20.—A REPORT UPON INVESTIGATIONS IN THE MAUMEE RIVER BASIN DURING THE SUMMER OF 1893.

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The investigations upon which this report is based were made during the summer of 1893, under the direction of Hon. Marshall McDonald, United States Commissioner of Fish and Fisheries. A description of each stream and lake examined is given, with a list of the fishes found in these waters and notes on their characteristics. In prosecuting the work the writer had the efficient help of Mr. Charles Beeson, instructor in Indiana University; Prof. W. S. Blatchley, teacher of biology in the Terre Haute High School, and, for a short time, Mr. Jesse Harrison, of Columbia City, Ind.

In the summer of 1887 Prof. Seth E. Meek, professor of zoology in Arkansas Agricultural College, made a small collection of fishes in Defiance County, Ohio. The writer is indebted to him for the use of his unpublished notes.

For aid received in various ways the writer is under special obligations to Prof. Barton W. Evermann, assistant to the United States Fish Commission.

THE MAUMEE RIVER SYSTEM.

The Maumee River, with its tributaries, drains a tract of country lying in the northeastern part of Ohio, including parts of the counties of Hillsdale and Lenawee, on the southern border of Michigan, and portions of Steuben, Dekalb, Allen, and Adams counties, in the northeastern part of Indiana. In all, this water basin embraces about 7,500 square miles. The country is rolling, but contains no elevations worth noting. The surface is everywhere composed of glacial drift, but bed rock is exposed in the channel of the Maumee River and in the lower courses of all its larger tributaries.

The climate in this region is generally mild and considered healthful. According to the report of the Ohio meteorological bureau, the normal temperature at Toledo, Ohio, for a period of twenty-two years was 50° F. The highest temperature at the same place during a period of seven years was 94°, and the lowest during the same period was —7°. The average annual amount of precipitation (including melted snow) at Toledo for a period of twenty-two years was 32.03 inches.

The water in the Maumee River and that of its larger tributaries is rather clear, while that in the smaller streams, on account of their clay channels, is more or less turbid. The water of all the lakes examined by us is remarkably clear and pure.

Besides a great abundance of the smaller varieties of fishes, all the waters that were investigated by us were well supplied with the best quality of native game and food fishes. Crawfish and mussels were found rather common at all points explored by us in the Maumee Basin. Fresh-water shrimps were also taken in several of the streams. In some localities water snails were found in great numbers. At other places the banks of the streams contained numerous snail shells. Batrachians and

reptiles were found common throughout the Maumee River basin, and specimens were noted and secured at nearly all points investigated by us.

The following is a classified list of the waters examined:

Maumee River:
- St. Joseph River
  - Fish Lake.
  - Fish Creek.
  - Big Run.
  - Indian Lake.
  - Cedar Lake.
  - Cedar Creek.
  - Mill Creek.
- St. Marys River.
- Gordon Creek.

Maumee River—Continued.
- Lost Creek (near Cecil, Ohio).
- Tiffin River.
  - Devils Lake.
  - Manitou Beach
- Auglaize River.
  - Sugar Creek.
  - Lost Creek (near Lima, Ohio).
  - Blanchard River.
  - Hoaglin Creek.
- Beaver Creek.

THE MAUMEE RIVER.

The Maumee River is formed at the city of Fort Wayne, Ind., by the confluence of the St. Joseph and St. Marys rivers. It flows in a general northeast direction for a distance of 96 miles through Paulding, Defiance, Henry, and Lucas counties, Ohio, and near its mouth it forms the northwest boundary of Wood County, Ohio. At Toledo it empties into Lake Erie through Maumee Bay.

According to the Indiana Geological Report, 1878, the Maumee River at Fort Wayne has an elevation above sea level of 737 feet, and at its mouth of 573 feet. The river has therefore a fall, in its total length of 96 miles, of 164 feet, or 1⅔ feet per mile.

The Maumee River was examined at the following places:

(*a*) Fort Wayne, Ind., August 14 and 15: The channel at this place has been straightened and the old water-course has been filled up with gravel and rubbish that were washed in by overflows of the river. The bottom is of solid Devonian limestone. The banks of the channel are about 15 feet high, and are composed of whitish clay. The water is mostly deep, with but few shoals. Immediately below the city, where the measurements of the river were taken, the stream is confined in a rocky channel 33 feet wide, and has an average depth of 3 feet and a current of 1.86 feet per second. Therefore the volume of water conveyed per minute was 82,863 gallons. The temperature at the bottom of this current of water was 76°.

The St. Marys River for some distance up from its mouth has been straightened and the stream is now confined to a ditch-like channel which is about 40 feet wide. The channel of the St. Joseph River has a width of about 50 feet. The St. Joseph River conveys somewhat the larger quantity of water.

(*b*) The Maumee River was fished August 16, about 2½ miles above Antwerp, Ohio. The channel has a width of about 250 feet, and the banks on the sides of the bottom lands are about 10 feet high. The bottom of the channel is of Devonian limestone, with numerous loose rocks scattered over it. There are long stretches of deep water, which are connected by short rocky riffles. Low islands in the river and low sloping banks are entirely covered with water willow. There are also dense growths of wrackweed. In water only a few inches deep the rocks as well as the earth bottom is covered with algæ, mostly *Spirogyra*. Willows and horseweed form dense thickets along the margins of the stream.

(*c*) The Maumee River, near Cecil, Ohio: Prof. Seth E. Meek says that the current at this place is swifter than usual and that the bottom of the river is sandy, or in a few places rocky.

(*d*) The Maumee River was investigated at the State dam, 4 miles below Defiance, Ohio, August 19. Here the river has a width of 600 feet; its bottom is of shale (Devonian) and free from loose rocks. The riffles below the dam extend down the river for half a mile; they are well grown over with riverweed, wrackweed, and other water plants. There is an abundance of algæ. The banks of the channel are from 10 to 15 feet high. The surrounding country is decidedly rolling. The dam has a width of 600 feet and is 7 feet high. It is provided with a fishway. Below the dam is good fishing with hook and line. Black bass, rock bass, calico bass, and redhorse are the commonest of food-fishes taken. This dam was built by the State of Ohio for a feeder to the Miami and Erie Canal. The termini of this canal are at Cincinnati and Toledo, Ohio. At Defiance the canal enters the Maumee River on the south side and after crossing to the north side it follows in the channel of the river down to the State dam. Here the canal quits the dam on its north side. This canal is still in use, chiefly for rafting logs from the river to manufacturing establishments.

(*e*) At Grand Rapids, Ohio, the Maumee River was examined August 21 and 22. The work was done on the rapids below the Providence dam, which is half a mile above the town of Grand Rapids. The bottom of the channel is of a fine-grained sandstone (Devonian), which is being largely quarried for building purposes. The surface of the rocks is eroded into long, deep ruts and numerous pot-holes. Where the rocks have been quarried are deep pools of water, which contain large quantities of fish. At our investigation the river was low with no water on the riffles, except what little escaped through a leak in the dam. The canal on the north side of the rapids and the mill-race on the south side convey a small quantity of water.

This dam, like the one near Defiance, was built by the State of Ohio for a feeder to the Miami and Erie Canal. The dam is constructed on either side of an island, which is known as Purdy Island. That part of the dam on the south side of the island is 660 feet wide, and the part of the dam on the north of the island has a width of 1,205 feet. The island between the two dams has a width of 350 feet and contains 8 acres. The dam has a nearly uniform height of 5 feet and is provided with a fishway in good condition. It is said here that the dam backs up the water for 14 miles. The width of the river at the wagon bridge below town is 653 feet. This is probably the average width of the river at this place.

(*f*) The Maumee River at Waterville, Lucas County, Ohio, was fished August 24. Here the bottom of the channel is of limestone (Upper Silurian), which lies in contorted folds and has many irregular outcrops. The small quantity of water in the channel was distributed among several irregular streams. At this place is an island containing 22 acres, which divides the river into two nearly equal channels. At the wagon bridge, 100 yards below the island, the channel is 850 feet wide.

Two miles above this place is an island which contains 240 acres, and is known as Station Island. On either side of this island the water is "slack," having a depth of about 25 feet, and is said to afford fine pickerel and bass fishing with hook and line.

The bottom of the river, on account of its hard, clean rock, is remarkably free from vegetation.

Local sportsmen told me that formerly sturgeon were very abundant at this place, while now one is seldom taken; also that the large pike (*Lucius lucius*), pickerel, and eels are rapidly decreasing in numbers. All of this decrease of fish is claimed by them to be due to the net fishing in the backwater in the river during the season when these fishes ascend the stream to spawn.

(*g*) The Maumee River was examined at Toledo, Ohio, August 25, 26, and 28. The width of this river at the wagon and street-car bridge is 1,500 feet, and the depth of the water at points across the river about 100 feet apart, beginning on the west side, was respectively 16 feet, 26 feet, 22½ feet, 21 feet, 20½ feet, 17½ feet, 12½ feet, and 12½ feet. The deepest water is under the turn bridge, where the boats pass through. At all these places the water had a bottom temperature of 75°.

ST. JOSEPH RIVER.

