

## 7.—A LIST OF FISHES AND MOLLUSKS COLLECTED IN ARKANSAS AND INDIAN TERRITORY IN 1894.

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### INTRODUCTION.

The following paper is based on two collections of fishes made by the writer under the auspices of the United States Fish Commission and the Museum of the Arkansas University.

The first collection was made during the last week in May, 1894, along the line of the St. Louis and San Francisco Railroad, between Fort Smith, Arkansas, and Arthur, Texas. The second collection was made during the last two weeks of August, 1894, in the St. Francis River in northeastern Arkansas. As these two regions are somewhat remote from each other, and unlike, for the most part, as to physical characteristics, they are treated separately in this paper.

For assistance in the identification of doubtful species and in the preparation of this report I am indebted to Prof. Barton W. Evermann, ichthyologist of the United States Fish Commission.

### WESTERN ARKANSAS AND EASTERN INDIAN TERRITORY.

The Poteau and Kiamichi rivers are the most important streams draining the eastern portion of Indian Territory south of Fort Smith. These rivers rise in the Ozark Mountains, between the Arkansas and Red rivers, the Poteau flowing north, the Kiamichi south; each drains, for the most part, in the upper two-thirds of its course, a mountainous sandstone region, where their currents are swift and their bottoms usually rocky. Between Poteau, Indian Territory, and Fort Smith the Poteau River flows with a slow current in a deep and rather broad channel, with an occasional rocky shoal; in dry weather the depth some 5 or 6 miles above Fort Smith is more than 15 or 20 feet in places; so broad and deep is this channel and so slow is the current that the river partakes somewhat of the nature of a lake.

Collections were made from the Poteau River near Fort Smith and a few small rocky tributaries near Poteau, Indian Territory.

The Kiamichi River collections were made from Walnut Creek and Kiamichi River, at Kiamichi, Indian Territory, and Flat Creek, near Goodland, Indian Territory. Those from the Red River were made at Arthur, Texas. The Kiamichi River was too deep and rocky to admit of successful collecting at the places mentioned, especially at the latter place.

At Arthur the Red River is similar to the Arkansas at Fort Smith. There are along the stream many bayous, from which most of our collections were made.

## LIST OF FISHES.

The fishes are listed as follows:

