (Tuckahoe Creek, near Richmond, Va.).
Enneacanthus simulans McKay, Proc. U. S. Nat. Mus., 93, 1881.
Enneacanthus pinniger Jordan, Bull. x, U. S. Nat. Mus., 27 1878 (Kinston, N. C.).
Enneacanthus simulans pinniger Jordan, Cat. Fish. N. A., 76, 1885.
Enneacanthus margarotis Gill & Jordan, Bull. x, U. S. Nat. Mus., 28, 1878 (Beaseley's Point, N. J.).

Habitat: New Jersey to Florida, in lowland streams, east of the mountains.

Etymology: Latin; *gloriosus*, glorious.

A careful comparison of specimens of *E. simulans*, with Holbrook's description of *Bryttus gloriosus*, convinces me that they are the same, and as *gloriosus* is an older name it must be used in place of *simulans*. *Enneacanthus simulans pinniger* is not worthy even of a subspecific rank, as the characters upon which it is based are very variable, and are those of highly developed males. In this point I agree with Mr. Charles L. McKay (Proc. U. S. Nat. Mus. 1881, 92).

10. ENNEACANTHUS ERIARCHUS.

Copelandia eriarcha Jordan, Proc. Acad. Nat. Sci. Phila. 1877, 56 (Menominee River, Milwaukee, Wisconsin).
Enneacanthus eriarchus McKay, Proc. U. S. Nat. Mus. 1881, 93.

Habitat: Unknown. The assigned localities are the Menominee River, Wisconsin, and Missouri.

Etymology: 'Epi, an intensive particle; ἀρχός, anus.

This is a very doubtful species, but it may be retained provisionally as distinct, on the characters given in the key, which are those of the original type. Both the localities assigned to this species are probably erroneous. The original type was sent to the Indiana University by Dr. P. R. Hoy, purporting to have come from the neighborhood of Milwaukee. Another smaller specimen is in the National Museum, said to have been taken by Dr. Hoy in Tabo Creek, Missouri. Inasmuch as no other collector has obtained any *Enneacanthus* west of the Alleghany Mountains, it is probable that Dr. Hoy's specimens came from some eastern locality.

E. eriarchus is probably identical with *E. gloriosus*, the frequent variation in number of spines in the latter species being additional reason for so thinking.

VIII. MESOGONISTIUS.

1864. *Mesogonistius* Gill, Amer. Journ. Sci. and Arts, 92 (*chatodon*).

Type: *Pomotis chatodon* Baird.

Etymology: Μέσος, middle; γωνία, angle; ἰστίον, sail.

ANALYSIS OF THE SPECIES OF MESOGONISTIUS.

- a. Body suborbicular, compressed; head moderate; snout shorter than eye; mouth very small; maxillary reaching to pupil; eye large, 3 to 3½ in head; opercular spot much smaller than eye, with a crescent-shaped pale center; scales large; dorsal spines elevated, longest reaching just beyond eye; pectorals and ventrals reaching anal, ventral spine reaching anus. Clouded straw-color sides with 6 to 8 conspicuous black irregular vertical bars, first through the eye, second in front of pectorals, interrupted on the operculum, third at the front of the dorsal covering the membrane of the first three spines, and forming a median black stripe on each ventral fin, the fourth at front of soft dorsal, fifth opposite its last ray, last at base of caudal; fins mottled; head, 3 to 3½; depth, 1½ to 1¾; D. x, 10; A. iii, 12; lat. 1., 28; L., 3 inches CHÆTODON, 11.

11. MESOGONISTIUS CHÆTODON.

(Plate LXX, fig. 2.)

Pomotis chatodon Baird, Ninth Smith. Rept., 324. 1854 (Cedar Swamp Cr., N. J.).

Mesogonistius chatodon Gill, Amer. Journ. Sci. and Arts, 92, 1864.

Habitat: New Jersey to Maryland, only in sluggish streams near the coast.

Etymology: *Chatodon*, a genus of fishes, from χαιτή, hair; ὀδών, tooth.

IX. LEPOMIS.

1819. *Lepomis* Rafinesque, Journ. de Phys., 402 (*auritus*).

1819. *Pomotis* Rafinesque, Journ. de Phys., (*auritus*).

1819. *Apomotis* Rafinesque, Journ. de Phys., 420 (*cyaneus*).

1820. *Ichthelis* Rafinesque, Ich. Ob., 27 (*auritus*).

1820. *Telipomis* Rafinesque, Ich. Ob., 27 (*macrochira*=*pallidus*).

1831. *Bryttus* Cuv. & Val., Hist. Nat. Poiss., 461 (*punctatus*).

1876. *Helioperca* Jordan, Ann. N. Y. Lyc. Nat. Hist., 355 (*pallidus*).

1877. *Xenotis* Jordan, Proc. Acad. Nat. Sci. Phila., 76 (*fallax*=*megalotis*).
 1877. *Xystroplites* Jordan ms., Cope, Proc. Amer. Phil. Soc., 66 (*gillii*=*albulus*).
 1877. *Eupomotis* Gill & Jordan, Field & Forest, 190 (*Sparus aureus*=*gibbosus*).
 1877. *Lepiopomus* Jordan, Ann. N. Y. Lyc. Nat. Hist., 316 (*emend.*).

Type: *Labrus auritus* Linnaeus.

Etymology: *Λεπίς*, scale; *πῶμα*, opercle.

ANALYSIS OF THE SPECIES OF LEPOMIS.*

- a. Lower pharyngeals narrow, teeth conic.
 b. Gill-rakers long, stiff; supplementary bone evident, usually well developed; pectorals shorter than head.
 c. Scales moderate, lat. 1., 43 to 50. (*Apomotis* Rafinesque.)
 d. Body oblong, the depth $2\frac{1}{2}$ to $2\frac{1}{2}$ in length; dorsal with a black spot at base of soft rays more or less distinct; head large; snout projecting, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; mouth large; maxillary reaching middle of eye; eye $4\frac{1}{2}$ to $4\frac{3}{4}$ in head; opercular spot as large as eye, margined, black confined to bony part; scales small; dorsal spines low, longest equal to snout; pectoral short, not reaching anal; ventrals short, not reaching anal fin, spine $1\frac{1}{2}$ to 2 in distance from origin of ventrals to anus. Green, with brassy luster, each scale with a blue spot at base; fins largely blue, anal and ventrals edged with orange; a dark spot at base of last rays of dorsal and usually of anal also; cheeks with blue stripes; iris red. Head, $2\frac{1}{2}$ to 3; depth, $2\frac{1}{2}$ to $2\frac{1}{2}$; D. x, 11; A. III, 9; lat. 1., 48 to 50. L., 7 inches.....CYANELLUS, 12.
 dd. Body short and deep, the depth half the length; dorsal without a black spot at base of soft rays; head rather large; snout moderate; mouth moderate; maxillary reaching to posterior border of pupil; eye large, shorter than snout, $4\frac{1}{2}$ in head; opercular spot as large as eye, margined above and below; scales large, 6 to 7 rows on cheeks; dorsal elevated, longest spine as long as from tip of snout to middle of pupil; pectorals reaching anal; ventral spines $1\frac{1}{2}$ in distance from origin of ventrals to anus, fin not reaching anal. General color olive-green; unmarked. Head, 3; depth, 2 to $2\frac{1}{2}$; D. x, 10; A. III, 9; lat. 1., 43 to 46. L., 6 inches.....ISCHYRUS, 13.
 cc. Scales rather large, 33 to 34 in lateral line. Body short and deep, robust; dorsal and ventral curves equal; head moderate; snout very short, $4\frac{1}{2}$ to 5 in head; mouth small; maxillary extending to posterior border of pupil; eye large, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; opercular spot smaller than eye, higher than long, margined with black on the bony part; scales large; dorsal spines moderately high, longest spine reaching posterior border of eye; pectorals shorter than head, not reaching anal; ventrals not reaching anal, spine long, $1\frac{1}{2}$ to $1\frac{3}{4}$ in distance between origin of ventrals and anus. Dark green, sides with about 10 vertical bars; dorsal in ♀ with a black ocellus on last ray; cheeks not striped. Head, $2\frac{3}{4}$ to 3; depth, 2 to $2\frac{1}{2}$; lat. line, 33 to 34. L., $2\frac{1}{2}$ inches.....SYMMETRICUS, 14.

*Some of the characters used in this key are variable, and with young specimens it must be used with caution.

