

7.—NOTES ON A COLLECTION OF FISHES FROM THE SOUTHERN TRIBUTARIES OF THE CUMBERLAND RIVER IN KENTUCKY AND TENNESSEE.

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All of the specimens noted in the present paper were collected by the writer in the southern tributaries of the Cumberland River between Nashville, Tenn., and the Cincinnati Southern Railroad, during the period from August 18 to September 9, 1891.

The streams examined may be grouped as follows:

Stone River:

1. West Fork Stone River near Murfreesboro, Tenn.

Spring Creek:

1. Spring Creek, Spring Creek Station, Tenn.

Round Lick:

1. Round Lick, Watertown, Tenn.

Caney Fork River:

1. Caney Fork near Lancaster, Tenn.
2. Smith Fork near Lancaster, Tenn.

Roaring River:

1. Roaring River near Windle, Tenn.
2. Spring Creek at Netherland, Tenn.

Obeys River:

1. Obeys River at Olympus, Tenn.
2. Eagle Creek near Olympus, Tenn.
3. Wolf River near Byrdstown, Tenn.

Cumberland River:

1. Cumberland River, Cumberland County, Ky.
2. Willis Creek, Cumberland County, Ky.

Beaver Creek:

1. Beaver Creek, Wayne County, Ky.
2. Otter Creek, Wayne County, Ky.

Big South Fork of the Cumberland River:

1. Little South Fork, Whitley County, Ky.
2. Canada Creek, Whitley County, Ky.
3. Big South Fork, near Whitley Station, Ky.
4. Rock Creek, near Whitley Station, Ky.
5. New River at New River Station, Tenn.
6. Brimstone Creek near New River Station, Tenn.

STONE RIVER.

Stone River is formed in Rutherford County, Tennessee, by the confluence of the East and West Forks; it takes a northwesterly course through Davidson County and flows into the Cumberland River about 12 miles above Nashville.

The *West Fork*, near Murfreesboro, Tenn., August 20: This stream was seined for a distance of 1 mile below Murfreesboro. The river at this point has a width of 175 to 200 feet; the banks are generally low; the bottom of the channel is mostly of cherty limestone.

FISHES OF THE WEST FORK OF STONE RIVER.

1. *Catostomus nigricans* Le Sueur. Abundant in deep, swift waters.
2. *Moxostoma macrolepidotum duquesnei* (Le Sueur). Everywhere common. Agrees with the description given by Dr. D. S. Jordan, Manual of Vertebrates, edition 1888.
3. *Lagochila lacera* Jordan & Brayton. The single specimen taken is 6 inches in length.
4. *Campostoma anomalum* (Rafinesque). *Little brown sucker*. Abundant in swift waters.
5. *Pimephales notatus* (Rafinesque). The largest of the 22 specimens, 3¼ inches long. Black spot on front of dorsal fin indistinct.
6. *Notropis boops* Gilbert. Very scarce.
7. *Notropis whipplei* (Girard). Very abundant. Length of head equals depth of body.
8. *Notropis galacturus* (Cope). Common everywhere.
9. *Notropis megalops* (Rafinesque). Specimens small and varied in form and color.
10. *Notropis telescopus* (Cope). Not common.
11. *Hybopsis amblops* (Rafinesque). Scarce.
12. *Hybopsis kentuckiensis* (Rafinesque). Equally scarce with the preceding.
13. *Zygonectes notatus* (Rafinesque). Rather common. Largest taken, 2 inches long.
14. *Labidesthes sicculus* (Cope). Very common.
15. *Lepomis pallidus* (Mitchill). The largest of the 5 specimens, 4½ inches.
16. *Lepomis megalotis* (Rafinesque). Not common.
17. *Micropterus dolomieu* Lacépède. *Trout*.
18. *Etheostoma simoterum atripinnis* (Jordan). The single specimen taken is 2½ inches in length, and highly colored.
19. *Etheostoma blennioides* Rafinesque. Abundant. D. XIII or XIV—13.
20. *Etheostoma caprodes* (Rafinesque).
21. *Etheostoma rufolineatum* (Cope). The larger of the two specimens 1½ inches long.
22. *Etheostoma squamiceps* Jordan. Seven specimens taken, varying in length from 1 to 3½ inches. Comparing these specimens with the description of *E. squamiceps* in Jordan & Gilbert's Synopsis of Fishes of North America and with that in Jordan's Manual of Vertebrates, 5th edition, the following differences are notable: The lower fins of the males are not black but they are pale in either sex. Males have 7 or 8 crossbars on the dorsal region instead of 6. There are more than 50 scales in the lateral line; in all the specimens examined the number varied from 53 to 57. The gill-membranes are not broadly united across the isthmus, but on the contrary they are scarcely united at all.