The St. Joseph River has its rise in the uplands of Hillsdale County, Mich. Its general course is southwest through Williams County and the southeast corner of Dekalb County, Ind., to Fort Wayne, Allen County, Ind., where it joins the St. Marys River to form the Maumee River. This river was examined at the following places:

(*a*) Near Hudson, Mich., July 24: The river was examined at a point 6 miles southwest of Hudson. Here the stream was fished for a distance of nearly 2 miles. The upper mile examined flows through woodland, and the bottom of the channel is mostly gravel, but at some places mud. There are several large drifts of wood in the stream that are barriers to the passage of fish. Further down, the stream flows through cleared land and the bottom of the channel is of bluish clay, which has eroded very unevenly, leaving many projections and numerous holes. There are many long stretches of quiet water, with in some places a depth of 4 feet. Riffles are few. The channel has an average width of about 14 feet. The bottom is remarkably clear of weeds. The most common plants at the water's edge are wild touch-me-nots, Joe-Pye weed, shrub dogwood, and prickly ash. Owing to the clayey bottom the water is not clear. Where the volume of water was taken the stream had a width of 10⅓ feet, an average depth of 14 inches, and a rate of current of 13 inches per second. This gives a volume of about 55,000 gallons per minute.

The banks of the channel are from 6 to 8 feet high.

(*b*) Edgerton, Williams County, Ohio, July 28: The St. Joseph River was seined at a point 3½ miles southeast of Edgerton. Here the river has a width of 45 to 50 feet; the almost perpendicular banks are 8 to 10 feet high. The bottom of the channel is mostly of sand and gravel with occasional loose rocks. The riffles are few, and almost entirely free from weeds. The shores are lined with common weeds, shrubbery, and trees. On account of the recent rains the water was tinged with the clay that composes a large part of the banks and bottom of the channel.

(*c*) The St. Joseph River was next examined at Fort Wayne, Ind., August 14.

FISH LAKE.

Fish Lake, at Hamilton, Steuben County, Ind., July 19 and 20: What is now known as Fish Lake was formerly in three different bodies of water. In 1837 the outlet was filled in and the surface of the lake was thus raised 9 feet, which united the three lakes into one body of water. The water power of this lake is utilized for milling purposes, and is at present controlled by the Fort Wayne Water Power Company.

Fish Lake has a length, from northwest to southeast, of about 3 miles, and its greatest width is about 1 mile. It has several islands, the largest of which contains 13 acres, the others less than 1 acre each.

The large island is covered with a growth of small oak.

That portion of the lake lying west of the large island is known as Fee Lake, that north and east of it as the Main Lake, and that south of it as the Mill Pond.

Fee Lake has a rather uniform depth of 25 to 33 feet. Temperature at bottom, 77°.

The shores of the main lake at its northwest and east sides are gravelly, with clean bottom, and the banks at either place have a height of from 10 to 12 feet, and are covered with woods. The remainder of the shores of this part of the lake are swampy, except along the large island, where the bottom is rather clean and solid. On the east side of the main lake are several strong springs. The water of these springs is charged with iron, and has a temperature of 49° F. In the lake near these springs were taken a number of *Labidesthes sicculus*, but all were of small size. Here were also found a few specimens of *Semotilus atromaculatus* and one *Pimephales notatus*. None of these species was found elsewhere in the lake. The greatest depth we were able to find is a short distance northeast of the large island, where it was 62 feet deep, and the temperature of the water at this depth was 75°. A little farther southeast of this point, near the middle of the main lake, the depth was only 30 feet and the temperature of the water 57°. The low temperature of the water at this point would indicate the presence of strong bottom springs. The upper end of the main lake has a nearly uniform depth of 50 to 60 feet and a temperature of 70° to 75°.

A bay extends from the northeast side of the main lake in a southeast direction. It has a length of three-quarters of a mile, and along its middle line a depth of 40 feet and a temperature of 67°. Toward the shores the water gets shallower, with a corresponding increase in temperature. In 12-foot water the temperature was 70°.

The bottom of the mill pond is almost entirely covered with weeds, and it is only along the middle where the weeds do not appear above the surface of the water. The depth of this portion of the lake is from 7 to 9 feet, and the temperature of the water at this depth was 73° to 74°. The temperature of the water immediately below the surface in all parts of Fish Lake was 78°.

Fully a quarter of the entire area of the bottom of Fish Lake is covered with weeds, of which the most common are chara, pondweed, and riverweed. Near the shores are water lilies in abundance. Along the water's edge are giant bulrush and large thickets of water smartweed. The prevailing trees upon the banks are oaks, maples, elm, and cottonwood.

The water in this lake is clear and well stocked with native game and food fish. The ringed perch (*Perca flavescens*), the blue gill (*Lepomis pallidus*), the common sunfish (*Lepomis gibbosus*), and the large-mouthed black bass (*Micropterus salmoides*) are among the most common fishes. We were told that illegal fishing has not been practiced at this lake, and the abundance of game-fish is the result.

Fish Lake receives its waters from several ditch-like tributaries, but chiefly from the springs along its shores and bottom. It empties its waters from the lower end of the mill pond into Fish Creek, of which it is the source.

FISH CREEK.

Fish Creek, near Hamilton, Ind., July 21: The width of Fish Creek immediately below Fish Lake is 13 feet, its average depth 7 inches, and the rate of current was 6¾ inches per second. The lake therefore discharged 2,000 gallons of water per minute.

The stream flows in a southeasterly direction and joins the St. Joseph River near Edgerton, Ohio. A few hundred yards below its source it receives a small stream from the west, which is the outlet of Ball Lake, a pond-like body of water a mile west of Hamilton. Fish Creek has many ditches and springs along its course, so that its volume rapidly increases. For a mile in its upper course the creek has been ditched

and straightened, but below this the channel is very crooked, swinging from side to side across the bottom land. The bluffs bordering the bottom lands are at some places 20 to 25 feet high. The creek was examined for a distance of 2 miles from its source down. The bottom is mostly sand; at some places it is covered with coarse gravel or rocks, while in the woodland the bottom is mud. The current is rapid, and the depth of water was nowhere more than 4 feet.

Everywhere in shallow water the bottom of the channel is covered with water-weeds and algæ. Lizardtail is the commonest plant along the water's edge. Several service-berry trees were noticed upon the banks.

Fish Creek was again examined near Edgerton, Williams County, Ohio, July 28. One mile north of Edgerton, where the investigations were made, this stream was 20 to 25 feet wide, and the clay banks had a height of about 5 feet. The bottom of the channel is also of clay and where not covered with sand or gravel is very slippery. The water, on account of recent rains, had a yellowish color. The stream is almost free from vegetation.

BIG RUN.

Big Run, near Butler, Ind., July 29: One mile north of Butler, where this stream was examined, it had a current on the riffles about 3 feet wide and not more than 3 inches deep. There are several stretches of quiet water, which had a depth of 3 to 4 feet, and contained many bullheads and small-mouthed black bass. One of the latter weighed half a pound. The bottom is clay or mud and notably clear of vegetation. Big Run has its origin among large springs 8 or 10 miles northwest of this place, and, after flowing southeast some 5 or 6 miles, empties into the St. Joseph River.

INDIAN LAKE.

Indian Lake, near Waterloo, Ind., July 15: This body of water lies 12 miles northwest of Waterloo. It has a length, east and west, of one-half to three-fourths miles and is about one-eighth mile wide. In most places the shores are lined with *Nuphar* and *Nymphæa*, *Myriophyllum*, *Chara*, and algæ. Its banks are marly on the north side, muck elsewhere.

Mr. Anthony Zonker measured the lake some years ago and found it 45 feet deep at its upper end, which agrees with our measurements. The depth near the lower end was 60 feet. Further toward the center, 28 feet, with a bottom temperature of 55°. At about the middle the depth was 55 feet, with a temperature of 48°.

Indian Lake is fed by a small stream which enters from the north, and its outlet is a sluggish ditch at the east end.

CEDAR LAKE.

Cedar Lake, 4½ miles northwest of Waterloo, Indiana, July 14: This lake has a length of about half a mile from north to south, and is one-eighth of a mile wide. Formerly it was perhaps a third larger, but its area has been decreased by ditching the outlet. There is muck bottom everywhere. Cedar Creek, the outlet, has some gravel. The lake is margined with marsh, the water's edge is filled with lily pads, mostly *Nuphar*, also *Nymphæa* in abundance, *Potamogeton*, *Myriophyllum*, and various algæ. *Lemna* is very abundant. The land around the lake is timbered with, in order of abundance, beech, gray ash, ironwood, slippery elm, dogwood, hawthorn, white oak, red oak, cherry, hickory. There are many willows at the lower end of the lake.

The water was warm at the surface, having a temperature of 86°, and was somewhat stained from the presence of vegetation. The temperature near its outlet, in 14 feet of water, was 74°; in 22 feet of water, 67°; nearer the center of the lake, in 25 feet of water, 61°; near the upper end, in 25 feet of water, 52°. This last measurement was probably near springs. On the west side, near the middle of the lake, in water 25 feet deep, the temperature was 61°; near by, in 22 feet of water, it was 62°. At a spring back in the woods a short distance on the east shore the temperature was about 51°. There are undoubtedly many springs in the bottom and the lake is mostly supplied from that source.

CEDAR CREEK.

Cedar Creek rises a short distance above Indian Lake, and after flowing through that lake and Cedar Lake it continues in a southeasterly direction and flows into the St. Joseph River at Cedarville, in Allen County, Ind.

Cedar Creek was fished, July 15, at a point 1½ miles above Cedar Lake. Here it has an average width of about 10 feet, an average depth of 8 inches, but with a slow rate of current. The bottom is mostly mud, but gravelly on the riffles.

Cedar Creek was examined from the outlet at Cedar Lake down to a point 2 miles below Waterloo, a distance of about 7 miles, July 17 and 18. The first 2 miles from the lake down the channel has been ditched and straightened so that the water has an average depth of about 10 inches. In the remainder of the course examined the channel is very crooked, with many deep holes and frequent gravelly shoals. At the outlet of Cedar Lake this creek had a width of 12 feet, an average depth of 10 inches; rate of current of one-third foot per second. Cedar Lake at this time, therefore, discharged 1,500 gallons of water per minute. Temperature at the bottom of this water, 68°; in the air at 9 a. m., 76°.