- bb. Gill-rakers moderate or shortish; supplementary maxillary very small or obsolete. (*Lepomis*.)
- e. Pectorals moderate or short, shorter than head; usually no distinct black spot on last rays of dorsal or anal.
- f. Mucous pores large; opercular spot wholly surrounded by a very broad red margin; scales very large, lat. l., 33 to 35. Body oblong, moderately compressed; head rather large; snout moderate, $3\frac{1}{2}$ in head; mouth moderate; maxillary reaching nearly to middle of pupil; eye rather large, $3\frac{1}{2}$ to 4 in head; mucous pores large, those on proopercle especially so; opercular spots rather long, as large as or larger than eye, the black not confined to the bony part; dorsal rather high, longest spine as long as from tip of snout to posterior border of eye; pectorals short, about $1\frac{1}{2}$ in head; ventrals reaching anal, spine $1\frac{1}{2}$ to $1\frac{1}{4}$ in distance between origin of ventrals and anus. Olive, with greenish spots posteriorly; sides with round orange spots; belly and lower fins red. Head, $2\frac{1}{2}$; depth, $2\frac{1}{4}$ to $2\frac{1}{2}$; lat. line, 32 to 35. L., $2\frac{1}{2}$ inches. HUMILIS, 15.
- ff. Mucous pores small; opercular spot various; scales moderate or small, 35 to 43.
- g. Pectoral fin rather long and slender, reaching to first soft rays of anal, and as long as head without flap; dorsal spines high, the longest as long as snout and eye; general form and coloration of *Lepomis humilis*, the scales smaller and the fins longer; body oblong, compressed; profile depressed above eye, the snout projecting; mouth moderate, the lower jaw projecting, the maxillary reaching to below front of pupil; opercular flap moderate, with a wide red margin; ventrals reaching anal; gill-rakers shortish and thick; scales 6-40 to 43-13, 5 or 6 on cheek; eye moderate, $3\frac{1}{4}$ in head, a little longer than snout. Color light olive; back and sides mottled with olive, these markings taking the form of chain-like crossbands; adult with round orange spots on sides, as in *L. humilis*; fins plain. MACROCHIRUS, 16.
- gg. Pectoral fins short, not reaching beyond front of anal, and shorter than head without opercular flap; dorsal spines low, not longer than from snout to posterior margin of pupil.
- h. Opercular flap in the adult very long, longer than high, and usually with a red margin, which is generally narrow.
- i. Palatine teeth none; gill-rakers very short and weak; body deep, with the back rounded. Color of adult, brilliant orange and blue, the former color predominating below, the blue in wavy streaks, the orange in spots; head with conspicuous blue stripes; fins mostly with the membranes orange, the rays blue. Body short and deep, compressed; profile steep; head short; snout short, 4 to $4\frac{1}{4}$ in head; maxillary extending to opposite middle of pupil; eye moderate, $3\frac{1}{4}$ to 4 in head; opercular spot usually larger than eye, and margined with red, in the adult becoming very long and rather broad; scales moderately small; dorsal spines rather low, longest reaching from snout to posterior border of pupil; pectorals shorter than head; ventrals not reaching anal, spine $1\frac{1}{2}$ to $1\frac{1}{4}$ in distance from origin of ventrals to anus. Head, 3; depth, $2\frac{1}{2}$ to $2\frac{1}{4}$; lat. line, 35 to 42. L., 6 in. MEGALOTIS, 17.

- ii. Palatine teeth present, few; gill-rakers moderate; body oblong; adult olive; belly and lower fins largely red; scales on sides with bluish spots; bluish stripes on head, especially before eye. Body elongate, moderately deep, profile steep; head moderately long; snout short, 4 in head; maxillary extending to posterior border of pupil; opercular flap becoming very long in the adult, but always remaining narrow; eye moderate, 4 in head; scales varying in size: dorsal spines low, longest reaching to pupil; pectorals reaching to anal; ventrals usually not reaching anal; spine $1\frac{1}{2}$ to $1\frac{3}{4}$ in distance from origin of ventrals to anus. Head, $2\frac{1}{2}$ to 3; depth, $2\frac{1}{2}$ to $2\frac{3}{4}$; lat. line, 38 to 48. L., 8 inches *AURITUS*, 18.
- hh. Opercular spot higher than long; cheeks without distinct blue stripes, sides of body with round orange spots; body deep and compressed.
 - j. Body without conspicuous brown spots, dusky, fins darker; scales above lat. l. with rows of dark spots, as in *auritus*; below lat. l. are about 7 rows of bronze spots, which fade out towards the belly; lower fins dusky; body moderately robust, short and deep, compressed; head small; snout short, smaller than eye; maxillary reaching middle of pupil; eye large, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; opercular spot margined above and below; scales moderate, five or six rows on cheeks; dorsal moderate, longest spine reaching from tip of snout to posterior border of pupil; pectorals short, $1\frac{1}{4}$ in head, not quite reaching anal; ventrals nearly reaching anal. Head, 3; depth, 2; lat. l., 36 to 38. GARMANI, 19.
 - jj. Body covered with conspicuous brown spots, like fly-specks. Olivaceous, with numerous small deep-brown spots, smaller than pinheads; these are most distinct on the lower parts of the side, where they form lines along the rows of scales, and on opercles; body robust, short and deep, compressed; head small; snout short, 4 in head; maxillary extending to middle of pupil; eye large, $3\frac{1}{2}$ in head; opercular spot about as large as eye, black, confined to bony part; scales rather large; dorsal spines rather high, longest reaching posterior border of eye; pectorals short, not reaching anal; ventrals not reaching anal; spine $1\frac{1}{4}$ in distance from origin of ventrals to anus. Head, 3; depth, $1\frac{1}{2}$ to 2; lat. line, 40 to 45; L., 5 inches *PUNCTATUS*, 20.
- ee. Pectorals longer than head; dorsal and anal with a black spot at base of posterior ray. Body short and deep, compressed; head small; snout short, 4 in head; maxillary reaching front of pupil; eye large, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head; opercular flap usually higher than long and the black confined, but in some southern specimens longer than high and with a black membranaceous border, with or without a pale margin below; scales moderate; dorsal spines high, longest reaching posterior border of eye; pectorals reaching middle of anal; ventrals not reaching anal; spine $1\frac{1}{4}$. Olive green; young, purplish silvery, with crossbars; belly coppery red in old specimens. Head, 3; depth, 2; lat. line, 42 to 44; L., 10 inches *PALIDUS*, 20.

- aa. Lower pharyngeals broader, teeth bluntly conic or paved. (*Xystroplites* Jordan.)
- k. Cheeks without wavy blue lines; dorsal not mottled; sides of body not spotted.
- l. [Pectorals shorter than head, not extending beyond ventrals; body elongate, rather deep mesially; caudal peduncle rather elongate; snout projecting, forming an angle above eye; mouth wide, the lower jaw projecting; maxillary reaching just past front of pupil; eye as long as opercular flap, $4\frac{1}{2}$ in head; flap moderate, broad, with a very wide pale margin below and behind; dorsal spines moderate, as long as snout and half of orbit; five rows of scales on cheeks; lower pharyngeals blunt, almost paved; light olive, uniform in spirits; traces of dusky mottlings on last rays of dorsal and anal. Head, $2\frac{1}{2}$; depth 2; lat. 1., 42; L., 5 inches] (Jordan & Gilbert.)
- ALBULUS, 22.
- ll. Pectorals longer than head, extending past ventrals.
- m. Scales along lateral line 34 to 39; dorsal and ventral outlines about equally curved; body moderately elongate, compressed; head rather large; snout $3\frac{1}{2}$ to 4 in head; maxillary slightly longer than snout; eye moderate, $3\frac{1}{2}$ to $4\frac{1}{2}$ in head; opercular flap much smaller than eye, black confined, pale margin widest above and below; scales rather large, 4 rows on cheeks; longest dorsal spine reaching past posterior border of pupil; pectorals reaching beyond middle of anal; ventral spine $1\frac{1}{2}$ to $1\frac{3}{4}$ in distance between origin of ventrals and anus; dusky olive, silvery beneath. Head, $2\frac{1}{2}$ to 3; depth, 2 to $2\frac{1}{2}$. HEROS, 23.
- mm. Scales along lateral line 42 to 44; dorsal outline much more strongly curved than ventral; longest dorsal spine reaching posterior border of eye; scales smaller than in *notatus*; rest as in the above species. HOLBROOKI, 24.
- kk. Cheeks with wavy blue lines; dorsal mottled; sides of body spotted; body short and deep; head small; snout short, $4\frac{1}{2}$ in head; maxillary extending to pupil; eye moderate, 4 to $4\frac{1}{2}$ in head; opercular spot about equal to eye, margined below and behind, black not confined; scales rather large; dorsal spines moderately low, longest reaching middle of pupil; pectorals scarcely longer than head; ventrals not reaching anal, spine $1\frac{1}{2}$ to $1\frac{1}{4}$ in distance between origin of ventrals and anus. Greenish-olive, sides bluish, belly and lower fins orange; the sides profusely mottled with orange; dorsal bluish, orange-spotted. Head, 3 to $3\frac{1}{2}$; depth, 2 to $2\frac{1}{2}$; lat. line, 38 to 48; L., 8 inches. GIBBOSUS, 25.

12. LEPOMIS CYANELLUS.

(Green Sunfish; Little Red-eye.)