SPRING CREEK.

Spring Creek has its source in the southeast part of Wilson County, Tennessee, from which region it flows 32 miles in a northwesterly direction, where it empties into the Cumberland River about 25 miles above Nashville. It was investigated at Spring Creek Station, 12 miles from its mouth, August 21. Here the stream has a width of 30 feet. Its banks are low and sloping, with no exposure of rock. There are long stretches of deep, quiet water. On account of the mud, wood, and brush covering the bottom, it is hard to work it satisfactorily. During a long drought the stream becomes almost dry on the shoals.

FISHES OF SPRING CREEK.

1. *Ameiurus natalis* (Le Sueur). Scarce. Largest taken, 7 inches.
2. *Catostomus nigricans* Le Sueur. Common in swift currents.
3. *Moxostoma macrolepidotum duquesnei* (Le Sueur). A common food-fish among local fishermen.
4. *Campostoma anomalum* (Rafinesque). *Little black sucker*. Common in all pools below shoals.
5. *Pimephales notatus* (Rafinesque). Very numerous.
6. *Notropis whipplei* (Girard). Not common.

7. *Notropis galacturus* (Cope). Scarce.
8. *Notropis megalops* (Rafinesque). *Silverside*. Common, as usual in southern streams.
9. *Notropis umbratilis cyanocephalus* (Copeland). Everywhere common.
10. *Notropis atherinoides* Rafinesque.
11. *Hybopsis amblops* (Rafinesque). Four small specimens only were taken.
12. *Hybopsis kentuckiensis* (Rafinesque). Two small specimens.
13. *Fundulus catenatus* (Storer.) Scarce. Fish highly colored.
14. *Zygonectes notatus* (Rafinesque). One specimen.
15. *Labidesthes sicculus* (Cope). Scarce.
16. *Lepomis pallidus* (Mitchill). Scarce. No black spot on anal.
17. *Lepomis megalotis* (Rafinesque). Abundant.
18. *Micropterus salmoides* (Lacépède). *Trout*.
19. *Etheostoma simoterum atripinnis* (Jordan). Common.
20. *Etheostoma blennioides* Rafinesque. Common in clear water.
21. *Etheostoma caprodes* (Rafinesque). Equally common.
22. *Etheostoma rufolineatum* (Cope). Six specimens were taken, the largest 2 inches long.
23. *Etheostoma squamiceps* Jordan. One specimen.

ROUND LICK CREEK.

Round Lick Creek is a small stream in Wilson County, Tennessee; it has a northerly course and is tributary to the Cumberland River. It was fished at Watertown, August 22. The channel has a width of 25 feet; its bottom is of smooth limestone and free from loose rocks and rubbish. The bottom land is broad and fertile.

FISHES OF ROUND LICK CREEK.