- Arthur = Bayons and Red River near Arthur, Texas.  
 Goodland = Flat Creek near Goodland, Indian Territory.  
 Poteau = Creeks, bayous, and lake at Poteau, Indian Territory.  
 Fort Smith = Poteau and Arkansas rivers.  
 Kiamichi = Kiamichi River and Walnut Creek at Kiamichi.
1. *Lepisosteus osseus* (Linnaeus). *Long-nosed Gar Pike*; *Common Gar Pike*. Quite abundant in the Poteau and Arkansas rivers at Fort Smith; specimens frequently seen floating quietly near surface of water. The other two species of gar found in these waters seem much less abundant; neither of them was taken by me.
  2. *Ictalurus punctatus* (Rafinesque). *Channel Cat*; *White Cat*. Quite abundant at Arthur and in the Poteau and Arkansas rivers at Fort Smith. In the former place it is the most important food-fish. The largest specimen observed was taken on a trot line; its weight was 20 pounds.
  3. *Ameiurus nebulosus* (Le Sueur). *Common Bullhead*. Poteau, one specimen; Kiamichi, scarce.
  4. *Ameiurus melas* (Rafinesque). *Small Bullhead*. Common in bayous at Arthur, Kiamichi, and Poteau; especially common in Poteau Lake.
  5. *Noturus nocturnus* Jordan & Gilbert. One specimen from Walnut Creek at Kiamichi.
  6. *Leptops olivaris* (Rafinesque). *Blue Cat*. Common at Arthur and Goodland and at Fort Smith in Arkansas River. It is an important food-fish at these places.
  7. *Ictiobus cyprinella* (Cuvier & Valenciennes). *Buffalo*. One small specimen from Arthur.
  8. *Carpiodes velifer* (Rafinesque). *Quillback*. Common at Arthur (dorsal rays 29 to 30), Goodland, and in the Poteau and Arkansas rivers at Fort Smith.
  9. *Erimyzon sucetta* (Lacépède). *Chub Sucker*. Common at Goodland, Kiamichi, and Poteau. It is usually found in small streams with sluggish currents.
  10. *Minytrema melanops* (Rafinesque). *Striped Sucker*. A few specimens were taken at Goodland and Poteau. This species is usually found with the preceding.
  11. *Moxostoma macrolepidotum duquesnei* (Le Sueur). *Common Redhorse*. Apparently scarce; a few specimens from Goodland, Kiamichi, and Poteau, and the Poteau River at Fort Smith.
  12. *Campostoma anomalum* (Rafinesque). *Stone-lugger*; *Stone-roller*. Scarce; Goodland, Kiamichi, and Poteau, and the Poteau River at Fort Smith.
  13. *Hybognathus nuchalis* (Agassiz). *Silvery Minnow*. Quite abundant and variable in Arkansas and Indian Territory. Some specimens quite slender and more finely scaled than others. No doubt the specimens at hand include *argyritus* and *placita*. In the Red and Arkansas rivers it is the most abundant minnow. Common at Poteau, Fort Smith, and Arthur.
  14. *Pimephales notatus* (Rafinesque). *Blunt-nosed Minnow*. Apparently scarce; Arthur, Goodland, Kiamichi, and Poteau.
  15. *Cliola vigilax* (Baird & Girard). Scarce at Goodland and Poteau; also in Arkansas and Poteau rivers at Fort Smith.
  16. *Notropis heterodon* (Cope). Arthur, scarce.
  17. *Notropis blennius* (Girard). *Blunt-nosed Minnow*. Arthur, Goodland, and the Arkansas and Poteau rivers at Fort Smith, scarce.
  18. *Notropis shumardi* (Girard). Arthur, scarce; Goodland, Kiamichi, and Poteau, abundant.
  19. *Notropis buchanani*, new species.  
 Type locality: A small creek near Poteau, where 14 specimens were secured in May, 1894.  
 Type, No. 47532, U. S. Nat. Mns.  
 Head, 4; depth, 4; D. 8; A. 8. Scales, 6-31-2. Teeth, 4-4. Body rather robust, back considerably elevated, snout blunt, mouth small and nearly horizontal. Snout short, about two-thirds diameter of eye. Preorbital bone slightly longer than broad. Eye moderate, 3 in head. Lateral line complete, or nearly so. About 12 scales in a series before dorsal fin. Dorsal fin slightly nearer tip of snout than base of caudal. Pectorals reaching ventrals; ventrals reaching anal. Color light olivaceous, a faint silvery lateral band; no dark lateral band or black caudal spot. This species belongs to the *N. blennius* type. It is a smaller species, lighter in color, and has fewer scales in the lateral line. I take pleasure in naming this fish for Dr. John L. Buchanan, president of the Arkansas Industrial University.
  20. *Notropis bubalinus* (Baird & Girard). Poteau River at Fort Smith, scarce.