Lepomis cyanellus Rafinesque, Journ. de Phys., 420, 1819.

Ichelis cyanella Rafinesque, Ich. Oh., 28, 1820 (Ohio River).

Chanobryttus cyanellus Jordan, Man. Vert., ed. 1, 234, 1876.

Telipomis cyanellus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Apomotis cyanellus Jordan, Ann. N. Y. Lyc. Nat. Hist., 376, 1877 (White River).

- Icthelis melanops* Rafinesque, Ich. Oh., 28, 1820 (Ohio River.)
Chanobryttus melanops Gill, Amer. Jour. Sci. and Arts, 94, 1864.
Lepomis melanops Cope, Jour. Acad. Nat. Sci. Phila. 1868, 223.
Chanobryttus cyanellus melanops Jordan, Man. Vert., ed. 1, 234, 1876.
Pomotis longulus Baird and Girard, Proc. Ac. Nat. Sci. Phila. 1853, 391 (Platte R.; Otter Cr., Ark.; Rios Ciloco, Seco, and Pecos, Texas; Mineville, Texas).
Bryttus longulus Baird and Girard, Proc. Acad. Nat. Sci. Phila. 1854, 25.
Calliurus longulus Girard, U. S. Pac. R. R. Surv., 16, 1859.
Calliurus diaphanus Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Rio Blanco, Tex.).
Telipomis diaphanus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Calliurus microps Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Rio Brazos, Tex.; Fort Washita).
Lepomis microps Cope, Journ. Acad. Nat. Sci. Phila. 1868, 222.
Telipomis microps Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Calliurus murinus Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Rio Brazos, Delaware Creek, Tex.).
Bryttus murinus Gunther, Cat. Fish. Brit. Mus., 1, 260, 1859.
Telipomis murinus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Lepomis murinus McKay, Proc. U. S. Nat. Mus. 1881, 88.
Calliurus formosus Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Brazos and Colorado Rivers, Gypsum Creek, Tex.; Fort Smith, Ark.).
Bryttus signifer Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Rio Medina, Texas).
Icthelis signifer Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Bryttus mincopas Cope, Proc. Acad. Nat. Sci. Phila. 1865, 84 (Lake Whittlesey, Minn.).
Lepomis mincopas Cope, Jour. Acad. Nat. Sci. Phila., 223, 1868 (Kanawha, Miami, and Missouri Rivers).
Chanobryttus mincopas Cope, 1865.

Habitat: United States, west of the Alleghany Mountains, from the Great Lakes to Georgia, Kansas, and the Rio Grande River.

Etymology: *κόβανος*, dark blue.

The synonymy of *cyanellus* as given above agrees with that given by McKay and others, except that I have included *Calliurus murinus* Girard as a full synonym.

13. LEPOMIS ISCHYRUS.

- Lepiopotomus ischyurus* Jordan and Nelson, Bull. U. S. Nat. Mus. x, 25, 1877 (Illinois River).
Apomotis phenax Cope & Jordan, Bull. U. S. Nat. Mus., x, 26, 1877 (Beasley's Point, N. J.).
Lepomis phenax McKay, Proc. U. S. Nat. Mus. 1881, 88.

Habitat: Streams of Illinois.

Etymology: *ἰσχυρός*, robust.

I have examined the types of *Apomotis phenax* and of *Lepomis ischyurus* and have come to the conclusion that the two are identical. They agree closely in technical characters, differing only in features which may be due to size or to the condition of the specimens.

The description in the analysis is drawn from the types of *phenax*. The following notes are taken from the type of *Lepomis ischyurus* Jordan & Nelson, kindly sent to me by Dr. S. A. Forbes:

Scales 7-46-15, 6 rows on cheek; longest dorsal spine as long as from tip of snout to anterior margin of pupil; head, 3 in length; depth, 2; pectoral reaching just to anal; ventrals to anal; third anal spine $1\frac{1}{2}$ in head; mouth large, the maxillary reaching posterior border of pupil; eye slightly shorter than snout; 4 in head; supplemental maxillary evident as in *Lepomis cyanellus*: gill-rakers large, x, 10; opercular flap larger than eye, the dark spot bordered all around by paler; nape steep, forming an angle with the profile of the head; body short and deep, compressed, heavy forward; no distinct dark spot on dorsal; scales bluish at base, those above lateral line marked as in *Lepomis auritus*.

In the original description the color is said to be "dusky, mottled with orange and blue; cheeks with wide obscure blue bands; a faint, dusky spot on dorsal and anal behind; belly and lower fins coppery yellow; lower jaw and lower parts of head leaden-blue."

The type of *Apomotis phenax* is labeled as from "Beaseley's Point, New Jersey," in the museum of the Academy of Philadelphia. This is probably an error. The waters about Beaseley's Point are mostly brackish, and if *phenax* and *ischyrus* be identical the species belongs to the Illinois River basin. This species thus far is the least common of all the sunfishes, and more specimens are greatly desired.

14. LEPOMIS SYMMETRICUS.

Lepomis symmetricus Forbes, in Jordan & Gilbert's Syn. Fish. N. A., 473, 1883 (Illinois River).

Habitat: Lowlands of the Mississippi Valley from central Illinois southward to New Orleans.

Etymology: Latin; symmetrical.

This little species has been found common about New Orleans, and is doubtless widely diffused in the Lower Mississippi.

15. LEPOMIS HUMILIS.

Bryttus humilis Girard, Proc. Acad. Nat. Sci. Phila. 1857 (Sugar Loaf Creek, Ark.; Cottonwood Creek, Utah; Brazos River, Tex.).

Ichthelis humilis Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Lepiopomus humilis Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.

Lepomis humilis Cope, Journ. Acad. Nat. Sci. Phila. 1868, 223.

Bryttus oculatus Cope, Proc. Acad. Nat. Sci. Phila. 1865, 83 (Lake Whittlesey, Minn.).

Ichthelis oculatus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Lepomus oculatus Cope, Journ. Acad. Nat. Sci. Phila. 1868, 221.

Lepiopomus oculatus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.

Lepomis anagallinus Cope, Journ. Acad. Nat. Sci. Phila. 1868, 221 (Leavenworth, Kans.).

Ichthelis anagallinus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Lepiopomus anagallinus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.

Habitat: Mississippi Valley from Minnesota to Ohio, to Kansas, and Texas.

Etymology: Latin; humble.

16. LEPOMIS MACROCHIRUS.

- Lepomis macrochira* Rafinesque, Journ. de Phys., 420, 1819 (Ohio River, Licking River, etc.).
- Ichthelis macrochira* Rafinesque, Ich. Oh., 27, 1820.
- Lepiopomus macrochirus* Jordan, Ann. Lyc. Nat. Hist., 386, 1877.
- Lepomis macrochirus* Jordan & Gilbert, Syn. Fish. N. A., 475, 1883.
- Lepomis nephelus* Cope, Journ. Amer. Phil. Soc., 222, 1868 (Kiskiminitas River, Western Pennsylvania).

Habitat: Ohio Valley; western Pennsylvania to Kentucky and Illinois.

Etymology: *Μακρός*, long; *χείρ*, hand.

This species is rather scarce and has doubtless been confounded with *Lepomis humilis*, which it must resemble in form and color. *L. macrochirus* has, however, smaller scales and much longer pectorals than *L. humilis*, its pectorals being scarcely shorter than in *L. pallidus*. The specimens here described were collected by Mr. A. J. Woolman at Tradewater River, Dawson Springs, Kentucky. This stream is a tributary of the Ohio.

17. LEPOMIS MEGALOTIS.

(Long-eared Sunfish. Plate LXX, fig. 3.)

- Ichthelis megalotis* Rafinesque, Ich. Oh., 29, 1820 (Ohio River).
- Xenotis megalotis* Jordan, Ann. N. Y. Lyc. Nat. Hist., 373, 1877 (Rock Castle River, Kentucky).
- Ichthelis aurita* Rafinesque, Ich. Oh., 29, 1820 (Ohio River, not *Labrus auritus* L.).
- Lepomis auritus* Cope, Journ. Acad. Nat. Sci. Phila., 1868, 220.
- Ichthelis auritus* Jordan, Geol. Rept. Ind., 215, 1875.
- Pomotis nitida* Kirtland, Bost. Journ. Nat. Hist., 472, 1842 (Ohio).
- Ichthelis nitida* Jordan, Geol. Rept. Ind., 215, 1875.
- Pomotis aquilensis* Baird and Girard, Proc. Acad. Nat. Sci. Phila. 1853, 307.
- Ichthelis aquilensis* Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
- Xenotis aquilensis* Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
- Pomotis breviceps* Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1853, 309.
- Ichthelis breviceps* Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
- Xenotis breviceps* Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
- Pomotis fallax* Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1854, 24.
- Ichthelis fallax* Jordan, Man. Vert., ed. 1, 238, 1876.
- Xenotis fallax* Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
- Pomotis convexifrons* Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1854, 24.
- Pomotis nefastus* Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1854, 24.
- Pomotis sanguinolentus* Agassiz, Amer. Jour. Sci. and Arts, 302 (Huntsville Ala.).
- Ichthelis sanguinolentus* Jordan, Man. Vert., ed. 1, 238, 1876.
- Xenotis sanguinolentus* Jordan, Ann. N. Y. Lyc. Nat. Hist., 318, 1877.
- Pomotis inscriptus* Agassiz, Amer. Jour. Sci. and Arts, 302, 1854 (Huntsville, Ala.).
- Lepomis inscriptus* Cope., Journ. Acad. Nat. Sci. Phila., 221, 1868.
- Ichthelis inscriptus* Jordan, Man. Vert., ed. 1, 238, 1876.
- Xenotis inscriptus* Jordan, Ann. N. Y. Lyc. Nat. Hist., 318, 1877.
- Pomotis bombifrons* Agassiz, Amer. Jour. Sci. and Arts, 303, 1854 (Huntsville, Ala.).