At several places the channel has much driftwood which obstructs the passage of fish, and it should therefore be removed. During floods the bottom lands are said to overflow to a depth of 2 feet.

In the channel were found algæ (*Nostoc* and *Spirogyra*), lizardtail in full bloom, ditch grass, and marsh cress. On the banks were seen ground ivy, purple vervain, button bush, horseweed, bulrushes, common thistle, teasel, elder, yellow dock, horsetail (*Equisetæ*), and numerous willows.

MILL CREEK.

Mill Creek, a few miles southeast of Indian Lake, July 15: This little stream was fished just below Mr. Wert's mill pond, of which it is the outlet. It has but a small current. The bottom is gravel or mud and the water is warm and not very clean. This stream empties into Cedar Creek.

ST. MARYS RIVER.

St. Marys River is formed by the confluence of several creeks in the southern part of Auglaize County, Ohio. After a northwesterly course through Mercer and Van Wert counties it enters Indiana and crosses Adams County and flows to Fort Wayne in Allen County, where it joins the St. Joseph River. It has no large tributaries. It was investigated at the following places:

The St. Marys River was examined immediately above the city of St. Marys, in Auglaize County, Ohio, August 3. The channel has an average width of about 30 feet. The banks are 7 or 8 feet high. The current is mostly sluggish. We found only one riffle, and on this the water was contracted into a stream 5 feet wide and only a

few inches deep. The bottom of the channel, as well as the banks, is composed of bluish clay and the water, in consequence, had a whitish color. In the city, and some distance below, the water was foul with the refuse from the strawboard works, and what few fish inhabited it were not fit to eat. Temperature of the air, 90°; of the water at a depth of 3 feet, 80°.

The Miami and Erie Canal crosses the river just south of St. Marys. This canal is fed from the Grand Reservoir, which has a width of 4 miles and a length of about 8 miles. Near St. Marys, where the canal is fed from this reservoir, is a lock which gives a fall of water of 8 feet. Between this point and where the canal crosses the river is another lock which has a fall of 7 feet, and where the canal crosses the river the surface of the water in the canal is 18 feet above that in the river below. Therefore, the surface of the water in the Grand Reservoir is 33 feet higher than that in the St. Marys River.

Vegetation was very abundant. Pondweed and arrow-leaf were common. At several places water willows were so dense as to almost blockade the stream. Along the margin of the stream were numerous patches of false dragon-head and horseweed.

The St. Marys River was examined at Rockford, Mercer County, Ohio, August 1 and 2. Here the river was fished for a distance of 2 miles. The channel is from 35 to 40 feet wide; the bottom is soft and everywhere covered with wood, making seining very difficult. There are long stretches of quiet water, which is 18 to 20 inches deep. Few riffles. There is no rock exposed in the channel, but we were informed that 3 miles farther down the water flows over solid limestone rock. The banks of the channel are about 8 feet high. The land along the river is covered with timber, mostly oaks, maples, elms, hickory, sycamore, beech, walnut, and willows.

The St. Marys River was examined at Decatur, Ind., July 31 and August 1. Above the city the channel is of limestone; nearer the city it is gravelly or sandy. Where the measurements were taken the stream was 50 feet wide, had an average depth of 6 inches, and a rate of current of 0.85 feet per second. This gives a volume of 9,500 gallons per minute. The temperature of the water at this point was 76°. The water was not very clear. The channel is free of vegetation. Along the water's edge were horseweed, fog fruit, cocklebur, morning-glory, and white snakeroot.

The St. Marys River was examined at Fort Wayne, Ind., August 14.

GORDON CREEK.

Gordon Creek is a northern tributary to the Maumee River, and it empties into the river a short distance below Cecil, Defiance County, Ohio. Prof. Meek says of Gordon Creek that it is a small stream, and in the summer it becomes nearly dry, with little or no running water in it. The seining was done by him in a few holes by the roadside about 1 mile above its mouth, and at Cicero, 10 or 12 miles farther up the creek. At the latter point the creek is little more than a small brook, with muddy bottom, with occasional stretches of sand.

Farlow's Pond, a small body of water covering about half an acre, during high water communicates with Gordon Creek by means of ditches. This pond was also seined by Prof. Meek.

LOST CREEK.

Lost Creek is also a northern tributary of the Maumee River, in Defiance County, Ohio. Prof. Meek described it as being larger than Gordon Creek, with sandy bottom, and that, as it is fed by springs in the upper part of its course, it is seldom, if ever, without running water.

TIFFIN RIVER.

Tiffin River has its origin in Devils Lake in Lenawee County, Mich. It flows in a southerly direction through Fulton, Williams, and Defiance counties, Ohio, and joins the Maumee River near the city of Defiance. It has no large tributaries. This river was examined at the following places:

Devils Lake, at Manitou Beach, Mich., July 25: The surface of this lake has been raised 20 inches by filling in the outlet, thereby extending the area at least one-eighth. The lake is in the form of the letter T, with the stem of the letter extending toward the north and the cap of the letter extending east and west. The greatest length from north to south is 4 miles, and the greatest width 2½ miles. On the outer border of the east arm is Round Lake, which has a diameter of 1 mile. This is connected with the east arm by two channels, each about 10 feet wide and 100 feet long. One of these channels is shallow, not more that 1 foot deep, while the other has a depth of 5 feet, and is used for the passage of small steamboats. Round Lake is shallow and bulrushes appear almost over its entire surface.

The deepest water found in Devils Lake is in the north end of the main stem and only 100 yards from the shore, where it is 50 feet deep and has a bottom temperature of 66°. Temperature just below the surface was 79°; that of the air (10 a. m.), 78°. The greater portion of the lake is shallow, and the surface is covered with bulrushes. The shores are mostly clean, with solid bottom. The east shore is covered with innumerable shells of water snails. Mussels are very common. The country surrounding the lake is rolling and near the shores is covered with timber. Devils Lake has no inlet of any consequence; it receives nearly all its water from rains and springs.

The Tiffin River was examined at Manitou Beach, July 26. This stream is the outlet of Devils Lake. It was fished for only a few hundred yards from the lake down. The channel has a soft mud bottom and is everywhere overgrown with weeds and dense growths of algæ. Its average width was 8⅔ feet; average depth, 8 inches; rate of current, 6 inches per second. The volume of water discharged from Devils Lake at this time was 1,300 gallons per minute. The surface of the water was 20 inches lower than that of the lake of which it is the outlet. Here were caught a great many mud minnows, stone cats (*Noturus gyrinus*), and dogfish.

The Tiffin River was examined at Hudson, Mich., July 22. From the dam down for 2 miles the channel has a width of 15 to 20 feet; the banks are from 4 to 6 feet high. The bed of the stream is clean, mostly of coarse gravel. There are many long riffles and few deep holes. The water is rather clear and cool. Where the measurements were taken the stream had a width of 8½ feet, the average depth was 4 inches, and the rate of current 1¼ feet per second. The volume of water conveyed was therefore 1,590 gallons per minute. About a mile below Hudson the river receives several strong springs and the water is much cooler. Immediately below these springs we took several specimens of *Rhinichthys atronasus*.

The dam in Tiffin River just above Hudson is 6 feet high. The dam 2½ miles below Hudson has a height of 12 feet; it has two falls, the upper of which is 8 feet. Neither of these dams is provided with fish-ladders.

The bottom lands vary in width from ¼ to 1 mile. The hills bordering the bottom lands are 20 to 30 feet high. At points where the river touches the side hills the ascent is almost perpendicular, exposing layers of gravel and bluish clay.

The ox-eyed daisy and Canada thistle are very common upon the banks. The common lizardtail is the commonest plant in the edge of the water.

The Tiffin River was fished at a point 6 miles southeast of West Unity, Ohio, July 27. Here the river is about 40 feet wide; the almost perpendicular banks are from 6 to 9 feet high and expose bluish clay with strata of gravel. The bed of the channel is also clay and full of snags, making it very difficult seining. The Tiffin is mostly a sluggish stream with a maximum depth of 6 feet. The water was roily from recent rains. Width of stream, 38 feet; average depth, 9 inches; rate of current, 1.3 feet per second. This gives a flow of 16,600 gallons of water per minute. The temperature of water at a depth of 3 feet was 80°. The bottom land at this place is broad and fertile and not so rolling as higher up the stream.

The Tiffin River was next examined at Brunersburg, a small village 2 miles northwest of Defiance, Defiance County, Ohio, August 18. The bottom of the river is of limestone (Devonian), and along the banks are outcrops of shale. The banks of the river are about 10 feet high, and the bluffs bordering the bottom land are 20 to 25 feet high. From the bridge at Brunersburg down to the mouth of the river, a distance of 2 miles, the water has an average depth of about 3 feet and but little current. At Brunersburg below the old dam are broad riffles overgrown with weeds. At the bridge, one-fourth of a mile above the mouth of the river, the channel is 204 feet wide.

AUGLAIZE RIVER.

The Auglaize River is formed in the southwest part of Allen County, Ohio. It flows first southwest through the city of Wapakoneta; thence northerly through Allen, Putnam, and Paulding counties. At Defiance, in Defiance County, it empties into the Maumee River 1 mile below and opposite the mouth of the Tiffin River. The Auglaize River differs from the other branches of the Maumee River in having numerous important tributaries. The most important of these are the Blanchard River, Sugar and Hoaglin creeks. Each of these streams was examined.

The Auglaize River was examined at Wapakoneta, Ohio, August 4. At this place the river has a varying width of 40 to 80 feet, with banks 5 feet high. The solid bed of the river is smooth, but occasionally covered with loose rocks and near the city with tin cans and other refuse. The current is mostly sluggish; few riffles. The channel in shallow water is thickly covered with riverweed. There are also occasional patches of pondweed and algæ. Many willows skirt the stream and overhang the water.