21. *Notropis venustus* (Girard). Arthur and Goodland, very common.
22. *Notropis umbratilis* (Girard). Abundant at Goodland, Kiamichi, and Poteau; scarce in the Poteau at Fort Smith.
23. *Notropis dilectus* (Girard). *Emerald Minnow*. Arthur and Goodland, scarce; Poteau and Arkansas rivers, common.
24. *Notropis whipplii* (Girard). *Silver-fin*. Goodland, Kiamichi, and Poteau; Arkansas and Poteau rivers at Fort Smith, not common.
25. *Notropis lutrensis* (Baird & Girard). Poteau and Arthur, common.
26. *Notropis jejunus* (Forbes). Poteau and Arkansas rivers at Fort Smith, scarce.
27. *Phenacobius mirabilis* (Girard). Poteau and the Poteau River at Fort Smith, scarce.
28. *Hybopsis amblops* (Rafinesque). Goodland, scarce.
29. *Hybopsis storerianus* (Kirtland). Poteau River at Fort Smith, common.
30. *Hybopsis tetranemus* Gilbert. Arkansas River at Fort Smith, scarce.
31. *Opsopœodus emilîæ* Hay. Poteau and Goodland, scarce.
32. *Notemigonus chrysoleucus* (Mitchill). *Golden Shiner*. Arthur and Poteau, common.
33. *Gambusia affinis* (Baird & Girard). Goodland, Poteau, and Fort Smith, scarce. Very abundant in the bayous along the Red River at Arthur. Females taken at Arthur the last week of May contained partially hatched young.
34. *Zygonectes escambiæ* Bollman. Poteau, scarce.
35. *Zygonectes notatus* (Rafinesque). *Top Minnow*. Goodland, Kiamichi, and Poteau, and the Poteau River at Fort Smith, not common.
36. *Dorosoma cepedianum* (Le Sueur). *Hickory Shad*; *Gizzard Shad*. Arthur and the Poteau River at Fort Smith, abundant in bayous.
37. *Hiodon alosoides* (Rafinesque). *Moon-eye*. Arkansas River at Fort Smith, scarce.
38. *Lucius vermiculatus* (Le Sueur). *Little Green Pickerel*. Arthur, Goodland, Kiamichi, and Poteau, apparently scarce. A difficult fish to capture with a small seine.
39. *Lucius reticulatus* (Le Sueur). *Eastern Pickerel*. Arthur, one specimen taken. This is the extreme southwestern locality from which this species has been taken.
40. *Labidesthes sicculus* Cope. Goodland, Kiamichi, and Poteau, not common.
41. *Chænobryttus gulosus* (Cuvier & Valenciennes). Poteau, one specimen.
42. *Pomoxis annularis* Rafinesque. *Crappie*. Common in the Red River bayous at Arthur; scarce at Goodland and Poteau.
43. *Lepomis cyanellus* Rafinesque. *Green Sunfish*; *Perch*. Arthur, Goodland, Kiamichi, Poteau, and Fort Smith, not very common.
44. *Lepomis macrochirus* Rafinesque. Poteau and the Poteau River at Fort Smith, scarce.
45. *Lepomis pallidus* (Mitchill). *Blue Sunfish*; *Perch*. Arthur, common; Kiamichi and Poteau, scarce.
46. *Lepomis humilis* (Girard). *Red-spotted Sunfish*; *Perch*. More abundant than any other of the sunfishes found in the region covered by this paper. Arthur and Poteau River at Fort Smith, common; Goodland and Poteau, scarce.
47. *Lepomis megalotis* (Rafinesque). *Long-cared Sunfish*; *Perch*. Arthur, Goodland, Kiamichi, Poteau, and the Poteau River at Fort Smith, common. This species is very variable. Scales vary in the lateral line from 34 to 44, the usual number being from 36 to 42; some specimens are deeper than others; these usually have the larger scales. The more slender specimens usually have a rather steep and trenchant profile.
48. *Micropterus salmoides* (Lacépède). *Large-mouthed Black Bass*. Arthur, Goodland, Kiamichi, Poteau, and the Poteau River at Fort Smith, common; absurdly called "trout" here, as elsewhere throughout the South.
49. *Etheostoma chlorosoma* (Hay). Arthur, Goodland, Poteau, and Kiamichi, and the Poteau River at Fort Smith, scarce.
50. *Etheostoma ouachitæ* Jordan & Gilbert. Arthur, Goodland, and Kiamichi, common. Specimens from Kiamichi have D. XI or XII, 11 or 12; A. I, 8; scales, 55 to 58.
51. *Etheostoma caprodes* (Rafinesque). *Hogfish*; *Log Perch*. Arthur, Poteau, and Goodland, scarce; Poteau River at Fort Smith, scarce.
52. *Etheostoma whipplii* (Girard). The most abundant and variable darter found in the region covered by this paper. Abundant at Arthur, Poteau, Goodland, Kiamichi, and in the Poteau River at Fort Smith.
53. *Etheostoma lepidum* (Girard). Arthur, common; scales, 45 to 49; D. IX or X-13; scales, 45 to 49, no scales on the head. Goodland and Poteau, common.

54. *Etheostoma phoxocephalum* Nelson. Poteau River at Fort Smith, scarce.
55. *Etheostoma fusiforme* (Girard). Arthur, common; scales, 46 to 52; D. ix or x-11; cheeks and opercles scaly; breast naked; a small black spot at base of caudal fin. Kiamichi, scarce.
56. *Etheostoma microperca* Jordan & Gilbert. Kiamichi and Poteau, scarce. This species has sometimes but one anal spine.
57. *Stizostedion canadense* (C. H. Smith). *Sauger*. Said to be common in the Poteau River at Fort Smith.
58. *Aplodinotus grunniens* Rafinesque. *Fresh-water Drum*. Goodland, scarce; Arthur and the Arkansas River at Fort Smith, common.

#### THE ST. FRANCIS RIVER.

The region drained in Arkansas by the St. Francis River is low and flat, except the eastern slope of Crowley Ridge, which is more or less rolling. The river soon after passing south of the northern line of Arkansas widens, forming a lake from a few rods to 5 miles wide and about 50 miles long. On either side of this lake are many shallow bayous which quite or entirely dry up during the summer. The region between the St. Francis and Mississippi rivers is very low and contains a number of lakes, some of which are 5 or 6 miles wide and three or four times as long. Most of these lakes discharge their waters into the St. Francis, the others into the Mississippi River. In the spring nearly all of this region, including a large area west of the St. Francis River, is flooded with water from a depth of a few inches to as much as 10 feet. Thus, at least once a year, the Mississippi, these lakes, the St. Francis, and even the head waters of the Black and Cache rivers, are all united in one vast sheet of water. There is probably no time in the year when it is not possible with a small skiff to go from St. Francis through Little River to the Mississippi River.