- Ichthelis bombifrons* Jordan, Man. Vert., ed. 1, 237, 1876.
Lepiopomus bombifrons Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
Lepomis bombifrons Jordan, Man. Vert., ed. 2, 240, 1878.
Lepiopomus bombifrons Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
Pomotis marginatus Holbrook, Journ. Acad. Nat. Sci. Phila. 1855, 49 (St. John's River, Fla.).
Ichthelis marginatus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Xenotis marginatus Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
Lepomis marginatus McKay, Proc. U. S. Nat. Mus. 1881, 89.
Pomotis popeii Girard, U. S. Pac. R. R. Surv., x, 26, 1859 (Colorado River).
Xenotis popeii Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
Lepomis pellastus Cope, Proc. Amer. Phil. Soc., 1870, 453.
Ichthelis pellastus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Xenotis lythochloris Jordan, Ann. N. Y. Lyc. Nat. Hist., 1877, 376 (Wabash R.).
Xenotis aureolus Jordan, Ann. N. Y. Lyc. Nat. Hist., 376 (Wabash River).

Habitat: Great Lake region to Georgia and Mexico west of the Alleghanies.

Etymology: Μέγας, great; ὄψις, ear.

18. LEPOMIS AURITUS.

(Yellow-belly; Red-breast Bream. Plate LXXI, fig. 1.)

- Labrus auritus* Linnaeus, Syst. Nat., ed. x, 283, 1758 (Philadelphia).
Lepomis auritus Gill, Amer. Journ. Sci. and Arts, 93, 1854.
Ichthelis auritus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Lepiopomus auritus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Bryttus unicolor Cuv. & Val., Hist. Nat. Poiss., 1831, 464 (Philadelphia and Charleston).
Pomotis solis Cuv. & Val., Hist. Nat. Poiss., VII, 468, 1831 (New Orleans).
Ichthelis solis Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Xenotis solis Gill & Jordan, Bull. x, U. S. Nat. Mus., 22, 1877 (Tangipahoa River, Louisiana).
Lepomis auritus solis McKay, Proc. U. S. Nat. Mus. 1881, 89.
Pomotis rubricauda Storer, Bost. Jour. Nat. Hist., 1842, 177 (Massachusetts).
Ichthelis rubricauda Holbrook, Ich. S. C., 15, 1860.
Lepomis rubricauda Cope, Proc. Amer. Phil. Soc., 452, 1870.
Pomotis elongatus Holbrook, Journ. Acad. Nat. Sci. Phila. 1855, 47 (South Carolina and Florida).
Ichthelis elongatus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Lepiopomus elongatus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Lepomis ophthalmicus Cope, Journ. Acad. Nat. Sci. Phila. 1863, 233 (Roanoke R.).
Xenotis ophthalmicus Jordan, Bull. x, U. S. Nat. Mus., 36, 1877.
Lepomis mystacalis Cope, Proc. Amer. Phil. Soc., 66, 1877.
Lepiopomus mystacalis Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Lepiopomus miniatus Jordan, Bull. x, U. S. Nat. Mus., 26, 1877 (Tangipahoa R., La.).
Lepomis miniatus McKay, Proc. U. S. Nat. Mus. 1881, 89.
 Not syn.—*Pomotis auritus* Günther, Cat. Fish. Brit. Mus., 1, 261 (Lake Erie, New Orleans; = *gibbosus*).

Habitat: Maine to Texas, east of the Alleghany Mountains.

Etymology: Latin; long-eared.

I now refer *elongatus*, *mystacalis*, and *miniatus* to the synonymy of *auritus*.

Pomotis elongatus Holbrook agrees in all respects with *auritus*, with the exception of a "dark blotch on the tail behind dorsal fin," but as this is a character which does not occur in any known sunfish, it is safe to say that it is based on erroneous observations. There is in the museum at Cambridge, Massachusetts, a sunfish labeled "*Lepomis elongatus* Holbrook and Agassiz," from South Carolina, which is identical with *auritus*. Although probably not a type specimen of *elongatus*, nevertheless it affords a clew as to the identity of Holbrook's species.

The *Lepomis mystacalis* Cope agrees with *auritus* in the number of scales in the lateral line and partly in color, and with *holbrookii* in the number of scales on cheeks and the silvery coloration. But it is no doubt identical with *auritus*, for the next species Cope described after *mystacalis* is *Xyströplites gillii*, which is identical with *holbrookii* as is shown by the character of the pharyngeal teeth. The teeth of *mystacalis* he does not describe and the natural inference is that they must have been of the *auritus* type. *Lepomis miniatus** Jordan I am unable to satisfactorily separate from *auritus*, although the specimens examined differ somewhat in coloration, and none of them are as large as the adult *auritus*.

19. LEPOMIS GARMANI.

Lepomis garmani Forbes, Bull. Ill. State Lab. Nat. Hist., 135, 1885 (Wabash and Little Fox Rivers).

Habitat: Wabash and Illinois valleys.

Etymology: Named after Dr. Harrison Garman, of Champaign, Ill.

20. LEPOMIS PUNCTATUS.

(Chinquapin Perch. Plate LXXI, fig. 2.)

Bryttus punctatus Cuv. & Val., Hist. Nat. Poiss., VII, 462, 1831 (Charleston).

Ichthelis punctatus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Lepomis punctatus Jordan, Proc. U. S. Nat. Mus. 1879, 224.

Bryttus reticulatus Cuv. & Val., Hist. Nat. Poiss., VII, 463, 1831 (Charleston).

Lepomis apialus Cope, Proc. Amer. Phil. Soc., 1877, 65 (Volusia, Fla.).

Lepiopomus apialus Jordan, Bull. X, U. S. Nat. Mus., 25, 1877 (St. John's River).

Habitat: South Carolina to Florida, in lowland streams.

Etymology: Latin; dotted.

21. LEPOMIS PALLIDUS.

(Blue-gill; Dollar Dee; Blue Bream; Copper Nose. Plate LXXI, fig. 3.)

Labrus palladus Mitchell, Trans. Lit. & Phil. Soc. N. Y. 1815, 407 (New York).

Pomotis pallidus Agassiz, Amer. Jour. Sci. and Arts, 303, 1854 (Huntsville, Ala.).

Eupomotis pallidus Gill & Jordan, Bull. X, U. S. Nat. Mus., 21, 1877.

Lepiopomus pallidus Gill & Jordan, Ann. N. Y. Lyc. Nat. Hist., 316, 1877.

Helioperca pallida Jordan, Ann. N. Y. Lyc. Nat. Hist., 355, 1877.

Lepomis pallidus Jordan, Man. Vert., ed. 2, 241, 1878.

* This species needs further comparison before it is definitely united to *Lepomis auritus*. It is also a question as to whether a subspecies *solis* can be maintained for the southern form of *Lepomis auritus* (Carolina to Louisiana).—JORDAN.

- Lepomis appendix* Mitchell, Amer. Mont. Mag., 247, 1818.
Ichthelis appendix Jordan, Man. Vert., ed. 1, 239, 1876.
Pomotis gibbosus Cuv. & Val., Hist. Nat. Poiss., vii, 467, 1831 (Charleston).
Pomotis macrochira Kirtland, Bost. Journ. Nat. Hist. 1842, 469 (not of Rafinesque).
Pomotis incisor Cuv. & Val., vii, 468, 1831 (New Orleans).
Ichthelis incisor Holbrook, Ich. S. C., 12, 1855.
Lepomis incisor Gill, Amer. Jour. Sci. and Arts, 93, 1864.
Pomotis speciosus Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1854, 24.
Ichthelis speciosus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Ichthelis incisor speciosus Jordan, Man. Vert., ed. 1, 236, 1876.
Pomotis obscurus Agassiz, Amer. Journ. Sci. and Arts, 303 (Huntsville, Ala.).
Ichthelis obscurus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Lepiopomus obscurus Jordan, Ann. N. Y. Lyc. Nat. Hist., 317, 1877.
Lepomis obscurus Jordan, Man. Vert., ed. 2, 242, 1878.
Ichthelis incisor obscurus Jordan, Man. Vert., ed. 1, 236, 1876.
Pomotis luna Girard, Proc. Acad. Nat. Sci. Phila., 1857.
Lepomis longispinis Cope, Proc. Acad. Nat. Sci. Phila. 1865, 83 (Leavenworth, Kansas).
Lepomis ardesiacus Cope, Journ. Phila. Nat. Sci. 1868, 222 (Kiskiminitas River).
Lepomis purpurecens Cope, Proc. Amer. Phil. Soc. 1870, 453 (Yadkin River).