The Auglaize River was investigated near Cloverdale, Putnam County, Ohio, August 9 and 10. Here the stream was examined from the mouth of Sugar Creek down to that of the Blanchard River, a distance of 4½ miles. The width of the Auglaize River just before receiving Sugar Creek is 71 feet, and Sugar Creek at its mouth is 80 feet wide. The Auglaize River below their junction has a width of 105 feet. While Sugar Creek has somewhat the wider channel, the Auglaize had the greater volume of water. Auglaize River, 4½ miles below the mouth of Sugar Creek, receives the Blanchard River from the east. The Auglaize and Blanchard rivers were both measured immediately above their confluence and each was found to be 119 feet wide, and each had an average depth of about 15 inches. Neither of these streams, by the nature of their confluence, offers advantages over the other to the passage of fish. Just below the junction of the two rivers the Auglaize has a width of 140 feet. Here the temperature at the bottom of 5 feet of water was 76°; near the surface, 79°; in the air, 91°.

At places the bottom is limestone (Upper Silurian); at others coarse gravel or sand. The banks of the channel are from 8 to 10 feet high, and where the channel touches the hills that border the bottom lands the banks have a height of about 25 feet. The lower 5 feet of the banks expose a bluish clay, and the portion above this clay is composed of strata of clay and gravel. The dam is about midway between the mouth of Sugar Creek and that of the Blanchard River. The maximum depth is 6 feet, with smooth limestone bottom. The dam is 7 feet high and has no fish-ladder. The pool below was 4 feet deep and contained great numbers and many species of fishes.

Wrackweed, water willow, and dartweed are common plants in shallow water and damp places. Algæ very common. Horseweed is very common upon the banks and low bottom lands. Willows skirt the streams.

The Auglaize was examined at Oakwood, Paulding County, Ohio, August 12. The bed of the river is limestone (Upper Silurian). The small quantity of water upon the riffles has no distinct current, but steals its way through the dense growth of wrackweed which fills the channel. Above and below the town of Oakwood the channel is deeper and contains more water.

The Auglaize River was next investigated at a point 2½ miles south of Defiance, Ohio, August 17. The bottom of the channel is of shale or soapstone, which is smooth and slippery. At places the river has cut its channel into this shale so that the lower 2 or 3 feet of its banks are shale. The remainder of the bank is composed of layers of yellow and bluish clays. The river is mostly shallow, with a slow current. Only one riffle was seen and here the stream had a width of about 10 feet, and was 2 or 3 inches deep. At Defiance, just before entering the Maumee River, the Auglaize has a width of 334 feet and is 15 feet deep, with a bottom temperature of 76°.

Water willow and wrackweed are the commonest of water-plants.

SUGAR CREEK.

Sugar Creek originates in the eastern part of Allen County, Ohio. It flows southwest to within 2 miles of Lima, Ohio, where it takes a west of north course to within a few miles of Cloverdale, Ohio, where it empties into the Auglaize River.

Sugar Creek was first examined 2 miles north of Lima, Ohio, August 5. The channel is 15 feet wide; the bottom and banks are of Upper Silurian limestone. The bottom at places is as smooth as a planed floor. The stone is quarried for building purposes, and is said to be of excellent quality. In holes was found considerable water; the riffles were almost dry. One of the springs near the bank is strongly impregnated with hydrogen sulphide. In shallows were seen large patches of riverweed, some pondweed, and dartweed.

Sugar Creek was again examined at its junction with the Auglaize River, near Cloverdale.

LOST CREEK.

Lost Creek was examined 1½ miles east of Lima, Allen County, Ohio, August 5. It had no flow of water upon the riffles, but in many places the water was 2 feet deep and contained many small fish and great numbers of crawfish. The water is warm and tainted with oil which finds its way into the stream from the neighboring oil wells. Several draws were also made with the seine in the dam, but with no good results. The bottom of the dam is soft mud thoroughly saturated with oil. The dam has a height of 7 feet, but at present no water flows over it. This dam serves as a reservoir for the Lima waterworks. Lost Creek empties into Sugar Creek.

BLANCHARD RIVER.

Blanchard River is formed near Kenton, in Hardin County, Ohio; it flows north to within a few miles of Findlay, Ohio, then west through the city of Findlay to the western part of Putnam County, and empties into the Auglaize River.

The Blanchard was examined at a point 3 miles east of Findlay, Ohio, August 7. The channel is from 60 to 70 feet wide; its banks are either sloping or perpendicular and about 6 feet high. The bottom is of limestone (Upper Silurian), which is very uneven and covered with innumerable rocks of all shapes and sizes from that of a few pounds to many hundredweight. Above the dam there was but little flow of water over the riffles, while below the dam there was no current at all.

The dam mentioned here is 1½ miles east of Findlay and was constructed for a reservoir for the Findlay waterworks. The water in this dam is clear and warm. At a depth of 3 feet it had a temperature of 81°, while that of the air was 76°. This dam has a height of 8 feet and is without a fish-ladder.

Riverweed and lizardtail are the commonest of water-plants.

The Blanchard River was next examined at Ottawa, Putnam County, Ohio, August 8. The river is 50 to 60 feet wide; its banks are 6 to 10 feet high. The hills bordering the bottom lands are about 25 feet high. The banks, as well as the bottom of the channel, are of whitish clay. In some places the bottom is covered with sand and fine gravel. The stream is remarkably clear from rubbish. Just below Ottawa the stream was 14 feet wide, the average depth 1¾ inches, and the rate of current 1⅐ feet per second. The volume of water, 1,000 gallons per minute. Temperature at the bottom of 3 feet of water was 73°.

Water willows and dartweed are common in the channel. Willows skirt the stream.

The Blanchard was investigated at its mouth near Cloverdale, Ohio, August 9.

HOAGLIN CREEK.

Hoaglin Creek rises near Fort Wayne, Ind., flows southeast to within a few miles west of Van Wert, Ohio, then takes a northeast course to a point 2 miles northwest of Oakwood, Paulding County, Ohio, where it empties into the Maumee River.

August 11 this stream was fished for some distance above its mouth. The channel is 80 feet wide, with limestone bottom. The banks, which are about 10 feet high, are composed of whitish clay. There is considerable deep water, but upon the riffles, which are numerous, the water is contracted into several small streamlets. The water was warm and somewhat muddy. Wrackweed was very common in the water.

BEAVER CREEK.

Beaver Creek, near Grand Rapids, Ohio: This stream has its origin in the north part of Henry County, Ohio. It takes a northerly course and flows into the Maumee River one-half mile below Grand Rapids, Wood County, Ohio. Beaver Creek was examined from the mouth up for 3 miles August 23. The bed is solid limestone, except at its mouth, where this rock is overlaid with sandstone. The channel is 20 to 25 feet wide; the banks have a height of about 6 to 8 feet and expose a bluish clay. No water flowed over the riffles, but there are many pools that contain an abundance of fish. As the course of the stream is mainly through woodland the water is cool.

Snapping turtles are numerous. Several were taken that weighed 10 pounds apiece. Many frogs were also taken.

FISHES OF THE MAUMEE RIVER BASIN.

The following abbreviations are used in noting the distribution of fishes:

Ft. Maumee, St. Joseph, and St. Marys rivers, at Fort Wayne, Ind.
MA. Maumee River, at Antwerp, Ohio.
MCl. Maumee River, at Cecil, Ohio.
MD. Maumee River, at Defiance, Ohio.
MG. Maumee River, Grand Rapids, Ohio.
MW. Maumee River, Waterville, Ohio.
T. Maumee River, Toledo, Ohio.
JH. St. Joseph River, Hudson, Mich.
JE. St. Joseph River, Edgerton, Ohio.
FL. Fish Lake, Hamilton, Ind.
FH. Fish Creek, Hamilton, Ind.
FE. Fish Creek, Edgerton, Ohio.
BR. Big Run, Butler, Ind.
IL. Indian Lake, Waterloo, Ind.
CL. Cedar Lake, Waterloo, Ind.
CC. Cedar Creek, Waterloo, Ind.
MC. Mill Creek, near Waterloo, Ind.
MM. St. Marys River, at St. Marys, Ohio.
MR. St. Marys River, at Rockford, Ohio.
MDe. St. Marys River, at Decatur, Ind.
GC. Gordon Creek, near Cecil, Ohio.
LCr. Lost Creek, near Cecil, Ohio.
DL. Devils Lake, Manitou Beach, Mich.
TB. Tiffin River, Manitou Beach, Mich.
TH. Tiffin River, Hudson Mich.
TW. Tiffin River, West Unity, Ohio.
TBr. Tiffin River, Brunersburg, Ohio.
AW. Auglaize River, Wapakoneta, Ohio.
AC. Auglaize River, Cloverdale, Ohio.
AO. Auglaize River, Oakwood, Ohio.
AD. Auglaize River, Defiance, Ohio.
SL. Sugar Creek, Lima, Ohio.
SC. Sugar Creek, Cloverdale, Ohio.
LC. Lost Creek, Lima, Ohio.
BF. Blanchard River, Findlay, Ohio.
BO. Blanchard River, Ottawa, Ohio.
BC. Blanchard River, Cloverdale, Ohio.
HC. Hoaglin Creek, near Oakland, Ohio.
BCr. Beaver Creek, Grand Rapids, Ohio.
E. West end of Lake Erie.*