1. *Ameiurus natalis* (Le Sueur). A few small specimens.
2. *Campostoma anomalum* (Rafinesque). Abundant, color dark.
3. *Pimephales notatus* (Rafinesque).
4. *Notropis megalops* (Rafinesque). Common.
5. *Notropis ariommus* (Cope). A single specimen.
6. *Notropis umbratilis cyanocephalus* (Copeland). Everywhere common.
7. *Notropis atherinoides* (Rafinesque). Scarce.
8. *Semotilus atromaculatus* (Mitchill). Common.
9. *Fundulus catenatus* (Storer). Common.
10. *Lepomis megalotis* (Rafinesque). Common and of large size.
11. *Etheostoma simoterum atripinnis* (Jordan). Exceedingly abundant; more than 1,000 specimens were secured in a distance of three-fourths of a mile.
12. *Etheostoma squamiceps* Jordan. Thirty specimens were secured from smooth limestone bottom. Characteristics similar to those from Spring Creek and Stone River.
13. *Cottus bairdi* Girard. A few small specimens from rocky bottom among grass.

CANEY FORK RIVER.

Caney Fork River is formed by the confluence of several small streams in Warren County, Tenn., and after a northerly course through De Kalb and Smith counties it flows into the Cumberland River opposite Carthage. Collections were made at the following points:

1. *Caney Fork River*, near Lancaster: This stream was investigated 1 mile west of Lancaster, August 24. The channel has an average width of 175 feet. On account of recent rains the water was up and but little seining could be done. The bottom land is narrow, and the bordering bluffs steep, rising in places to a height of 250 feet.

The margin of the stream is fringed with a thick growth of willows. Species from this stream are marked "C."

2. *Smith Fork*, Lancaster: Smith Fork has its source in the southern part of Wilson County, Tenn.; it takes a northwesterly course and joins Caney Fork River near Lancaster. August 24 the work in this stream was done for a distance of 1 mile above the railroad bridge. The channel is cut into solid limestone, and in many places is covered with fragments of rocks which have fallen from the steep side hills. Smith Fork is a beautiful stream and abundantly stocked with native fish. Specimens collected from this stream are marked "S."

At this point I was materially assisted by Messrs. W. H. Nixon, A. Jackson, T. J. Lancaster, and C. C. Smith.

FISHES OF CANEY FORK RIVER.

1. *Lepisosteus osseus* (Linnæus). (S.)
2. *Ictalurus punctatus* (Rafinesque). (S.)
3. *Ameiurus nigricans* (Le Sueur). (S.) Common.
4. *Leptops olivaris* (Rafinesque). (S.) Three specimens were secured, the largest 10 inches long.
5. *Noturus flavus* Rafinesque. (S.) A single small specimen.
6. *Ictiobus difformis* (Cope). *High-backed sucker*. (C, S.) A common food-fish.
7. *Catostomus nigricans* Le Sueur. (C, S.) Common in currents in the latter stream.
8. *Moxostoma macrolepidotum duquesnei* (Le Sueur). *White sucker*. (C, S.) Equally common in both streams.
9. *Campostoma anomalum* (Rafinesque). (S.)
10. *Hybognathus nuchalis* Agassiz. (S.) A single specimen.
11. *Pimephales notatus* (Rafinesque). (S.) The single fish taken is 2½ inches long.
12. *Notropis whipplei* (Girard). (C, S.) Very common.
13. *Notropis galacturus* (Cope). (S.) One.
14. *Notropis megalops* (Rafinesque). (S.) Scarce.
15. *Notropis atherinoides* Rafinesque. (S.) Common and of large size.
16. *Hybopsis watauga* Jordan & Evermann. (C, S.) Not common. Head, 4 in length of body; eye equals length of snout and 3 in length of head.
17. *Hybopsis amblops* (Rafinesque). (S.) Scarce.
18. *Hybopsis storerianus* (Kirtland). (S.) The largest 6 inches long.
19. *Ambloplites rupestris* (Rafinesque). (S.)
20. *Lepomis megalotis* (Rafinesque). (S.) Scarce.
21. *Micropterus dolomieu* Lacépède. *Trout*. (S.)
22. *Etheostoma simoterum atripinnis* (Jordan). (S.)
23. *Etheostoma blennioides* Rafinesque. (S.)
24. *Etheostoma caprodes* (Rafinesque). (S.) Common.
25. *Etheostoma aspro* (Cope & Jordan). (S.) Two small specimens.
26. *Etheostoma eviðes* (Jordan & Copeland). (C, S.) Scarce.
27. *Etheostoma rufolineatum* (Cope). Scarce.
28. *Etheostoma stigmæum* (Jordan). (S.) Very abundant.
29. *Stizostedion vitreum* (Mitchill). (S.) *Spotted trout*.
30. *Aplodinotus grunniens* Rafinesque. *White perch*. (S.) Common.