Habitat: Eastern United States on both sides of the Alleghanies from the Great Lakes, New York to Florida, Virginia, Kansas, and Texas.

Etymology: Latin; pale.

The synonymy of *Lepomis pallidus* has been carefully worked out by Jordan & McKay, and I see no reason to dissent from their conclusion.

22. LEPOMIS ALBULUS.

- Bryttus albulus* Girard, Proc. Acad. Nat. Sci., Phila., 1857 (Rio Blancos).
Ichthelis albulus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.
Apomotis albulus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Lepomis albulus Cope, Journ. Acad. Nat. Sci. Phila., 223, 1881.
Xystroplites gillii Jordan, Bull. x, U. S. Nat. Mus., 24, 1877, "Garden Key, Fla."
 (Probably an error.)

Habitat: Georgia to Texas.

Etymology: Latin; whitish.

The habitat assigned *Xystroplites gillii* is doubtless erroneous, as there is no fresh-water stream or pond on the island of Garden Key.

23. LEPOMIS HEROS.

- Pomotis heros* Baird & Girard, Proc. Acad. Nat. Sci. Phila. 1854, 25 (Rio Cibolo, Rio Nueces, Rio Blanco, Dry Creek, Texas; Fort Bliss, New Mexico; Rio San Juan).
Xystroplites heros Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Lepomis heros McKay, Proc. U. S. Nat. Mus. 1881, 89.
Pomotis notatus Agassiz, Amer. Journ. Sci. and Arts, 302, 1854 (Huntsville, Ala.).
Ichthelis notatus Jordan, Indiana Geol. Rept., 215, 1876.
Xystroplites notatus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.
Lepomis notatus McKay, Proc. U. S. Nat. Mus. 1881, 92.
Lepomis holbrookii notatus Jordan, Man. Vert., ed. 5, 119, 1888.

Habitat: Southern Indiana to Florida and Texas, in lowland streams.

A careful comparison of the figures and descriptions of *heros* with two specimens of *notatus* from Posey County, Indiana, shows that the two species are probably identical. The type of *heros* is an old example. I have no means of positively deciding which of the two names, *heros* and *notatus*, has priority of date.

24. LEPOMIS HOLBROOKI.

Pomotis holbrooki Cuv. & Val., Hist. Nat. Poiss., VII, 466, 1831 (Charleston, S. C.).

Eupomotis holbrooki Jordan, Proc. U. S. Nat. Mus. 1879, 224.

Lepomis holbrooki McKay, Proc. U. S. Nat. Mus. 1881, 92.

Pomotis speciosus Holbrook, Journ. Acad. Nat. Sci. Phila. 1850, 48 (St. John's R.).

Eupomotis speciosus Jordan, Bull. x, U. S. Nat. Mus., 35, 1877.

Pomotis microlophus Günther, Cat. Fish. Brit. Mus., 1, 264, 1859.

Ichthelis microlophus Jordan & Copeland, Bull. Buff. Soc. Nat. Hist., 138, 1876.

Xystroplites longimanus Cope, Proc. Amer. Phil. Soc. 1877, 66 (Volusia and Bay Port, Fla.).

Habitat: Virginia to Florida, in streams of the lowlands.

Etymology: To John Edwards Holbrook, author of Ichthyology of South Carolina.

25. LEPOMIS GIBBOSUS.

(Common Sunfish; Pond Fish; Pumpkin Seed; Sunny. Plate LXXII, fig. 1.)

Perca gibbosus Linnaeus, Syst. Nat., ed. x, 292, 1758 (after *Perca fluviatilis gibbosa*, ventre luteo, of Catesby).

Lepomis gibbosus McKay, Proc. U. S. Nat. Mus., 91, 1881.

Sparus aureus Walbaum, Ardeci, Pisc., 290, 1792 (lakes of New York).

Eupomotis aureus Jordan, Bull. x., U. S. Nat. Mus., 35, 1877.

Morone maculata Mitchill, Fishes N. Y., 18, 1814.

Pomotis vulgaris Cuv. & Val., Hist. Nat. Poiss., III, 91, 1829.

Pomotus raveneli Cuv. & Val., Hist. Nat. Poiss., VII, 465, 1831 (Philadelphia).

Pomotis catesbei Cuv. & Val., Hist. Nat. Poiss., VII, 469, 1831 (Philadelphia.)

Pomotis solis Cuv. & Val., Hist. Nat. Poiss., VII, 468, 1831 (Philadelphia, New Orleans; in part).

Lepomis euryorus McKay, Proc. U. S. Nat. Mus. 1881, 89 (Fort Gratiot, Lake Huron).

Habitat: Great Lake region and Upper Mississippi Valley, eastward to Maine, and thence south to Florida, east of the mountains, not descending south of the Upper Wabash and Upper Illinois in the west.

Etymology: Latin; gibbous.

Of the four species of *Lepomis* (*cyanelus*, *megalotis*, *pallidus*, and *gibbosus*) that are found in the lakes of Michigan, Mr. McKay's *euryorus* seems to agree best with the last, as is shown by the character of the pharyngeal teeth, gill rakers, and the opercular flap. It is probably based on a very old example of *Lepomis gibbosus*.

X. MICROPTERUS.

1802. *Micropterus* Lacépède, Hist. Nat. Poiss., iv, 325 (*dolomicu*).
 1810. *Calliurus* Rafinesque, Journ. de Phys., 420 (*punctulatus* = *dolomicu*).
 1820. *Aplites* Rafinesque, Ich. Oh., 30 (*pallidus* = *salmoides*).
 1820. *Lepomis* Rafinesque, Ich. Oh., 30 (not *Lepomis* Raf., 1819; *pallida* = *salmoides*).
 1820. *Nemocampsis* Rafinesque, Ich. Oh., 31 (*flexularis* = *dolomicu*).
 1820. *Dioplites* Rafinesque, Ich. Oh., 32 (*salmonca* = *dolomicu*).
 1828. *Huro* Cuv. & Val., Hist. Nat. Poiss., II, 124 (*nigricans* = *salmoides*).
 1829. *Grystes* Cuv. & Val., Hist. Nat. Poiss., III, 54 (*salmoides*).

Type: *Micropterus dolomieu* Lacépède.

Etymology: *Μικρός*, small; *πτερόν*, fin.

ANALYSIS OF THE SPECIES OF MICROPTERUS.

- a. Mouth moderate, the maxillary in adult not extending beyond eye; scales small, about 11-74-17; young more or less barred or spotted, never with a lateral band..... DOLOMIU, 25.
 aa. Mouth very large, the maxillary in the adult extending beyond the eye; scales rather large, about 7-68-16; last spine of dorsal short, so that the fin is almost divided in two; young with a blackish lateral band..... SALMOIDES, 26.

26. MICROPTERUS DOLOMIU.

(Small-mouthed Black Bass. Plate LXXII, fig. 2.)

- Micropterus dolomieu* Lacépède, Hist. Nat. Poiss., iv, 325, 1802.
Bodianus achigan Rafinesque, Amer. Mont. Mag. 120, 1817 (New York, Canada).
Lepomis achigan Gill, Proc. Acad. Nat. Sci. Phila. 1860, 20.
Micropterus achigan Gill, Rept. Com. Agri., 407, 1866.
Calliurus punctulatus Rafinesque, Ich. Oh., 26, 1820 (Falls of the Ohio).
Lepomis trifasciata Rafinesque, Ich. Oh., 31 (Ohio, etc.).
Lepomis flexularis Rafinesque, Ich. Oh., 31 (Ohio).
Lepomis salmonca Rafinesque, Ich. Oh., 32 (Kentucky, Green, Licking, Ohio Rivers).
Lepomis notata Rafinesque, Ich. Oh., 32.
Etheostoma calliura Rafinesque, Ich. Oh., 36 (Ohio, Salt River).
Cichla variabilis Le Sueur, ms. in Museum d'Hist. Nat., Paris, 1822.
Dioplites variabilis Vail. & Boc., ms. Miss. Sci. Mex., 1874.
Micropterus variabilis Vail. & Boc., Miss. Sci. Mex. (ined.), 1874.
Cichla fasciata Le Sueur, Journ. Acad. Nat. Sci. Phila., 216 (Lake Erie).
Centrarchus fasciatus Kirtland, Bost. Journ. Nat. Hist., 25, 1842.
Grystes fasciatus Agassiz, Lake Superior, 295, 1850 (Lake Huron).
Micropterus fasciatus Cope, Proc. Acad. Nat. Sci. Phila. 1865, 83.
Cichla ohioensis Le Sueur, Journ. Acad. Nat. Sci. Phila. 1822, 218 (Ohio River).
Cichla minima Le Sueur, Journ. Acad. Nat. Sci. Phila. 1822, 220 (Lake Erie).
Centrarchus obscurus DeKay, Fishes New York, 30, 1842.
Grystes nigricans Garlick, Treat. Art. Prop. Fish, 185, 1857 (St. Lawrence, etc.).