1. **Acipenser rubicundus** Le Sueur. *Lake Sturgeon.* Several specimens were seen in the Columbia City (Ind.) fish-markets, which were taken in the west end of Lake Erie.
2. **Lepisosteus osseus** (Linnæus). *Long-nosed Gar-pike.* Ft., MG., MW., T., FL., DL., AC., AD., BO., HC., BCr.
3. **Lepisosteus platystomus** Rafinesque. *Short-nosed Gar-pike.* A single specimen, about 1 foot in length, was taken in the Maumee River at Toledo, Ohio.
4. **Amia calva** Linnæus. *Mudfish; Dogfish.* One specimen from the Maumee River at Toledo, Ohio, and many from the Tiffin River at Manitou Beach, Mich. Said to be common in the lakes.
5. **Ictalurus punctatus** (Rafinesque). *Channel Cat.* Ft., MD., MG., MW., T., MR., MDe., TBr., AC., AO., AD., BO., HC., SC., BCr. Found most common in the lower courses of the larger streams. Especially abundant in the Maumee River at Toledo, Ohio, where large numbers are taken with hand lines. The largest specimen was taken in the Maumee River at Grand Rapids, Ohio; it weighed 3¼ pounds.
6. **Ameiurus natalis** (Le Sueur). *Yellow Cat.* MA., MD., MG., MW., TB., TBr., SL., LC., BF., BO., BCr. Seemingly scarce at all these points. None taken by us is over 4 inches long.
7. **Ameiurus nebulosus** (Le Sueur). *Bullhead.* Taken at all places where investigations were made except at MA., MD., MG., T., MR., LC., BO., BCr., E. Rather common wherever found.
8. **Ameiurus melas** (Rafinesque). Taken in the Maumee River at Cecil, Ohio; the St. Joseph River at Hudson, Mich.; the St. Marys River at Rockford, Ohio; the Tiffin River at Hudson, Mich.; and Cedar Creek at Waterloo, Ind.
9. **Noturus flavus** Rafinesque. *Yellow Stone-cat.* Ft., MD., MG., MW., JH., FH., FE., MR., MDe., AC., AD., SC., BO., HC., BC. Generally common. Very common in the St. Marys River at Decatur, Ind., where the largest specimen secured measured 11 inches.
10. **Noturus exilis** Nelson. One specimen from the Tiffin River at Manitou Beach, Mich.
11. **Noturus miurus** Jordan. Ft., MA., JE., FH., CC., MR., MDe., TB., TH., TW., TBr., AC., AO., AD., SC., BF., BO., HC. In an old millrace which empties into Tiffin River near West Unity, Ohio, large numbers were caught. Also common in the St. Marys River at Decatur, Ind., and in Hoaglin Creek near Oakwood, Ohio. Rather scarce at all other points examined by us. The specimens from the Maumee River at Antwerp, Ohio, approach inc oloration *N. eleutherus.*

* I have included in the list such Lake Erie species as I have observed from time to time in the Columbia City fish markets. While some of these have not been taken by me in the Maumee Basin, all of them doubtless enter the mouth of the Maumee River at times.

12. **Noturus gyrinus** (Mitchill). Ft., T., FH., MM., TB., DL. Everywhere scarce except in the Tiffin River, at Manitou Beach, Mich., where more than a dozen specimens were caught from among weeds in sluggish water. The largest specimen taken was from this point, and measured 2½ inches in length.

13. **Carpiodes velifer** (Rafinesque). *Carp Sucker.* Ft., MA., MD., MG., T., TBr., AC., AO., AD., BO., BC., HC., BCr. Rather common at all these points. The largest were taken in the lower course of the Maumee River.

14. **Catostomus teres** (Mitchill). *Fine-scaled Sucker; "Black Sucker."* Taken by us throughout the Maumee River Basin, except at the following places: MA., MD., FL., IL., MR., TB., TBr., DL., AO., AD., MC., E. This is a common fish, and no doubt inhabits all the waters of this river system. It is taken with hook and line in the spring as soon as the ice leaves the streams.

15. **Catostomus nigricans** Le Sueur. *Hog Sucker.* Taken by us at all points examined, except T., MM., MR., TB., SL., LC., MC., LCr., GC., E. Rather common, and generally taken in clear swift currents. None taken in any of the lakes.

16. **Erimyzon sucetta** (Lacépède). *Chub Sucker.* T., JE., CC., MM., MDe., TW., LCr., GC. Scarce at all these points. The largest specimen, 7¼ inches long, was taken in St. Marys River, at St. Marys, Ohio.

17. **Minytrema melanops** (Rafinesque). *Striped Sucker.* Ft., MG., JH., JE., FH., FE., CC., MM., MR., MDe., AW., AC., BF. Common only at the last two places named. The largest specimen was caught in Fish Creek at Hamilton, Ind., and measured 7 inches. Striped suckers were not found in any of the lakes.

18. **Moxostoma anisurum** (Rafinesque). *White-nosed Sucker.* Ft., MA., MD., T., MDe., TW., TBr., AC., AO., AD., BO., HC., BCr. Not scarce at any of these places. The largest specimen, 10 inches in length, was caught in the Maumee River at Antwerp, Ohio. D. 15 or 16.

19. **Moxostoma macrolepidotum duquesnei** Le Sueur. *Common Redhorse; White Sucker.* This common fish was taken at all places examined except MD., BR., MR., TB., AO., SL., MC., E. It no doubt inhabits all the streams in this basin. The largest caught were about 12 inches long. D. 13; A. 7. None of this species was taken in the lakes.

20. **Moxostoma aureolum** (Le Sueur). *Lake Redhorse.* MD., MG., MW., JE., E. Common at all these points. It is valued as a food-fish in the lower Maumee River, where large numbers are taken with hook and line in early spring. Head in body, 5½; D. 14 (one 13). The largest, 3¼ pounds, was caught in the Maumee River at Defiance, Ohio.

21. **Lagochila lacera** Jordan & Brayton. *Harelip Sucker.* AC., BO. At the former place one specimen, 5 inches long, and at the latter many smaller ones. Head, about 5; depth, 4¼. D. 12.

22. **Cyprinus carpio** Linnæus. *German Carp.* T., CL., MR., TW., E. Very abundant in the Maumee River at Toledo, Ohio, and in west end of Lake Erie. Scarce at the other points named.

23. **Cyprinus carpio coriaceus** Linnæus. *Leather Carp.* One small specimen each from the Maumee River at Toledo, Ohio, and from the Tiffin River at West Unity, Ohio.

24. **Campostoma anomalum** (Rafinesque). *Stone-roller.* Ft., MA., MD., MG., JH., JE., FH., FE., BR., CC., TH., TW., DL., AW., AC., SL., BO., BC., GC., BCr. Generally common in clear pools below riffles. A single specimen was taken from Devils Lake. None were caught in the other lakes. Not one specimen was caught in the St. Marys River. D. 8; A. 7.

25. **Chrosomus erythrogaster** Rafinesque. *Red-bellied Minnow.* The specimens here noted were collected by Prof. Meek in Lost Creek, near Defiance, Ohio.

26. **Pimephales promelas** Rafinesque. MCl., FH., LCr., GC., TH., SL. Scarce. Lateral line imperfect; a black bar across middle of dorsal. Head, about 4; depth, 4¼. D. 1, 7; A. 7.

27. **Pimephales notatus** (Rafinesque). *Blunt-nosed Minnow.* A common little fish caught at all points where investigations were made, except the following: MC., DL., CL., TB., E. It is no doubt found in these waters also.

28. **Notropis cayuga** Meek. A few specimens from the Maumee River at Toledo, Ohio, and many from Devils Lake, Manitou Beach, Mich. Head, 4 to 4¼ in length of body; depth, about 4¼. Eye, about 3¼ in length of head. Mouth oblique. First ray of dorsal somewhat nearer snout than to base of caudal fin. Pectoral fins not quite reaching base of ventrals. Lateral line incomplete. Scales in lateral line, 36 to 38. The dark lateral bands pass forward and meet on the upper jaw in front. D. 8; A. 7 or 8.