ROARING RIVER.

Roaring River is formed in the southern part of Overton County, Tenn.; it flows north through Jackson County and pours its waters into the Cumberland River near Gainesborough. Fish were collected at the following places:

1. *Roaring River*, near Windle: This stream was fished August 30, a few miles from Windle. The current is deep, the channel has a width of about 30 feet, and its bottom is covered with wood and rocks. Fish from this stream are marked "R."

2. *Spring Creek*: This stream heads in Putnam County, Tenn. After a northerly course through Overton and Jackson counties it empties into the Roaring River. Spring Creek was investigated at Netherland, Overton County, Tenn., August 25. The channel here is 30 feet wide; its bottom is of limestone, frequently covered with loose rocks. The shoals are very rough and rocky. Specimens are marked "Sp."

FISHES OF ROARING RIVER.

1. *Catostomus nigricans* Le Sueur. (R.) Common.
2. *Catostomus teres* (Mitchill). (Sp.) Common and of large size.
3. *Campostoma anomalum* (Rafinesque). (R.) Common.
4. *Chrosomus erythrogaster* Rafinesque. (R, Sp.) Scarce.
5. *Notropis galacturus* (Cope). (R.) Common.
6. *Notropis umbratilis cyanocephalus* (Copeland). Common.
7. *Rhinichthys atronasus* (Mitchill). (R.) Very common.
8. *Hybopsis kentuckiensis* (Rafinesque). (R.) The most abundant species in the river.
9. *Semotilus atromaculatus* (Mitchill). (R, Sp.) Especially common in Spring Creek.
10. *Ambloplites rupestris* (Rafinesque). (R, Sp.)
11. *Micropterus dolomieu* Lacépède. (R.)
12. *Etheostoma blennioides* Rafinesque. (R.) Two small specimens.
13. *Etheostoma oceruleum* Storer. (R.) Two small specimens.
14. *Cottus bairdi* Girard. (R, Sp.) Not common. The specimens from Spring Creek had their stomachs filled with water insects.

OBEYS RIVER.

The Obeyes River is formed near Byrdstown, Tenn., by the junction of the East and West Forks. It has a general northwest course through Pickett and Clay counties and flows into the Cumberland River at Celina. The Obeyes River basin was examined at the following three points:

1. *Obeyes River*, Olympus, August 28: This stream was seined for a distance of one mile and a half. Here the river has a width of 180 feet, a solid limestone bottom with occasional outcrops of shale, and many gravelly shoals. Fish very abundant. The specimens from Obeyes River are marked "O."

2. *Eagle Creek* heads in Overton County, Tenn., and after a general northwesterly course it empties into Obeyes River at Olympus, in Pickett County. August 27 this creek was fished for a distance of 2 miles in its lower course. The banks are low, and the bottom of the channel is of limestone or shale with many gravelly shoals. This is a beautiful stream with an abundance of fish. The collections are marked "E."

3. *Wolf River*, near Byrdstown: This river rises in Fentress County, Tenn. It has a northwest course and is tributary to the Obeyes River at the Mouth of Wolf post-office. August 28 this stream was investigated at a point 3 miles north of Byrdstown. Here the channel has a limestone bottom with a few shoals. Fish from this stream marked "Wf."

FISHES OF OBEYS RIVER.