The present conditions of this region are due to the New Madrid earthquake of 1811-12. After the quaking of the earth, which lasted for several months, had subsided large areas of land sunk several feet below their former level, while a few smaller areas became somewhat elevated. The large lakes now in this region and the broad lake-like channel of the St. Francis River are due to this earthquake. Many of the large cracks made in the earth at that time are still visible as shallow ditches 1 or 2 yards wide and 6 inches or more in depth. To the ordinary observer these would be scarcely noticed. Although the people who witnessed that earthquake have about all passed away, so vivid were their recollections of it that their descendants point out with much accuracy the marks left by it and discuss with clearness its destructive features. I visited Old River, about 10 miles east of Greenway. This was formerly the main channel of the St. Francis, but after the earthquake its new channel was formed about 6 miles farther east. The Old River is little more than a large bayou. It has but little current, has a sandy bottom, and contains only a small amount of vegetation. It varies much in width, being from half a mile to only a few rods wide. It is as much as 20 feet deep in places, and seems to be full of fish life.

It was a comparatively easy matter with a collecting seine to catch pickerel and black bass weighing from 1 to 3 pounds. The water was quite clear, and large gars, buffalo, pickerel, black bass, and sunfishes could be seen in abundance. The usual method of catching black bass (the favorite food-fish) was trolling. The parts of two days I spent on Old River I saw many black bass taken this way. Two men would be out one or two hours and return with a dozen or more black bass weighing from 2 to 5 pounds. In all of my collecting I have never seen another stream that seemed to contain the enormous amount of fish life found in Old and St. Francis rivers.

I visited the main river near Big Bay and at Marked Tree. At Big Bay the river is about 5 miles wide, although the main current is much narrower. The river contains much vegetation on each side and in shallow places in the main channel. The vegetation was too abundant in shallow water to enable us to use a seine; where less abundant the water was too deep. This made collecting very irksome and unsatisfactory, but our labors were rewarded by getting a few species not taken elsewhere.

The bottom of the river, especially in the main channel, is sandy, and the water very clear. The current was moderate. The amount of fish life in the river was very great. Large fishes were everywhere coming to the surface and with a quick motion, sufficient to agitate the water considerably, would sink below the surface. In quietly floating down the stream in a dugout, many large fishes could easily be seen moving slowly about in the river below or resting quietly among the weeds. Professor Sampson and myself, in a half dozen strokes with a gig, caught one large gar and a 3-pound black bass. This was our first attempt to capture fish by this method.

In the spring, as the overflow water recedes, many large fishes become stranded in shallow bayous and even on level ground. Many of these are taken by farmers and lumbermen and used by them for food, while a large number are left to die as the water recedes. The buffalo are among the largest number destroyed for lack of water; some are reported of immense size.

One of the most noticeable features of Old River is the immense numbers of mollusks found in the sandy bottom and the banks of the stream. The Arkansas hogs feed on the mollusks in the shallow water; they root the mollusk out of the sand, crack the shell, and extract the meat; they also destroy many gasteropods, which are very abundant, by the same method. The hogs also consume many of the stranded fishes. Minnows were found in the St. Francis in much less quantities than one would at first suppose. They are probably reduced in number by the abundance of large predatory fishes. Crawfishes seemed quite scarce; only two species, the young *Cambarus palmeri*, and a small new species, *Cambarus faxoni*, being all that were found in the river.

At Marked Tree the St. Francis is confined to an ordinary river channel. It has clear water, a rather slow current, and a sandy bottom. About 2 miles above Marked Tree the Little River, its most important tributary from the east, empties into the St. Francis. When visited the water was low, there being scarcely enough water in Little River to enable us to get a small boat more than a mile above its mouth. The Little River is the outlet of Big Lake, and other smaller lakes between the St. Francis and the Mississippi rivers. Its water was clear and its current more swift than that of the St. Francis River. In places its sides and bottom were covered with vegetation. In dry weather it does not have enough water for the larger fishes, except in an occasional hole along its course. It afforded excellent opportunity to collect the smaller fishes, and nearly all of those listed from Marked Tree are from Little River.

At the mouth of the Little River the St. Francis is wide and very deep. Large schools of minnows, *Hybognathus nuchalis*, seem to loiter on the shallow sandbar bordering the deep water. We baited our hooks with some of these minnows and soon had a nice string of striped bass, *Morone interrupta*.

Near Greenway we seined in a small bayou. Only a few species of fishes were found in it and most of them in abundance. Among the most abundant was *Aphredoderus sayanus* and *Noturus gyrinus*. Several specimens of *Amia calva* and one specimen of *Umbra limi*, besides a few others of less importance, were taken.