Habitat: Lake Champlain, Manitoba, and southward to Kansas, on both sides of the mountains from James River southward, chiefly in clear lakes and running streams.

Etymology: To M. Dolomieu, a naturalist, of Paris, at the end of the last century. As the synonymy of the two species of *Micropterus* is now well established, I have nothing new to offer concerning them. For a complete account of both species of *Micropterus* see Henshall's excellent "Book of the Black Bass."

27. MICROPTERUS SALMOIDES.

(Large-mouthed Black Bass. Plate LXXII, fig. 3.)

Labrus salmoides Lacépède, Hist. Nat. Poiss., 716, 1802.*Grystes salmoides* Agassiz, Lake Superior, 295, 1850.*Dioplites salmoides* Vail. & Boc., ms. Miss. Sci. Mex., 1874.*Micropterus salmoides* Vail. & Boc., Miss. Sci. Mex. (inod.), 1874.*Lepomis pallida* Rafinesque, Ich. Oh., 30, 1820 (Ohio, Miami, Hoekhocking Rivers).*Micropterus pallidus* Jordan, Ann. N. Y. Lyc. Nat. Hist., 314, 1877.*Cichla floridana* Le Sueur, Journ. Acad. Nat. Sci. Phila. 1822, 219 (E. Florida).*Micropterus floridanus* Goode, Bull. vi, U. S. Nat. Mus., 63, 1876.*Huro nigricans* Cuv. & Val., Hist. Nat. Poiss., 124, 1828 (Lake Huron).*Grystes nigricans* Agassiz, Lake Superior, 297, 1850 (Great Lakes).*Micropterus nigricans* Cope, Proc. Acad. Nat. Sci., Phila. 1865, 83.*Grystes nobilis* Agassiz, Amer. Journ. Sci. and Arts, 1854, 298 (Huntsville, Ala.).*Grystes nuceensis* Baird & Girard, Proc. Acad. Nat. Sci. Phila., 25 (Rio Frio and Rio Nueces, Texas).*Dioplites nuceensis* Girard, U. S. Pac. R. R. Surv. 4, 1859 (Rio Cibolo, Rio Blanco).*Micropterus nuceensis* Vail. & Boc., ms. Miss. Sci. Mex., 1874.*Grystes megastoma* Garlick, Treat. Art. Prop. Fish, 103, 1857.*Dioplites treculii* Vail. & Boc., ms. Miss. Sci. Mex., 1874.

Habitat: Lake Champlain to Manitoba, and southward to Virginia, Florida, and Mexico; chiefly in lakes and lowland streams.

Etymology: *Salmo*, salmon; *εἶδος*, like.

SUMMARY.

Family CENTRARCHIDÆ.

Subfamily CENTRARCHINÆ.

I. *Centrarchus* Cuvier & Valenciennes.1. *Centrarchus macropterus* (Lacépède).II. *Pomoxis* Rafinesque.2. *Pomoxis sparoides* (Lacépède).3. *Pomoxis annularis* Rafinesque.

Subfamily LEPOMINÆ.

III. *Archoplites* Gill.4. *Archoplites interruptus* (Girard).IV. *Ambloplites* Rafinesque.5. *Ambloplites rupestris* (Rafinesque).V. *Chænobryttus* Gill.6. *Chænobryttus gulosus* (Cuv. & Val.).VI. *Acantharchus* Gill.7. *Acantharchus pomotis* (Baird).VII. *Enneacanthus* Gill.8. *Enneacanthus obesus* (Baird).9. *Enneacanthus gloriosus* (Holbrook).10. *Enneacanthus criarchus* (Jordan). (Doubtful species).VIII. *Mesogonistius* Gill.11. *Mesogonistius chatodon* (Baird).IX. *Lepomis* Rafinesque.§ *Apomotis* Rafinesque.12. *Lepomis cyanellus* Rafinesque.13. *Lepomis ischyurus* Jordan & Nelson.14. *Lepomis symmetricus* Forbes.§ *Lepomis*.15. *Lepomis humilis* (Girard).16. *Lepomis macrochirus* Rafinesque.17. *Lepomis megalotis* (Rafinesque).18. *Lepomis auritus* (L.).19. *Lepomis garmani* Forbes.20. *Lepomis punctatus* (Cuvier & Valenciennes).21. *Lepomis pallidus* (Mitchill).§ *Xystroplites* Jordan.22. *Lepomis albulus* (Girard).23. *Lepomis heros* (Baird & Girard).24. *Lepomis holbrooki* (Cuv. & Val.).25. *Lepomis gibbosus* (L.).

Subfamily MICROPTERINÆ.

X. *Micropterus* Lacépède.26. *Micropterus dolomieu* Lacépède.27. *Micropterus salmoides* Lacépède.

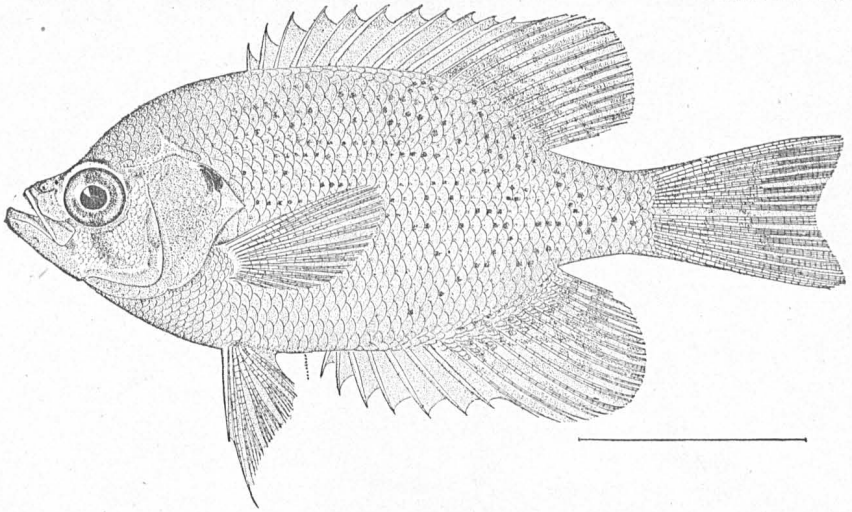


FIG. 1. *CENTRARCHUS MACROPTERUS*. Round Sunfish.

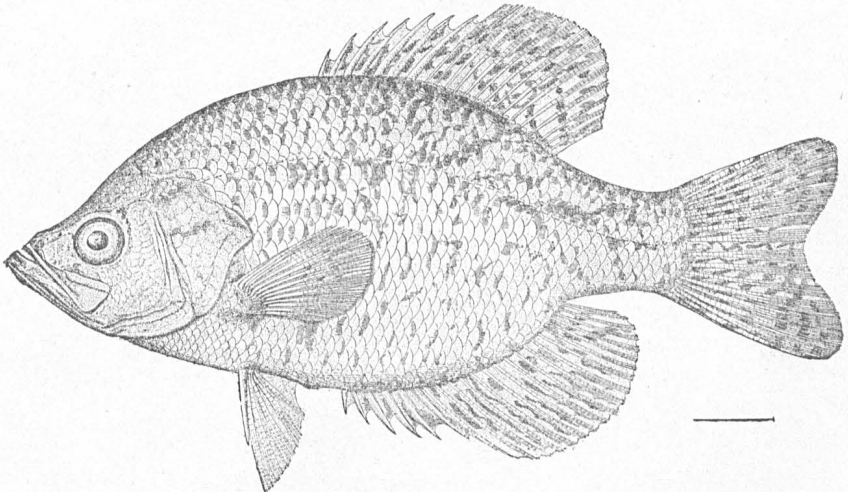


FIG. 2. *POMOXIS SPAROIDES*. Calico Bass ; Grass Bass ; Tin-mouth.