1. *Lepisosteus osseus* (Linnaeus). (O.) Common.
2. *Ictalurus punctatus* Rafinesque. (O.) A single specimen from deep water.
3. *Ameiurus nebulosus* (Le Sueur). (O.) Scarce; color dark.
4. *Noturus flavus* Rafinesque. (O, E.) A single fish from each stream.
5. *Catostomus nigricans* Le Sueur. (O, E, Wf.) The largest taken from Eagle Creek, 14 inches long.
6. *Moxostoma macrolepidotum duquesnei* (Le Sueur). (O, E, Wf.) Common in all the streams.
7. *Campostoma anomalum* (Rafinesque). (E, Wf.)
8. *Pimephales notatus* (Rafinesque). (Wf.) Abundant.
9. *Notropis boops* Gilbert. (Wf.) Scarce.
10. *Notropis whipplei* (Girard). (O, E, Wf.) Scarce.
11. *Notropis galacturus* (Cope). (O, E, Wf.) Very common except in Obeyes River.
12. *Notropis megalops* (Rafinesque). (O, E, Wf.) Common everywhere.
13. *Notropis ariommus* (Cope). (E.) A single specimen.
14. *Notropis umbratilis cyanocephalus* (Copeland). (E, Wf.) Not common.
15. *Notropis telescopus* (Cope). (O, E.) Very common in Obeyes River.
16. *Notropis atherinoides* Rafinesque. (O, E, Wf.) Common everywhere.
17. *Phenacobius uranops* Cope. (O, E, Wf.) Common. The largest from Obeyes River, 3½ inches long. D. 8; A. 7.
18. *Hybopsis watauga* Jordan & Evermann. (O, E.) Numerous specimens from 2 to 4 inches long. The larger without dusky spots on the lateral band.
19. *Hybopsis amblops* (Rafinesque). (E, Wf.)
20. *Hybopsis kentuckiensis* (Rafinesque). (E, Wf.) Common and of large size.
21. *Clupea chrysochloris* (Rafinesque). (O.) Several specimens; all small.
22. *Fundulus catenatus* (Storer). (O, E, Wf.) Common.
23. *Labidesthes sicculus* (Cope). (O.) Live specimens.
24. *Ambloplites rupestris* (Rafinesque). (O, Wf.) Common in Obeyes River; a single specimen from Wolf River.
25. *Lepomis megalotis* (Rafinesque). (O, E, Wf.) Abundant in Obeyes River.
26. *Micropterus dolomieu* Lacépède. (O, E, Wf.)
27. *Etheostoma simoterum atripinnis* (Jordan). (E.)
28. *Etheostoma blennioides* Rafinesque. (O, E, Wf.)
29. *Etheostoma caprodes* (Rafinesque). (O, E, Wf.)
30. *Etheostoma macrocephalum* Cope. (O, E.)
31. *Etheostoma evides* (Jordan & Copeland). (O.)
32. *Etheostoma rufolineatum* (Cope). (E.) One small specimen.
33. *Etheostoma cinereum* Storer. (O, E, Wf.) Especially common in Wolf River. Largest specimen taken about 3½ inches long. Head about 3½ in length of body; depth 5¼. D. XI to XII-11 to 13; A. II, 8. Lateral line 57 to 60.

Body oblong, somewhat compressed. Head pointed, gibbous over the eyes. Diameter of eye greater than length of snout and 4 in length of head. Interorbital space narrow. Mouth horizontal; upper jaw projecting; premaxillary not protractile; maxillary not reaching front of eye; teeth on vomer, and several irregular rows of teeth on the jaws. Opercles and preopercles covered with scales; breast and space in front of first dorsal naked. A small spine extends backward from near the free edge of the opercle. Gill membranes are united but not connected with the isthmus. The front of second dorsal is midway between the center of pupil and the base of caudal fin; the space between the two dorsals about equal to the diameter of the eye; the base of the first and second dorsals equal in length. Free edge of first dorsal rounded, its longest spine 1½ in base of fin, second dorsal high, its free edge straightish, longest ray equal in length to base of fin. Base of anal fin shorter than that of second dorsal and placed opposite the middle of that fin; first anal spine the shorter. Caudal fin somewhat shorter than the base of first dorsal. Pectorals extend to the posterior insertion of first dorsal. Ventrals about equal in length to base of second dorsal.

Scales ctenoid. Lateral line complete, slightly decurved.