At Paragould we did some seining in Eight-mile Creek, a western tributary of the St. Francis. This creek goes nearly dry in the summer. Like the bayou, it has a muddy and sandy bottom. The day before our visit a heavy thunder-shower had so swollen the stream as to render seining somewhat difficult and unsuccessful.

The time at my disposal did not permit me to visit the Cache River which drains the western slope of Crowley Ridge. This river is much smaller than the St. Francis, but is reported as being of considerable importance from an ichthyological standpoint. It is also said to suffer in this respect on account of the large quantity of sawdust deposited in it by sawmills. The injury the sawdust does the fish is not fully appreciated by either citizens or sawmill men, or it is quite certain it would be stopped.

Northeast Arkansas and adjacent portions of Missouri, Kentucky, and Tennessee are especially inviting to the biologist. A large portion of this region is yet wild and thinly settled. Thus the balance of life has not been seriously disturbed by man. On account of malaria some naturalists are prevented from visiting this region in the summer. Reports as to the unhealthful condition of this region have been considerably exaggerated. It no doubt contains its full share of malaria, but with moderate care no evil results need be feared. The people who live in this region, and who are engaged in cutting timber, suffer very little from malaria.

In making the collections at Greenway I was assisted by Mr. S. E. Mitchell, a former student of the Arkansas University. At Paragould I was assisted by the Oxley brothers. At Jonesboro I was the guest of a fishing party consisting of Professors Sampson and Johnson, Mr. H. C. Townley, Mr. Freer, and Mr. George Peters. Mr. Peters also accompanied me to Marked Tree, and to him I am under special obligations. At Paragould I was entertained by Mr. Richard Jackson.

#### LIST OF FISHES FROM THE ST. FRANCIS RIVER.

In order to abbreviate, I have used the names of localities as follows:

- Bayou = Bayou near Greenway, Arkansas.  
 Old River = Old River at Buckhorn Landing near Greenway, Arkansas.  
 Paragould = Eight-mile Creek near Paragould, Arkansas.  
 Big Bay = St. Francis River near Big Bay, Arkansas.  
 Marked Tree = Little and St. Francis rivers near Marked Tree, Arkansas.

At Marked Tree nearly all of the collections were made in the Little River from its mouth to about 1 or 2 miles above it. This stream and the St. Francis resemble each other very much. The Little River has a little more current and is much the smaller. A few hauls were made in the St. Francis, but they resulted in nothing new.

1. *Lepisosteus osseus* (Linnaeus). *Long-nosed Gar Pike*. Very abundant in the Old and St. Francis rivers; only a few specimens taken, but many were seen floating near the surface of the water.
2. *Lepisosteus platystomus* Rafinesque. *Short-nosed Gar*. Less abundant than the preceding. Gars over 10 feet long are reported from the St. Francis. No doubt these large specimens are the alligator gar.
3. *Amia calva* Linnaeus. *Grindle*. Quite abundant and very well known in northeastern Arkansas; used as food to some extent. Bayou, abundant; Old River and Paragould, common.
4. *Ictalurus punctatus* (Rafinesque). *Channel Cat*; *White Cat*. A few specimens were taken at Marked Tree. A very common and highly esteemed food-fish in the St. Francis River.
5. *Ameiurus melas* (Rafinesque). *Small Bullhead*. Not common. Bayou, Old River, and Paragould.
6. *Noturus nocturnus* Jordan & Gilbert. Marked Tree; only a few specimens taken.
7. *Noturus gyrinus* (Mitchill). *Stone Cat*. Bayou and shallow stagnant pools along Old River, very abundant. A few specimens also taken at Big Bay and Marked Tree.