29. **Notropis heterodon** (Cope). Taken nowhere except in Fish Lake at Hamilton, Ind., where many specimens were secured. None over 2¼ inches long. Lateral line not complete. Lateral dark bands pass forward through the eyes and meet on both jaws in front. Head, 4 to 4⅓ in length of body; depth, about 4. Eye somewhat longer than snout. Insertion of first dorsal ray nearer tip of snout than to base of caudal fin. Caudal peduncle long and slender. Coloration dark. D. 8; A. 8.
30. **Notropis deliciosus** (Girard). Ft., MA., MCl., MD., MW., TBr., AC., SC., BO., GC., BCr. Rather scarce at all these points. The two specimens from Maumee River, Cecil, Ohio, are given by Prof. Meek as var. *microstomus* (Rafinesque) and those from Gordon Creek as var. *volucella* Cope.
31. **Notropis boops** Gilbert. Common in the Maumee River at Grand Rapids. Five specimens from the Blanchard River at Findlay, Ohio. Eye longer than snout and 2½ in length of head.
32. **Notropis hudsonius** (De Witt Clinton). Very common in the Maumee River at Grand Rapids, Ohio, where the largest specimens measured 2½ inches in length. A single specimen, 3½ inches long, was secured in the Maumee River at Toledo, Ohio. Numerous specimens were taken in Devils Lake and Tiffin River at Manitou Beach, Mich.
33. **Notropis whipplei** (Girard). *Silver-fin.* Taken throughout the Maumee River Basin, except at the following places: BR., IL., CL., TB., TH., MC., GC., E.
34. **Notropis megalops** (Rafinesque). *Common Shiner.* Taken in all the streams and at nearly every point where investigations were made. None found in the lakes.
35. **Notropis ariommus** (Cope). *Big-eye.* Two specimens, 2⅞ inches long, from the Maumee River at Antwerp, Ohio. Eye, about 2½ in length of head; head, 4 in body. Jaw, oblique; maxillary extending to front of eye. Front of dorsal midway between tip of snout and base of caudal fin. D. 8; A. 8.
36. **Notropis ardens** (Cope). *Redfin.* Found at all points in the streams explored, except at MCl., T., JE., MR., TB., TH., MC. This includes the specimens taken in Lost and Gordon creeks, near Cecil, Ohio, by Prof. Meek, and classed by him as *Notropis lythurus* Jordan & Gilbert. Dr. D. S. Jordan says, in Manual of Vertebrates, that *Notropis ardens* is very variable, but the different varieties (*lythurus, atripes, cyanocephalus*) are hardly worthy of separate names; we have therefore classed all under the name *N. ardens* (Cope).
37. **Notropis dilectus** (Girard). Ft., JH., JE., CC., TH., BF., BCr. Common at all these places. Head, about 4½; depth, 4½. D. 9; A. 10.
38. **Notropis atherinoides** Rafinesque. Ft., MCl., MG., T., JH., JE., CC., TH., TBr., AW., AO. Not common at any of these places.
39. **Notropis arge** (Cope). MG., JE., TBr. Scarce. Distinguished from the former in having a slenderer body and a much larger eye.
40. **Ericymba buccata** Cope. Taken at all places in the streams except MCl., CL., TB., TW., TBr., AW., LC., MC. A single specimen from Indian Lake, Waterloo, Ind. None was found in any of the other lakes.
41. **Rhinichthys atronasus** (Mitchill). *Black-nosed Dace.* Common in the St. Joseph River near Hudson, Mich. Specimens were taken in cold water in the Tiffin River at Hudson; and several from Lost Creek, near Cecil, Ohio, by Prof. Meek. Found nowhere else.
42. **Hybopsis amblops** (Rafinesque). This little minnow was found in all the larger streams examined and in nearly all the smaller tributaries. It no doubt inhabits all the streams. It was not found in the lakes.
43. **Hybopsis kentuckiensis** (Rafinesque). *River Chub.* Caught in none of the lakes, but specimens were secured at every point in every stream examined except in Mill Creek near Waterloo, Ind. Especially common and of large size in the larger streams. The largest specimen secured was 7½ inches long.
44. **Semotilus atromaculatus** (Mitchill). *Creek Chub.* Generally distributed throughout the Maumee Basin, but not quite so abundant as the former. It inhabits swift currents in the smaller streams. Many small specimens were caught in cold water in Fish Lake at Hamilton, Ind. None was found in the other lakes.
45. **Opsopœodus emiliæ** Hay. Two small specimens from the St. Marys River at St. Marys, Ohio, 2⅛ and 1¾ inches long. Mouth very small and very oblique; eye longer than snout and 3 in length of head. Head, 4⅜ and 4⅓ in length of body; depth, 4⅜. Front of dorsal behind insertion of ventrals and nearer tip of snout than to base of caudal fin. D. 9; A. 8. Anterior rays of dorsal dusky.

46. **Notemigonus chrysoleucus** (Mitchill). *Golden Shiner.* Taken in warm water on grassy bottom at the following points: Ft., MCl., MG., MW., T., JH., BR., CC., MM., MR., MDe., TW., AO., AD., SL., LC., BF., MC.

47. **Hiodon tergisus** Le Sueur. *Moon-eye; Silver Bass.* Taken only below the dams in the Maumee River at Defiance and Grand Rapids, Ohio. At both places they were very abundant.

48. **Dorosoma cepedianum** (Le Sueur). *Hickory Shad.* Ft., MD., MG., MM., MR., MDe., TBr., AC., AO., AD., HC., GC. Generally found on muddy bottom. All the specimens taken by us are small, none over 4 inches long.

49. **Coregonus clupeiformis** (Mitchill). *Whitefish.* Specimens taken in the west end of Lake Erie are frequently seen in the Columbia City, Ind., fish-markets.

50. **Coregonus artedi** Le Sueur. *Lake Herring; Cisco.* From the west end of Lake Erie and observed in the Columbia City fish markets.

51. **Fundulus diaphanus** (Le Sueur). Caught by us only in the Maumee River at Toledo, Ohio, and in Devils Lake, Manitou Beach, Mich. Abundant at both these places.

52. **Zygonectes notatus** (Rafinesque). *Top Minnow.* MG., FL., MM., MR., MDe., TW., TBr., AW., AC., AO., AD., BO., HC. Seemingly scarce at all these points.

53. **Umbra limi** (Kirtland). *Mud Minnow.* FH., FE., CC., TB., TH., MC., LCr., GC. Very common on soft, muddy bottom. Several specimens were found in the stomachs of black bass.

54. **Lucius vermiculatus** (Le Sueur). *"Grass Pike"; Little Pickerel.* Common throughout the Maumee Basin. Specimens were taken from all the waters examined, except Indian Lake and Hoaglin Creek. Most abundant in grassy and sluggish waters.

55. **Lucius lucius** (Linnæus). *Common Pike; "White Pike."* JH., JE., CL., TW., TBr., AC. Scarce at all these points. The specimen caught in the St. Joseph River, at Hudson, Mich., weighed 3¼ pounds. The stomach of this fish was filled to its utmost capacity with a sucker (*Moxostoma macrolepidotum duquesnei*), which was not less than 5 inches long. The stomachs of others were examined and were found to contain minnows, crawfish, or beetles. The white pike seems to be gradually diminishing in numbers in our streams and lakes.

56. **Lucius masquinongy** (Mitchill). *Maskalonge,* T., E. Fishermen on the lower course of the Maumee River say that formerly the maskalonge was very abundant in that stream, but that now one is seldom taken there. They are also decreasing in Lake Erie. The Toledo fishermen say that only a small number are taken by them each year.

57. **Anguilla chrysypa** Rafinesque. *Common Eel.* None were taken by us, but the skin of one was seen that was taken in the Maumee River at Defiance, Ohio. They are said to inhabit all the waters of the Maumee Basin.

58. **Labidesthes sicculus** Cope. *Skipjack; Brook Silverside.* Generally distributed in the waters of the Maumee Basin. Great numbers of these small fish inhabit the Indiana lakes, where they constitute a large portion of the food supply of the bass and other food-fishes.

59. **Aphredoderus sayanus** (Gilliams). *Pirate Perch.* Only two small specimens were taken; one by Prof. Meek in Gordon Creek, near Cecil, Ohio, and one by us in warm sluggish water in St. Marys River, at Rockford, Ohio.

60. **Pomoxis sparoides** (Lacépède). *Calico Bass.* Ft., MD., MG., JE., FL., FH., FE., CC., MM., MR., MDe., TW., TBr., HC. Taken in none of the lakes except Fish Lake, where we found it very common. None was caught in the Auglaize and the Blanchard rivers, or in any of their tributaries. It is improperly called "rock bass" by the rural fishermen in northeastern Indiana.

61. **Ambloplites rupestris** (Rafinesque). *Rock Bass; Goggle-eye; Red-eye.* Two specimens were caught by us in Devils Lake, none from any of the other lakes. A common fish at nearly all the points where investigations were made in the streams except Fish Creek, Big Run, Lost Creek, near Lima, Ohio, and Lost and Gordon creeks near Cicily, Ohio. They were taken in the largest numbers and of the largest size in the St. Marys River at Decatur, Ind.

62. **Chænobryttus gulosus** (Cuv. & Val.). *Warmouth.* FL., FH., FE., IL., CC., TB. Not common anywhere.

63. **Lepomis cyanellus** Rafinesque. *Green Sunfish.* None was caught in the lakes, but specimens were taken at nearly every point in all the streams that were examined.

64. **Lepomis pallidus** (Mitchill). *"Blue-gill;" Blue Sunfish.* One of the commonest of fishes in all the lakes. Specimens were taken in all the streams and at nearly every point examined.

65. **Lepomis megalotis** (Rafinesque). Found in all the larger streams and in nearly all the smaller ones. A few specimens were taken in Devils Lake, Manitou Beach, Mich., but none from any of the other lakes. Several specimens were caught on the spawning beds in Cedar Creek at Waterloo, Ind., on July 17.

66. **Lepomis gibbosus** (Linnæus). *Common Sunfish.* Abundant in all the lakes. Common in all the larger streams, except the Auglaize River and its tributaries. Less common in the smaller streams.

67. **Micropterus dolomieu** Lacépède. *Small-mouthed Black Bass.* Common in all the streams. None was taken from the lakes. Large numbers are taken below the dams in the Maumee River at Defiance and at Grand Rapids, Ohio.

68. **Micropterus salmoides** (Lacépède). *Large-mouthed Black Bass.* A common fish in all the lakes, where they form excellent sport for the angler. Also common in the Maumee River and most of its larger tributaries. Not one was taken in the Auglaize River or in any of its tributaries. In the stomachs of black bass were found crawfish and minnows. In the stomach of one black bass was found a yellow perch (*Perca flavescens*), and in the stomach of the yellow perch, in turn, was found a mud minnow (*Umbra limi*).

69. **Etheostoma pellucidum** Baird. *Sand Darter.* Common everywhere on sandy bottom in the Maumee River and in the lower courses of the larger tributaries. None was found in the smaller streams or in the lakes.

70. **Etheostoma nigrum** Rafinesque. *Johnny Darter.* Common everywhere except in Indian and Cedar lakes, and Tiffin River at Manitou Beach, Mich.

71. **Etheostoma blennioides** Rafinesque. *Green-sided Darter.* None caught in any of the lakes, nor from St. Marys River. Taken in all the other larger streams and many of the smaller ones.

72. **Etheostoma copelandi** (Jordan). Two specimens, 1¼ inches in length, were taken in the Maumee River at Toledo, Ohio.