Coloration: The upper portion of the body is of a light yellow; the dorsal region is marked with four dark cross-bars; the first and largest of these is between the two dorsals, the next two in the base of the second dorsal, and the last upon the caudal peduncle. On the sides above the lateral line each scale is marked with a brown spot. These spots form 2 or 3 series of lines running backward to the region of the second dorsal. The lower portions of the body are yellowish-white. Following the course of the lateral line is a series of 11 or 12 oblong spots which are continuous downward and backward as a faint bar. On either side of the head the spots on the lateral line are replaced by dark bands which pass forward through the eyes and meet on the tip of the snout. "First dorsal is margined with red; second dorsal and anal variegated with red spots."

34. *Etheostoma obeyense* Kirsch. (O.) Two small specimens only were secured.
35. *Etheostoma cœruleum* Storer. (O, E, Wf.) Common in Eagle Creek; Obeyes and Wolf rivers one each.
36. *Etheostoma zonale* (Cope). One specimen from Obeyes River.
37. *Etheostoma copelandi* (Jordan). One specimen from Obeyes River.
38. *Etheostoma stigmæum* (Jordan). Abundant in all these streams.
39. *Cottus bairdi* Girard. (O.) Not many were taken.

CUMBERLAND RIVER.

1. During these explorations the main stream of the Cumberland River was touched only at the "lock and dam" near the mouth of Willis Creek, Cumberland Co., Ky. Here the river is easily worked but with the short seine only at command not much could be done. Fish from this stream are marked "C."

2. *Willis Creek* is in Clinton County, Ky. It flows in a northwesterly direction and empties into the Cumberland River in Cumberland County. September 1 this little creek was fished at its mouth. Specimens from here are marked "W."

For the prosecution of the work at this point I am greatly indebted to Capt. Wash Hurt for valuable assistance.

FISHES OF THE CUMBERLAND RIVER.

1. *Lepisosteus osseus* (Linnaeus). (C.) Many were taken.
2. *Ictiobus difformis* (Cope). (W.) One.
3. *Catostomus nigricans* Le Sueur. (W.)
4. *Moxostoma macrolepidotum duquesnei* (Le Sueur). (C, W.) Very common.
5. *Campostoma anomalum* (Rafinesque). (W.) Common.
6. *Notropis whipplei* (Girard). (W.) Scarce.
7. *Notropis galacturus* (Cope). (W.) Specimens all small; color dark.
8. *Notropis megalops* (Rafinesque). (W.) Scarce.
9. *Notropis umbratilis cyanocephalus* (Copeland). (C, W.)
10. *Notropis telescopus* (Cope). (W.) A single small specimen.
11. *Notropis atherinoides* Rafinesque. (C.) One only.
12. *Phenacobius uranops* Cope. (W.) One.
13. *Rhinichthys atronasus* (Mitchill). A single specimen.
14. *Clupea chrysochloris* (Rafinesque). (C.) Numerous small specimens were secured.
15. *Fundulus catenatus* (Storer). (W.)
16. *Micropterus salmoides* (Lacépède). (C, W.)
17. *Micropterus dolomieu* Lacépède.
18. *Etheostoma caprodes* (Rafinesque). (W.) Scarce.
19. *Etheostoma aspro* (Cope & Jordan). (C.)
20. *Etheostoma cœruleum* Storer. (W.) Very common.
21. *Etheostoma stigmæum* (Jordan). (W.) Common.
22. *Aplodinotus grunniens* Rafinesque. *White perch*. (C.) The largest of the many specimens taken is 8 inches long.

BEAVER CREEK.

Beaver Creek drains the western portion of Wayne County, Ky. It has a general northwest course and empties into the Cumberland River 3 miles above Rowena. Beaver Creek system was examined at the following points:

1. *Beaver Creek*, Wayne County, Ky., September 3. The work on this stream was done both above and below McCackney's milldam. The channel is very rocky. Specimens from this creek are marked "B."