8. *Carpiodes velifer* (Rafinesque). *Quillback*. A few specimens taken in Old River. Buffaloes in abundance and of large size are reported in the St. Francis River. Many large ones are captured as the overflow each year recedes.
9. *Erimyzon sucetta* (Lacépède). *Chub Sucker*. Bayou, Big Bay, and Paragould, common.
10. *Minytrema melanops* (Rafinesque). *Striped Sucker*. Bayou and Old River, common.
11. *Catostomus nigricans* Le Sueur. *Hog Sucker*; *Stone-roller*. Marked Tree, a few specimens seen in Little River.
12. *Moxostoma macrolepidotum duquesnei* (Le Sueur). *Common Redhorse*. Old River, scarce.
13. *Hybognathus nuchalis* Agassiz. *Silvery Minnow*. Bayou and Old River, scarce. Very abundant in the mouth of Little River at Marked Tree.
14. *Pimephales notatus* (Rafinesque). *Blunt-nosed Minnow*. Apparently scarce; a few specimens from Old River, Paragould, Big Bay, and Marked Tree.
15. *Cliola vigilax* (Baird & Girard). Old River and Big Bay, scarce.
16. *Notropis heterodon* (Cope). Old River, scarce; Big Bay and Marked Tree, abundant. Usually found among vegetation. Those from St. Francis River have the lateral band darker and broader than usual.
17. *Notropis cayuga* Meek. Old River, scarce.
18. *Notropis blennius* (Girard). Marked Tree, apparently scarce.
19. *Notropis xænocephalus* Jordan. Old River and Big Bay, scarce.
20. *Notropis shumardi* (Girard). Old River and Big Bay, scarce.
21. *Notropis umbratilis* (Girard). Old River and Big Bay, scarce; Paragould, common.
22. *Notropis venustus* (Girard). Marked Tree, common.
23. *Notropis megalops* (Rafinesque). *Shiner*. Paragould, common.
24. *Notropis dilectus* (Girard). Old River, scarce; Marked Tree, common. Head,  $4\frac{3}{8}$ ; depth,  $5\frac{3}{8}$ ; anal, 11. Scales, 41; lateral line slightly decurved. Diameter of eye greater than length of snout, 3 to  $3\frac{1}{2}$  in head. Side with silvery band.
25. *Hybopsis amblops* (Rafinesque). Old River and Big Bay, scarce.
26. *Opsopœodus emiliæ* Hay. Old River and Paragould, scarce.
27. *Notemigonus chrysoleucus* (Mitchill). *Golden Shiner*. Bayou, Old River, Paragould, and Big Bay, common.
28. *Fundulus scartes*, new species.  
Type locality: St. Francis River, Big Bay, Arkansas, where two specimens were collected in August, 1894.  
Type, No. 47301, U. S. Nat. Mus.; Co-type, No. 2277, L. S. Jr. Univ. Mus.  
Head,  $3\frac{1}{2}$ ; depth, 4; D. 8; A. 10 or 11; P. 4. Scales, 36-11. Body compressed, back slightly arched, head depressed in usual way. Mouth small, subterminal, lower jaw projecting slightly. Interorbital space,  $1\frac{1}{2}$  eye. Eye equal to snout,  $3\frac{1}{2}$  in head. Dorsal fin short, beginning slightly behind anal, neither fin reaching caudal. Teeth in narrow bands, outer row enlarged. Scales large, closely imbricated and minutely spotted with black. Color, dark-green above, becoming lighter below; belly, yellowish; large spots of white on some of the scales give appearance of several ill-defined silver bars on sides. Two small specimens, the longest  $1\frac{1}{2}$  inches long, from St. Francis River, Big Bay, Arkansas. Although but two small specimens of this species were taken, it is quite common. Many were observed where vegetation was entirely too abundant to enable us to use a net. When frightened, these little fishes will jump out of the water, lodge for an instant on some portion of a plant above the surface, and then dart back into the water. These two specimens I caught in my hand. I made many attempts to catch others, but failed to do so. I at first supposed them to be the young of *Z. notatus*. Σκάρτης, one who leaps.
29. *Zygonectes notatus* (Rafinesque). *Top Minnow*. Bayou, Old River, Paragould, Big Bay, and Marked Tree, apparently not common.
30. *Zygonectes guttatus* Agassiz. Big Bay, scarce.
31. *Gambusia affinis* (Baird & Girard). Bayou, Old River, Paragould, Big Bay, and Marked Tree, common.
32. *Umbra limi* (Kirtland). *Mud Minnow*. Bayou, one specimen.
33. *Lucius vermiculatus* (Le Sueur). *Little Green Pickerel*. Old River, Bayou, Paragould, Big Bay, and Marked Tree, apparently an abundant species.
34. *Lucius reticulatus* (Le Sueur). *Eastern Pickerel*; *Jackfish*. Quite a favorite and an important food-fish in the St. Francis River region. Only a few taken by us, but many others were seen in the water. Old River and Big Bay.