73. **Etheostoma caprodes** (Rafinesque). *Log Perch.* Rather common at nearly all places examined by us in all the larger streams. Specimens were also secured in most of the smaller streams. None from any of the lakes.

74. **Etheostoma aspro** Cope & Jordan. *Black-sided Darter.* Not taken in the lakes, but abundantly distributed in all the streams examined.

75. **Etheostoma evides** (Jordan & Copeland). Five specimens were caught at the confluence of the St. Marys and St. Joseph rivers, at Fort Wayne, Ind., and one specimen below the dam in the Maumee River, at Grand Rapids, Ohio. They were all taken in clear flowing water. Length, 2½ inches; head, 4½; depth, 5½.

76. **Etheostoma flabellare** Rafinesque. *"Fan-tailed Darter."* JH., FE., CC., TH., TBr., DL., SL., BCr. One specimen each from the Tiffin River at Brunersburg, Ohio, and from Devils Lake, Manitou Beach, Mich. Common at all the other points named.

77. **Etheostoma coeruleum** Storer. *Rainbow Darter.* Not one was caught in the lakes nor in the Maumee, St. Joseph, and St. Marys rivers. Common in all the larger and nearly all the smaller streams.

78. **Etheostoma coeruleum spectabile** Agassiz. *"Striped Rainbow Darter."* Only three specimens, from Sugar Creek, near Lima, Ohio. They differ from the former in having dark streaks along the rows of scales on the back.

79. **Etheostoma jessiæ** Jordan & Brayton. Very abundant in Devils Lake and Tiffin River at Manitou Beach, Mich. Head, 4; depth, about 5. D. XII, 12. A. II, 9.

80. **Etheostoma eos** (Jordan & Copeland). One specimen from Fish Lake, four from Indian Lake, and many from the Tiffin River at Manitou Beach, Mich.

81. **Etheostoma microperca** Jordan & Gilbert. *Least Darter.* Taken only in Fish Lake, where four specimens 1¼ inches in length were secured.

82. **Perca flavescens** (Mitchill). *Yellow Perch; "Ring Perch."* MG., MW., T., FL., FH., CL., MM., TB., DL., E. Rather common. Especially abundant in the lakes and in the lower courses of all the larger streams.

83. **Stizostedion vitreum** (Mitchill). *Wall-eye; Pike Perch.* A few specimens from the Maumee River below the dam at Grand Rapids, Ohio, and numerous specimens were taken in the Maumee River at Toledo, Ohio. In Lake Erie, around the mouth of the Maumee River, large numbers of this fish are caught for the markets of Toledo and other cities. It is one of the leading food-fishes.

84. Stizostedion canadense (C. H. Smith). *Sauger; Sand Pike.* MG., MW., T., BO., E. At the first three places named numerous specimens from 5 to 14 inches in length were taken. At the last place a single specimen 13 inches long was caught. This species is distinguished from the former by the absence of a black spot on the last spines of the first dorsal.

85. Roccus chrysops (Rafinesque). *White Bass.* A few specimens from the Maumee River at Grand Rapids, five from the Maumee at Waterville, and many from the Maumee at Toledo, Ohio. None was taken anywhere above the lower dam in the Maumee River.

86. Aplodinotus grunniens Rafinesque. *"Sheepshead."* MD., MG., MW., T., E. Abundant at these places. They are not valued for food, and the large numbers caught by fishermen in the west end of Lake Erie are thrown upon the beach, where they decay and the "lucky stones" are picked up by boys.

87. Cottus bairdi Girard. *Miller's Thumb.* JE., BR., CC. Only a few specimens from each of these places were secured. They inhabit cold water on rocky bottom.

LIST OF FRESH-WATER MOLLUSKS COLLECTED IN THE MAUMEE RIVER BASIN AND NORTHERN OHIO IN THE SUMMER OF 1893, BY A. J. WOOLMAN AND P. H. KIRSCH.

[Identified by Dr. W. H. Dall and Mr. C. T. Simpson, of the U. S. National Museum.]

Maumee River (Kirsch).
1. *Anodonta ferussaciana* Lea.
2. *Unio multiradiatus* Lea.
3. *Unio occidens* Lea.

Cedar Creek, Waterloo, Ind., July 15–17 (Kirsch).
1. *Anodonta edentula* var. Say.
2. *Anodonta decora* Lea.
3. *Anodonta footiana* Lea.
4. *Campeloma decisa* Say.
5. *Campeloma integra* Say.
6. *Limnæa stagnalis* L.
7. *Planorbis trivolvis* Say.
8. *Planorbis campanulatus* Say.
9. *Sphærium simile* Say.
10. *Sphærium striatinum* Con.
11. *Unio undulatus* var. Bar.
12. *Unio luteolus* Lam. Female.

Sugar Creek, Cloverdale, Ohio, August 10 (Kirsch).
1. *Unio circulus* Lea.

Lake Erie, Port Clinton, Ohio, July 11 (Woolman).
1. *Unio alatus* Say.
2. *Unio luteolus* Lam. Male and female, northern variety.
3. *Unio occidens* Lea. Female.
4. *Unio undulatus* Barnes.

Vermilion River, Clarkfield, Ohio, July 17 (Woolman).
1. *Unio luteolus* Lam.
2. *Unio iris* Lea.

Rock River, Elyria, Ohio, July 18 (Woolman).
1. *Unio undulatus* Bar.

Sandusky River, Tiffin, Ohio, July 19 (Woolman).
1. *Margaritana rugosa* Barnes.
2. *Unio undulatus* Bar.
3. *Unio circulus* Lea.
4. *Unio rubiginosus* Lea.

Beaver Creek, Lorain, Ohio, July 20 (Woolman).
1. *Unio asperrimus* Lea.
2. *Unio luteolus* Lam.

Grand River, Painesville, Ohio, July 21 (Woolman).
1. *Anodonta edentula* Say.
2. *Unio occidens* Lea.

Cuyahoga River, South Park, Independence, Ohio, July 25 (Woolman).
1. *Unio occidens* Lea. Female.
2. *Unio undulatus* Bar.
3. *Unio ligamentinus* var. Lam.
4. *Margaritana rugosa* Barnes.

LIST OF CRAWFISH COLLECTED IN THE MAUMEE RIVER BASIN BY P. H. KIRSCH.

[Identified by Dr. Walter Faxon.]

1. *Cambarus propinquus* Gir.
   Maumee River, 1 ♂ f. II, 2 ♀.
   Cedar Creek, Waterloo, Ind., 7 ♂ f. I, 5 ♀, 3 ♂ f. II.
   Devils Lake, Manitou Beach, Mich., 1 ♂ f. II.
   Tiffin River, Hudson, Mich., 1 ♀.
2. *Cambarus immunis* Hog.
   Maumee River, 1 ♂ f. II, 1 ♀.
   Cedar Creek, Waterloo, Ind., 1 ♂ f. I, 3 ♂ f. II.
   Beaver Creek, Grand Rapids, Ohio.
3. *Cambarus rusticus* Gir.
   Maumee River, 11 ♂ f. I, 4 ♀, 1 ♂ f. II.
   Cedar Creek, Waterloo, Ind., 5 ♂ f. I, 5 ♀.
   Auglaize River, Cloverdale, Ohio, 1 ♀ jw.
   Auglaize River, Defiance, Ohio, 1 ♂ f. II.
   Sugar Creek, Cloverdale, Ohio, 2 ♂ f. I.
   Blanchard River, Ottawa, Ohio, 1 ♂ f. I.
   Beaver Creek, Grand Rapids, Ohio, 1 ♂ f. I.

BATRACHIANS AND REPTILES OBSERVED BY US IN THE MAUMEE RIVER BASIN.

BATRACHIANS.

1. **Necturus maculatus** Rafinesque. *Mud puppy; water dog.* One specimen was seen by us in the Maumee River at Grand Rapids, Ohio. They were said to be common in the lakes and larger streams, where they are often taken with hook and line.
2. **Bufo lentiginosus** Shaw. *Toad.* Generally observed throughout the Maumee Basin.
3. **Acris gryllus crepitans** (Baird). *Cricket frog.* Very common along the margin of all the lakes. Less common but generally distributed along the streams.
4. **Rana pipiens** Schreber. *Common frog; leopard frog.* Observed at nearly all points where investigations were made.
5. **Rana sylvatica** Le Conte. *Wood frog.* A few from the St. Joseph River near Hudson, Mich.
6. **Rana clamitans** Latreille. *Green frog.* One specimen each from Cedar Creek, Waterloo, and Fish Creek, Hamilton, Ind.; St. Joseph River, Edgerton, and Sugar Creek, Lima, Ohio. A few specimens each from the Tiffin and St. Joseph rivers near Hudson, Mich. Many from the Blanchard River at Findlay, Ohio.
7. **Rana catesbeiana** Shaw. *Bullfrog.* Said to be common in all the lakes and sluggish waters of the streams, but specimens were seen by us only in Cedar Creek at Waterloo, and Big Run at Butler, Ind.

REPTILES.