2. *Otter Creek*.—This stream rises among the mountains in the extreme southwest part of Wayne County, Ky. It takes a northerly course and empties into Beaver Creek a few miles from its mouth. September 2 this stream was seined at a point near Jones's milldam, on the Monticello and Albany road. Like Beaver Creek it is a narrow, tortuous, rocky mountain stream and exceedingly hard to work. Fish noted from this stream are marked "O."

FISHES OF BEAVER CREEK.

1. *Ameiurus nebulosus* (Le Sueur). (B, O.) Those from Beaver Creek were taken in a muddy side-channel which has no connection with the main stream during low water.
2. *Catostomus nigricans* Le Sueur. (B, O.) Common in all swift waters.
3. *Moxostoma macrolepidotum duquesnei* (Le Sueur). (B, O.) Regarded as one of the principal food-fishes among local fishermen.
4. *Campostoma anomalum* (Rafinesque). (B, O.)
5. *Chrosomus erythrogaster* Rafinesque. (B.) Not common.
6. *Pimephales notatus* (Rafinesque). (B, O.) Common everywhere.
7. *Notropis whipplei* (Girard). (B, O.) Scarce.
8. *Notropis galacturus* (Cope). (B, O.) Especially abundant in Otter Creek.
9. *Notropis megalops* (Rafinesque). (B, O.) Seemingly scarce.
10. *Notropis umbratilis cyanocephalus* (Copeland). (O.) Not common.
11. *Hybopsis amblops* (Rafinesque). (O.)
12. *Hybopsis kentuckiensis* (Rafinesque). (B, O.) Only two small specimens were taken in Otter Creek; very common in Beaver Creek.
13. *Semotilus atromaculatus* (Mitchill). (B.) D. 7 or 8; A. 8.
14. *Fundulus catenatus* (Storer). (B, O.) Common.
15. *Lepomis cyanellus* Rafinesque. (B.) Only one.
16. *Lepomis megalotis* (Rafinesque). (B, O.) Scarce.
17. *Micropterus dolomieu* Lacépède. (O.) Many small specimens were taken.
18. *Etheostoma blennioides* Rafinesque. (B, O.)
19. *Etheostoma caprodes* (Rafinesque). (O.) The single specimen is 2½ inches long.
20. *Etheostoma obeyense* Kirsch. (B, O.) Very abundant everywhere.
21. *Etheostoma cœruleum* Storer. (O.)

BIG SOUTH FORK OF THE CUMBERLAND RIVER:

The Big South Fork drains a scope of country lying north of the Cumberland Plateau in Tennessee, and extending from the watershed of the Obeyes River system on the west to the Cross and Jellico mountain slopes on the east. It is tributary to the main stream of the Cumberland River at Burnside, Ky. This water system was investigated at the following places:

1. *Little South Fork*, September 5. This stream has its rise in the southern part of Wayne County, Ky.; it flows north and empties into the Big South Fork. The collections were made near the mouth of Canada Creek. Here the channel has an

average width of about 75 feet, its bottom mostly of smooth limestone covered with loose rocks. The stream is well stocked with fish. Collections are marked "L."

2. *Canada Creek* is in the southeast part of Wayne County, Ky., and tributary to Little South Fork. This stream was fished September 4 at a point about 8 miles above its mouth. The bottom of the channel is solid rock, having a width of about 30 feet. There are long stretches of deep and quiet water between the occasional shoals. Specimens from this creek are marked "C."

3. *Big South Fork*, near Whitley Station, Ky., September 7. This stream was examined on the shoals near the mouth of Rock Creek, about 7 miles west of Whitley Station, Ky. At this point the river has a width of about 300 feet, its bed is scattered over with large rocks, and the current is swift, making it almost impossible to seine. Specimens from here are marked "B."

4. *Rock Creek*, near Whitley Station, Ky. This stream is a western tributary of Big South Fork. It was investigated in its lower course September 7. It has a width of not more than 30 feet, the water is clear and cold, and, as the name indicates, the channel is very rocky. Fish from Rock Creek are marked "R."