35. *Labidesthes sicculus* Cope. *Silverside*. Old River, Big Bay, and Marked Tree, apparently scarce.
36. *Aphredoderus sayanus* (Gilliams). *Pirate Perch*. Bayou and Old River, very abundant. A few taken at Paragould, Big Bay, and Marked Tree.
37. *Elassoma zonatum* Jordan. Big Bay, common; Marked Tree, scarce.
38. *Centrarchus macropterus* (Lacépède). Old River and Bayou, abundant; Paragould, common.
39. *Chænobryttus gulosus* (Cuvier & Valenciennes). *Warmouth*; *Red-eyed Bream*. Big Bay, one specimen; color, nearly uniform black. Old River, scarce.
40. *Pomoxis sparoides* (Lacépède). *Calico Bass*. Big Bay and Old River, common.
41. *Pomoxis annularis* Rafinesque. *Crappie*. Old River and Big Bay, apparently less abundant than the preceding.
42. *Ambloplites rupestris* (Rafinesque). *Goggle-eye*; *Rock Bass*. Big Bay and Marked Tree, common.
43. *Lepomis cyanellus* Rafinesque. *Green Sunfish*; *Perch*. Bayou and Paragould, common.
44. *Lepomis macrochirus* Rafinesque. *Perch*. Bayou, Old River, and Big Bay, scarce.
45. *Lepomis pallidus* (Mitchill). *Blue Sunfish*; *Perch*. Old River and Bayou, common; Marked Tree, scarce.
46. *Lepomis garmani* Forbes. Old River, Big Bay, and Marked Tree, scarce.
47. *Micropterus salmoides* (Lacépède). *Large-mouthed Black Bass*. Very abundant throughout the St. Francis region, and is the favorite game-fish. Specimens frequently weigh from 4 to 6 pounds. The small-mouthed black bass is very scarce, if found at all, in St. Francis River Basin in Arkansas. Bayou, Old River, Paragould, Big Bay, and Marked Tree, abundant.
48. *Etheostoma pellucidum* Baird. *Sand Darter*. Marked Tree, Big Bay, and Old River, abundant.
49. *Etheostoma chlorosoma* (Hay). Paragould, Big Bay, Old River, and Marked Tree, scarce.
50. *Etheostoma shumardi* (Girard). Marked Tree, scarce.
51. *Etheostoma caprodes* (Rafinesque). *Log Perch*. Marked Tree, scarce.
52. *Etheostoma aspro* Cope & Jordan. *Black-sided Darter*. Old River, Paragould, Big Bay, and Marked Tree, common.
53. *Etheostoma ouachitæ* Jordan & Gilbert. Old River, scarce; Marked Tree, common.
54. *Etheostoma scierum* (Swain). Big Bay, scarce; Marked Tree, abundant. Head, 4; depth,  $5\frac{1}{2}$ ; D. XII or XIII, 12 to 14; A. II, 9. Scales in lateral line, 7-68 to 73-12. Gill-membranes broadly united. Checks with small scales; opercles with larger ones. Nape scaly; breast naked. Middle line of belly with enlarged, persistent scales. The preopercle is serrate in the older specimens, almost entire in the larger ones.
55. *Etheostoma histrio* Jordan & Gilbert. Marked Tree, scarce.
56. *Etheostoma jessiae* (Jordan & Brayton). Big Bay, Marked Tree, and Old River, common. Marked Tree specimens have the scales 45 to 55. D. IX or X-11 to 14. Color very dark.
57. *Etheostoma saxatile* (Hay). Marked Tree, common.
58. *Etheostoma copelandi* (Jordan). Paragould, scarce.
59. *Etheostoma fusiforme* (Girard). Old River, Paragould, Big Bay, and Marked Tree, scarce.
60. *Etheostoma microperca* Jordan. Old River, Big Bay, and Marked Tree, scarce. Anal spines, one or two.
61. *Morone interrupta* Gill. Marked Tree, common.

#### RECAPITULATION.

The total number of species of fishes obtained by me in western Arkansas and eastern Indian Territory is 58. The total number obtained in the St. Francis River is 61. Of the 58 species found in the first list, the following were not found in the St. Francis:

- |                                 |                                    |                                       |
|---------------------------------|------------------------------------|---------------------------------------|
| 1. <i>Ameiurus nebulosus</i> .  | 9. <i>Notropis jejunos</i> .       | 17. <i>Lepomis megalotis</i> .        |
| 2. <i>Leptops olivaris</i> .    | 10. <i>Phenacobius mirabilis</i> . | 18. <i>Etheostoma whipplii</i> .      |
| 3. <i>Ietiobus cyprinella</i> . | 11. <i>Hybopsis storerianus</i> .  | 19. <i>Etheostoma lepidum</i> .       |
| 4. <i>Campostoma anomalum</i> . | 12. <i>Hybopsis tetranemus</i> .   | 20. <i>Etheostoma phoxocephalum</i> . |
| 5. <i>Notropis buchanani</i> .  | 13. <i>Zygonecetes escambie</i> .  | 21. <i>Stizostedion canadense</i> .   |
| 6. <i>Notropis bubalinus</i> .  | 14. <i>Dorosoma cepedianum</i> .   | 22. <i>Aplodinotus grunniens</i> .    |
| 7. <i>Notropis whipplii</i> .   | 15. <i>Hiodon alosoides</i> .      |                                       |
| 8. <i>Notropis lutrensis</i> .  | 16. <i>Lepomis humilis</i> .       |                                       |