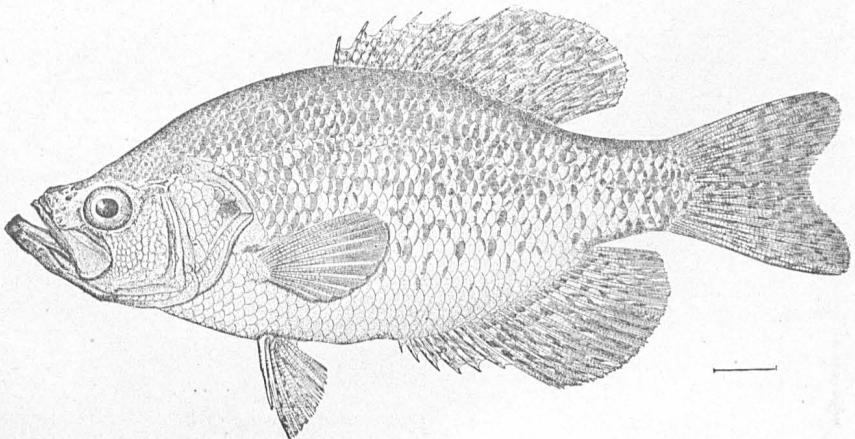


FIG. 3. *POMOXIS ANNULARIS*. Crappie ; New Light.

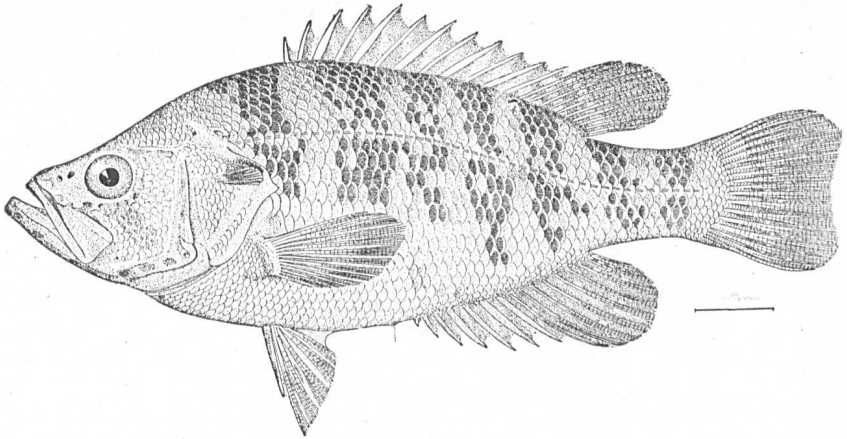


FIG. 1. *ARCHOPLITES INTERRUPTUS*. Sacramento Perch.

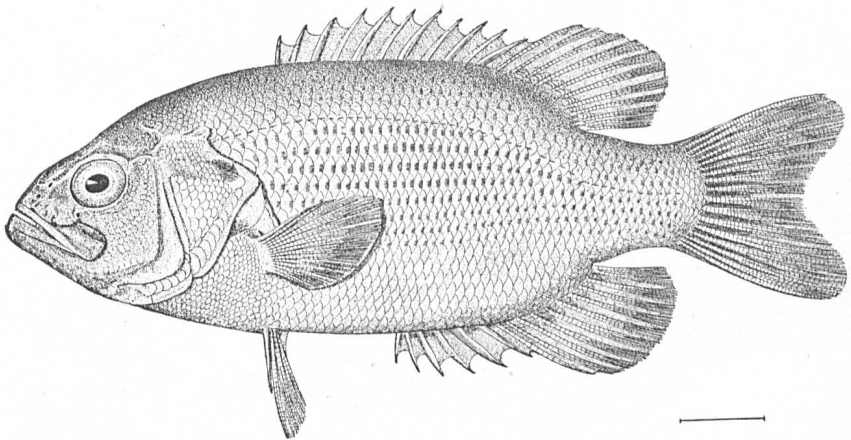


FIG. 2. *AMBLOPLITES RUPESTRIS*. Red-eye; Goggle-eye; Rock Bass.

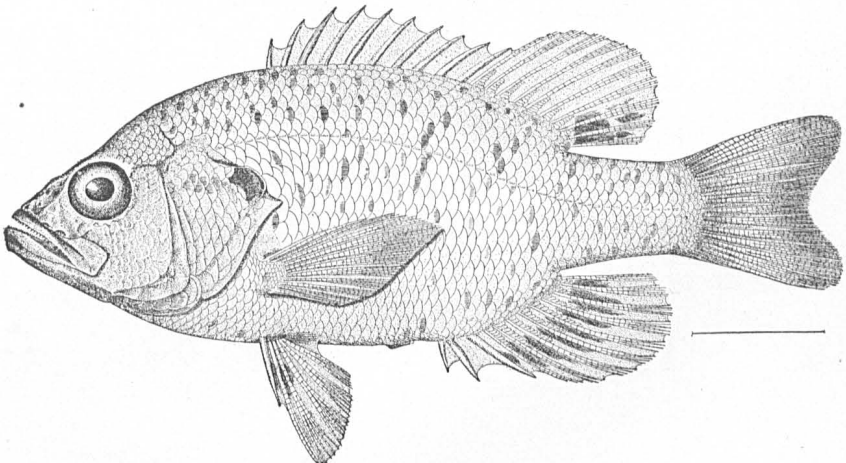


FIG. 3. *CHÆNOBRYTTUS GULOSUS*. War-mouth.

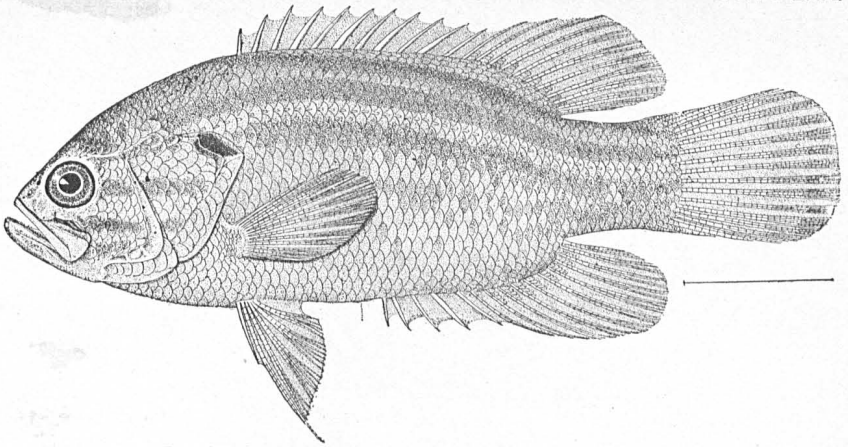


FIG. 1. ACANTHARCHUS POMOTIS. Mud Bass; Mud Sunfish.

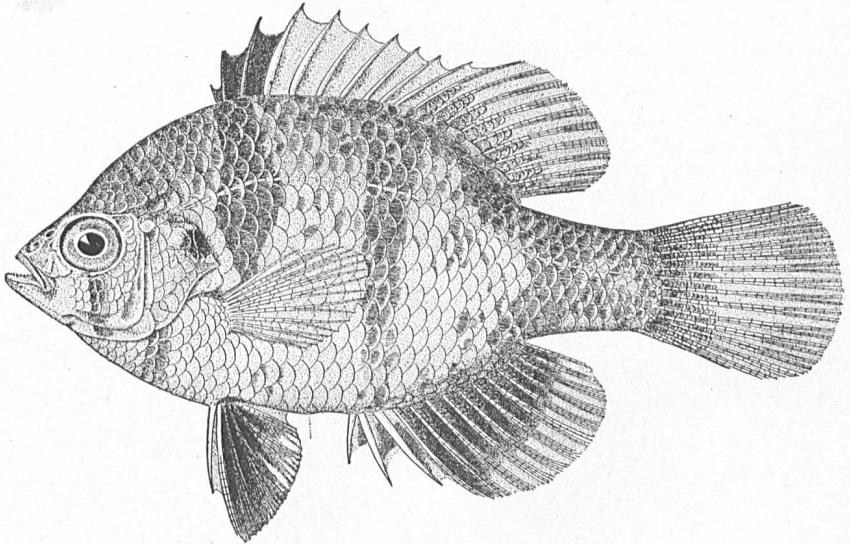
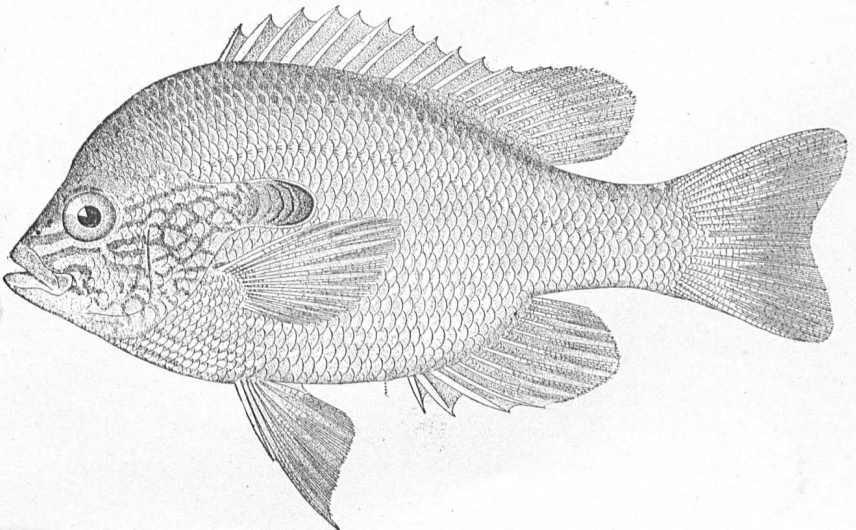


FIG. 2. MESOGONISTIUS CHÆTODON. Black-banded Sunfish.