5. *New River*, at New River Station, Tenn., on the Cincinnati Southern Railroad. This stream is formed in the east part of Scott County, Tenn. It flows north, and in conjunction with Clear Fork, White Oak Creek, and several other streams, forms the head waters of the Big South Fork. New River was investigated at New River Station September 9. The long stretches between the broad shoals are deep. The stream is well stocked with fish. Collections from this point are marked "N."

6. *Brimstone Creek*, New River Station. This stream has a length of only about 6 miles. It has a northerly course and is tributary to New River near New River Station. September 9 this little creek was seined for a distance of 1 mile. It has several gravelly shoals and many deep holes, with very muddy bottom. Fish small but very abundant. Specimens from this stream are marked "Br."

FISHES OF THE BIG SOUTH FORK OF THE CUMBERLAND RIVER.

1. *Catostomus nigricans* Le Sueur. (L, C, B, R, N, Br.) Common in all the streams.
2. *Moxostoma macrolepidotum duquesnei* (Le Sueur). (L, C, B, R.) Equally common.
3. *Lagochila lacera* Jordan & Brayton. (L, C.) Scarce.
4. *Campostoma anomalum* (Rafinesque). (L, C, R, N, Br.) A single specimen from Little South Fork; very abundant in the other streams.
5. *Pimephales notatus* (Rafinesque). (L, C.) Not common.
6. *Notropis heterodon* (Cope). (C.) Two small specimens only.
7. *Notropis whipplei* (Girard). (B, R, N, Br.) Common everywhere.
8. *Notropis galacturus* (Cope). (L, B, R, N, R.) Numerous specimens taken from all these streams.
9. *Notropis megalops* (Rafinesque). (L, C.) Common as usual.
10. *Notropis ariommus* (Cope). (R.) Two small specimens only.
11. *Notropis umbratilis cyanocephalus* (Copeland). (C, B, N, Br.) From the last point a single specimen.
12. *Notropis telescopus* (Cope). (C, B, R.) Rather common.
13. *Notropis atherinoides* Rafinesque. (L, C, B, R, Br.) Common everywhere except in Canada Creek.
14. *Hybopsis amblops* (Rafinesque). (L, C, R.)
15. *Hybopsis kentuckiensis* (Rafinesque). (L, C, B, N, Br.) Very common in all the streams except Brimstone Creek.

16. *Semotilus atromaculatus* (Mitchill). (C.) A few specimens only were secured.
 17. *Fundulus catenatus* (Storer). (L, C.) Scarce.
 18. *Ambloplites rupestris* (Rafinesque). (L, Br.)
 19. *Lepomis megalotis* (Rafinesque). (L, C, B, Br.) Generally scarce.
 20. *Micropterus dolomieu* Lacépède. (L, B, Br, C.) Common in flowing water.
 21. *Micropterus salmoides* (Lacépède). (B, R, N, Br.) Common.
 22. *Etheostoma simoterum atripinnis* (Jordan). (C.) Scarce.
 23. *Etheostoma blennioides* Rafinesque. (L, C, R, N.) Common at all points.
 24. *Etheostoma caprodes* (Rafinesque). (L, B, N, Br.)
 25. *Etheostoma macrocephalum* Cope. (L.) Scarce.
 26. *Etheostoma aspro* (Cope & Jordan). (B, Br.) Scarce.
 27. *Etheostoma camurum* (Cope). (L, R.) Not common. Several small specimens.
 28. *Etheostoma rufolineatum* (Cope). (L, B, R.) From swift waters. Scarce.
 29. *Etheostoma cinereum* Storer. (L, R.) Scarce.
 30. *Etheostoma obeyense* Kirsch. (L, C.) Scarce.
 31. *Etheostoma cœruleum* Storer. (C, B, R.)
 32. *Etheostoma stigmæum* (Jordan). (L, C, B, Br.)
 33. *Cottus bairdi* Girard. (L.) Only a few small specimens were secured.
- A large number of salamanders (*Amblystoma punctatum*) were taken in Rock Creek.

COLUMBIA CITY, IND., November 4, 1892.