No fewer than 25 of the 61 species found in the St. Francis were not found in western Arkansas and eastern Indian Territory. They are the following:

- |                                     |                                      |                                   |
|-------------------------------------|--------------------------------------|-----------------------------------|
| 1. <i>Lepisosteus platystomus</i> . | 10. <i>Umbra limi</i> .              | 19. <i>Etheostoma asperum</i> .   |
| 2. <i>Amia calva</i> .              | 11. <i>Aphredoderus sayanus</i> .    | 20. <i>Etheostoma scierum</i> .   |
| 3. <i>Noturus gyrinus</i> .         | 12. <i>Elassoma zonatum</i> .        | 21. <i>Etheostoma histrio</i> .   |
| 4. <i>Catostomus nigricans</i> .    | 13. <i>Centrarchus macropterus</i> . | 22. <i>Etheostoma jessiae</i> .   |
| 5. <i>Notropis cayuga</i> .         | 14. <i>Pomoxis sparoides</i> .       | 23. <i>Etheostoma saxatile</i> .  |
| 6. <i>Notropis xanocephalus</i> .   | 15. <i>Ambloplites rupestris</i> .   | 24. <i>Etheostoma copelandi</i> . |
| 7. <i>Notropis megalops</i> .       | 16. <i>Lepomis garmani</i> .         | 25. <i>Morone interrupta</i> .    |
| 8. <i>Fundulus scartes</i> .        | 17. <i>Etheostoma pellucidum</i> .   |                                   |
| 9. <i>Zygionectes guttatus</i> .    | 18. <i>Etheostoma shumardi</i> .     |                                   |

Adding these 25 species to the 58 found in western Arkansas and eastern Indian Territory gives a total of 83 species of fishes as the result of less than three weeks' collecting in these waters. There are but few regions in the United States that will yield so many species of fresh-water fishes.

#### MOLLUSKS COLLECTED IN OLD RIVER, NEAR GREENWAY, ARKANSAS.

No special effort was made to collect the mollusks occurring in the water examined. Some little time was given to collecting the different species in Old River, the names of which are given in the following list. I am indebted to Mr. Charles T. Simpson, of the National Museum, for the specific determinations and for the technical notes on each.

*Unio pyramidatus* Lea. Scarce.

*Unio gibbosus* Barnes. A thin, compressed, elongated variety, found rarely throughout the range of the species. Quite common.

*Unio parvus* Barnes. Scarce.

*Unio texensis* Lea. Scarce.

*Unio tuberculatus* Barnes. Scarce.

*Unio turgidus* Lea. So far as I know this species has not hitherto been reported north of southern Louisiana.

*Unio anodontoides* Lea. A pale, rather delicate variety, found in the Gulf States; abundant.

*Unio liosus* Conrad. The peculiar variety of this species found here has not been reported hitherto north of Columbus, Mississippi; not common.

*Unio castaneus* Lea. A common southern species found as far north as Clinton, on the Little Red River, Arkansas, 125 miles southwest of Greenway; common.

*Unio hydianus* Lea. Very abundant. The most northern limit heretofore known was Little Rock and Wittsburg, Arkansas.

*Unio cerinus* Conrad. A species of southern Louisiana and Mississippi, and not previously known north of Little Red River. There can be no doubt that these shells are genuine *cerinus*. Abundant.

*Unio undulatus* Barnes. Scarce.

*Anodonta imbecillis* Say. Scarce.

*Anodonta edentula* Say. Not common.

*Anodonta opaca* Lea. A form not known hitherto north of Little Rock, Arkansas. Scarce.

*Sphaerium solidulum* Prime.

*Pleurocera elevata* Say.

*Campeloma coarctata* Lea. A southern species.

*Planorbis trivolvis* Say.

*Vivipara subpurpurea* Say. Banded.

This collection is remarkable from the fact that it contains no less than six species of Unionidæ found at a locality farther north than they have ever been reported from before. In fact the species of general distribution throughout the Mississippi Valley that were taken at this locality have a most decidedly southern aspect, and the entire collection is such as one would expect to find among the streams near the shores of the Gulf of Mexico.

ARKANSAS INDUSTRIAL UNIVERSITY,  
Fayetteville, Arkansas, November 7, 1894.