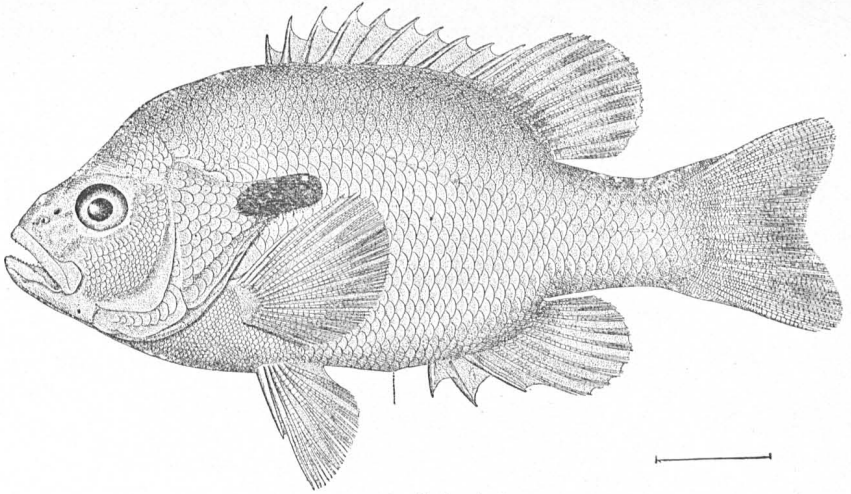


FIG. 1. *LEPOMIS AURITUS*. Yellow-belly; Red-breasted Bream.

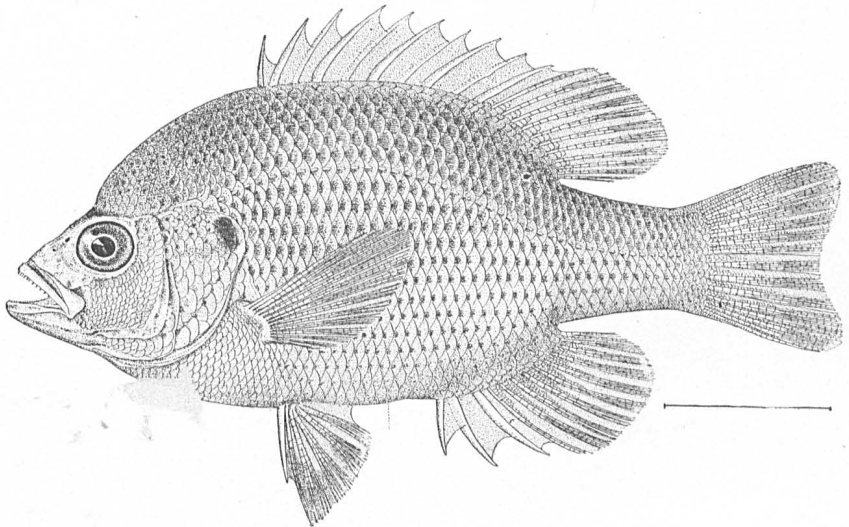
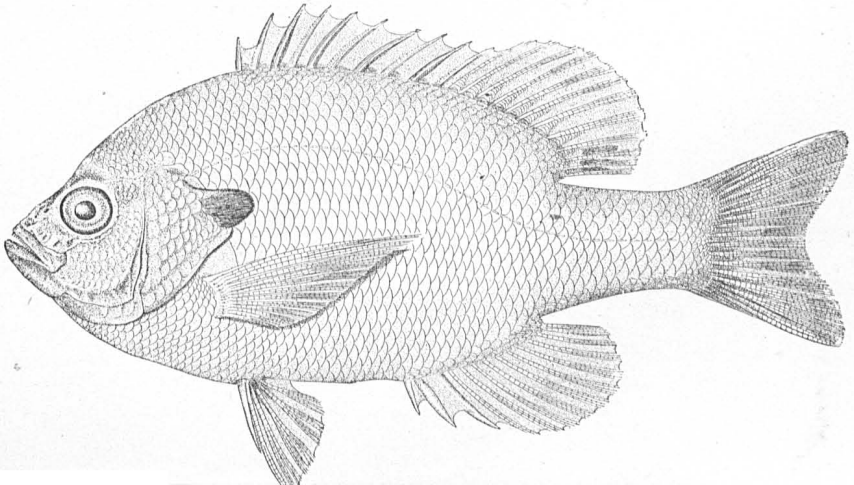


FIG. 2. *LEPOMIS PUNCTATUS*. Chinquapin Perch.



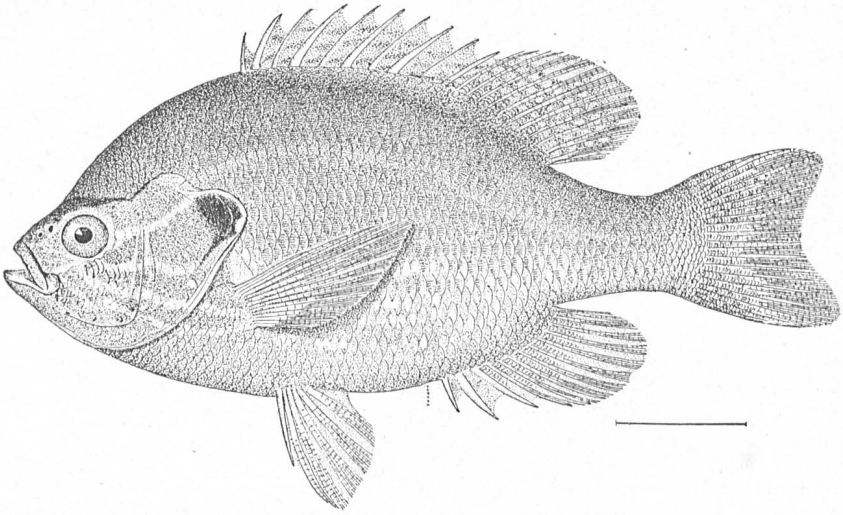


FIG. 1. *LEPOMIS GIBBOSUS*. Pumpkin Seed; Sunny.

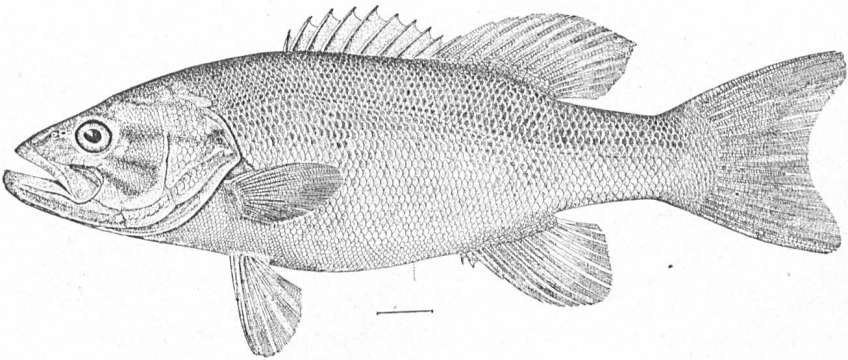


FIG. 2. *MICROPTERUS DOLOMIEU*. The Small-mouth Black Bass.
(Collected at Little Falls, Potomac River, by Maj. T. J. Hobbs.)

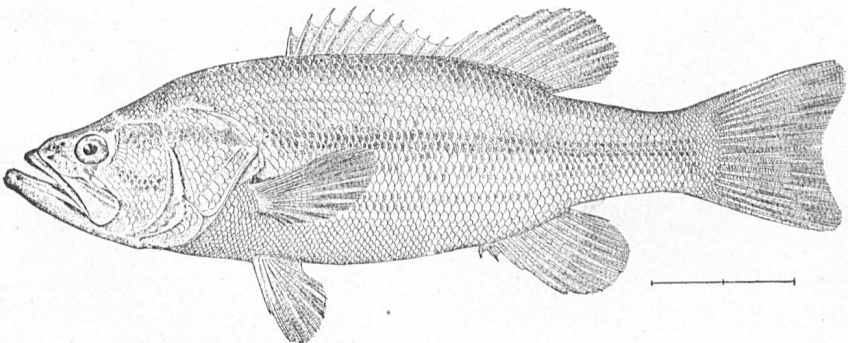


FIG. 3. *MICROPTERUS SALMOIDES*. The Big-mouth Black Bass.
(Collected at Sandusky, Ohio, by J. W. Milner.)