1. **Storeria dekayi** (Holbrook). One specimen each from Lost Creek, Lima; Auglaize River, Cloverdale; and Beaver Creek, Grand Rapids, Ohio.
2. **Thamnophis faireyi** (Baird & Girard). One specimen from near Hudson, Mich.
3. **Thamnophis butleri** (Cope). One specimen from Cedar Creek, Waterloo, Ind.
4. **Thamnophis sirtalis** (Linnæus). *Garter snake.* At Hudson and Manitou Beach, Mich., at Waterloo and Hamilton, Ind., and at Grand Rapids and Lima, Ohio.
5. **Natrix leberis** (Linnæus). A few specimens were seen at Waterloo and Hamilton, Ind., and at Lima and Findlay, Ohio.
6. **Natrix sipedon** (Linnæus). *Water snake.* A common snake, but was seen by us only at the following points: Maumee River, Antwerp, Ohio; Tiffin River, Manitou Beach, and Hudson, Mich.; Auglaize River, Defiance, and Sugar Creek, Lima, Ohio.
7. **Amyda mutica** (Le Sueur). *Leather turtle.* Generally distributed. Taken by us in the Maumee River at Grand Rapids, where it was common; Tiffin River at West Unity and Brunersburg, Ohio; Auglaize River at Defiance, Lost Creek, Lima, and Hoaglin Creek at Oakwood, Ohio.
8. **Platyrettis spinifer** (Le Sueur). *Soft-shelled turtle.* Specimens were taken by us in the Maumee River at Defiance, Ohio; St. Joseph River at Edgerton, Ohio; Fish Creek at Hamilton, Ind.; Tiffin River at West Unity, Ohio; Auglaize River at Cloverdale and Oakwood, Ohio.
9. **Chelydra serpentina** (Linnæus). *Snapping turtle.* Specimens were observed in the Maumee, Defiance, Ohio; St. Joseph River, Hudson, Mich.; Cedar Creek, Waterloo, Fish Creek, Hamilton, and Big Run, Butler, Ind.; St. Marys River, Decatur, Ind.; Tiffin River, West Unity, Ohio; Auglaize River, Defiance, Ohio, and Beaver Creek, Grand Rapids, Ohio.
10. **Aromochelys odorata** (Latreille). *Musk turtle.* A single specimen from the Maumee River at Defiance, Ohio.
11. **Malaclemys geographica** (Le Sueur). *Map turtle.* Not common. Taken by us in the Maumee River at Antwerp, Defiance, and Grand Rapids, Ohio; St. Marys River at Decatur, Ind.; Auglaize River at Defiance, and Blanchard River, Ottawa, Ohio.
12. **Chrysemys marginata** (Agassiz). The commonest of turtles. Specimens were taken at almost every place where investigations were made by us.

TABLE OF DISTRIBUTION.

The following table shows the present known distribution of the 87 species of fishes which we now know from the basin of the Maumee River. The streams and places from which each species has been obtained are indicated by the crosses in the appropriate columns.

TABLE SHOWING THE KNOWN DISTRIBUTION

Number.	Species.	Maumee River.							St. Joseph River.			Fish Lake.	Fish Creek.		Big Run.	Indian Lake.	Cedar Lake.	Cedar Creek.
		Fort Wayne.	Antwerp.	Cecil.	Defiance.	Grand Rapids.	Waterville.	Toledo.	Hudson.	Edgerton.	Fort Wayne.		Hamilton.	Edgerton.				
1	Acipenser rubicundus																	
2	Lepisosteus osseus	×				×	×	×			×	×						
3	Lepisosteus platystomus							×										
4	Amia calva							×										
5	Ictalurus punctatus	×			×	×	×	×			×							
6	Ameiurus natalis		×		×	×	×											
7	Ameiurus nebulosus	×		×			×		×	×	×	×	×	×	×	×	×	×
8	Ameiurus melas			×					×									×
9	Noturus flavus	×			×	×	×		×		×		×	×				
10	Noturus exilis																	
11	Noturus miurus	×	×							×	×		×					×
12	Noturus gyrinus	×						×			×		×					
13	Carpiodes velifer	×	×		×	×		×			×							
14	Catostomus teres	×		×		×	×	×	×	×	×		×	×	×		×	×
15	Catostomus nigricans	×	×	×	×	×	×		×	×	×	×	×	×	×	×	×	×
16	Erimyzon sucetta							×		×								×
17	Minytrema melanops	×				×			×	×	×		×	×				×
18	Moxostoma anisurum	×	×		×			×			×							
19	Moxostoma macrolepidotum duquesnei	×	×	×		×	×	×	×	×	×	×	×	×		×	×	×
20	Moxostoma aureolum				×	×	×			×								
21	Lagochila lacera																	
22	Cyprinus carpio							×									×	
23	Cyprinus carpio coriaceus							×										
24	Campostoma anomalum	×	×		×	×			×	×	×		×	×	×			×
25	Chrosomus erythrogaster																	
26	Pimephales promelas			×									×					
27	Pimephales notatus	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		×
28	Notropis cayuga							×										
29	Notropis heterodon											×						
30	Notropis deliciosus	×	×	×	×		×				×							
31	Notropis boops					×												
32	Notropis hudsonius					×		×										
33	Notropis whipplei	×	×	×	×	×	×	×	×	×	×	×	×	×				×
34	Notropis megalops	×	×	×	×	×	×	×	×	×	×		×	×	×			×
35	Notropis ariommus		×															
36	Notropis ardens	×	×		×	×	×		×		×		×	×	×			×
37	Notropis dilectus	×							×	×	×							×
38	Notropis atherinoides	×		×		×		×	×	×								×
39	Notropis arge					×				×	×							
40	Ericymba buccata	×	×		×	×	×	×	×	×	×		×	×	×	×		×
41	Rhinichthys atronasus								×									
42	Hybopsis amblops	×	×			×			×	×	×		×	×				×
43	Hybopsis kentuckiensis	×	×	×	×	×	×	×	×	×	×		×	×	×			×
44	Semotilus atromaculatus	×		×		×			×		×	×	×	×	×			×
45	Opsopœodus emiliæ																	
46	Notemigonus chrysoleucus	×		×		×	×	×	×		×				×			×
47	Hiodon tergisus				×	×												
48	Dorosoma cepedianum	×			×	×					×							

OF FISHES IN THE MAUMEE BASIN.

Mill Creek.	St. Marys River.				Gordon Creek.	Lost Creek (Cecil).	Devils Lake.	Tiffin River.				Auglaize River.				Sugar Creek.		Lost Creek (Lima).	Blanchard River.			Hoaglin Creek.	Beaver Creek.	Lake Erie.	Number.
	St. Marys.	Rockford.	Decatur.	Fort Wayne.				Manitou Beach.	Hudson.	West Unity.	Brunersburg.	Wapakoneta.	Cloverdale.	Oakwood.	Defiance.	Lima.	Cloverdale.		Findlay.	Ottawa.	Cloverdale.				
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TABLE SHOWING THE KNOWN DISTRIBUTION

Number.	Species.	Maumee River.							St. Joseph River.				Fish Creek.					
		Fort Wayne.	Antwerp.	Cecil.	Defiance.	Grand Rapids.	Waterville.	Toledo.	Hudson.	Edgerton.	Fort Wayne.	Fish Lake.	Hamilton.	Edgerton.	Big Run.	Indian Lake.	Cedar Lake.	Cedar Creek.
49	Coregonus clupeiformis																	
50	Coregonus artedi																	
51	Fundulus diaphanus							×										
52	Zygonectes notatus					×						×						
53	Umbra limi												×	×				×
54	Lucius vermiculatus	×				×			×	×	×	×	×	×	×		×	×
55	Lucius lucius								×	×							×	
56	Lucius masquinongy							×										
57	Anguilla chrysypa				×													
58	*Labidesthes sicculus*	×	×	×	×	×	×	×		×		×	×	×				
59	Aphredoderus sayanus																	
60	Pomoxis sparoides	×			×	×				×		×	×	×				×
61	Ambloplites rupestris	×	×	×	×	×	×	×	×	×	×							×
62	Chænobryttus gulosus											×	×	×		×		×
63	Lepomis cyanellus	×	×	×	×	×			×		×				×			×
64	Lepomis pallidus				×	×		×		×		×	×	×		×	×	×
65	Lepomis megalotis	×		×		×			×									×
66	Lepomis gibbosus					×	×	×	×	×		×	×	×			×	×
67	Micropterus dolomieu	×	×	×	×	×	×	×		×	×		×	×				×
68	Micropterus salmoides	×		×	×	×	×	×				×	×	×	×	×	×	×
69	Etheostoma pellucidum	×	×	×	×	×				×	×		×	×				
70	Etheostoma nigrum	×	×	×	×	×	×	×	×	×	×	×	×	×	×			×
71	Etheostoma blennioides	×	×		×	×	×		×	×	×		×	×				×
72	Etheostoma copelandi							×										
73	Etheostoma caprodes	×	×	×	×	×	×	×			×							
74	Etheostoma aspro	×	×	×	×	×			×	×	×		×	×	×			×
75	Etheostoma evides	×				×					×							
76	Etheostoma flabellare								×					×				×
77	*Etheostoma* cœruleum												×	×	×			×
78	Etheostoma cœruleum spectabile																	
79	Etheostoma jessiæ																	
80	Etheostoma eos											×				×		
81	Etheostoma microperca											×						
82	Perca flavescens					×	×	×				×	×				×	
83	Stizostedion vitreum					×		×										
84	Stizostedion canadense					×	×	×										
85	Roccus chrysops					×	×	×										
86	Aplodinotus grunniens				×	×	×	×										
87	Cottus bairdi									×					×			×

OF FISHES IN THE MAUMEE BASIN—Continued.

Mill Creek.	St. Marys River.				Gordon Creek.	Lost Creek (Cecil).	Devils Lake.	Tiffin River.				Auglaize River.				Sugar Creek.		Lost Creek (Lima).	Blanchard River.			Hoaglin Creek.	Beaver Creek.	Lake Erie.	Number.
	St. Marys.	Rockford.	Decatur.	Fort Wayne.				Manitou Beach.	Hudson.	West Unity.	Brunersburg.	Wapakoneta.	Cloverdale.	Oakwood.	Defiance.	Lima.	Cloverdale.		Findlay.	Ottawa.	Cloverdale.				
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