

FISHES. BY C. H. EIGENMANN.

Fishes were collected in much larger numbers than any of the other vertebrates. They will form the subject of our most extended study of variation. I present here simply a few dates on the spawning time and the distribution of the various species in the localities examined. Half of these localities are on the St. Lawrence side of the divide; the other half on the Mississippi side. To show the relation of the fauna to that of the State I present a complete list of Indiana fishes.

SPAWNING SEASONS.

Most of the fishes spawn in the spring before the Station opened. This was true of all the larger species except a few stragglers of *Lepomis pallidus*.

Noturus flavus. This species is common under boards and logs in Turkey Creek, at Syracuse. Eggs were found in all stages of development the latter half of June. They are laid in little depressions in the gravel under boards, and are apparently watched by the adult. The eggs adhere to each other in masses large enough to fill the hollow of the hand. The eggs are very flabby, the membrane being not tense, as usual in fish eggs. After hatching the young remain together in the nest, and if they are uncovered by raising the board they quickly scatter to hide under another object or under the board again if this has been turned over. The blastoderm forms a narrow nodule well separated from the yolk by a deep constriction.

Pimephales notatus. The eggs of this species are laid on the under surface of various objects submerged in the margin of the lake to a depth of one or two feet. The fish is usually found with the nest, and the immediate neighborhood of the nest is kept clean of weeds and mud. The eggs were found during the whole of June and the greater part of July. The young swim near the surface and are very abundant the latter half of June.

Fundulus diaphanus menona. On June 24 eggs of this species were dragged up by the seine from the grass of the bottom. They are bound together by filaments.

Zygonectes notatus. Many taken on June 27 in Turkey Creek were with ripe eggs.

Etheostoma caprodes. This species was spawning on May 30, a single ripe female was taken about June 25.

	ST. LAWRENCE BASIN.					MISSISSIPPI BASIN.						
	String Lake.	Turkey Creek (Upper).	Turkey Lake.	Channel.	Syracuse Lake.	Turkey Creek (Below Dam).	Webster Lake.	Webster Lake (Below Dam).	Tippecanoe Lake.	Tippecanoe River (Above Dam).	Tippecanoe River (Below Dam).	Shoe Lake.
<i>Ammocetes branchialis</i> L. Brook Lamprey						†						
<i>Ichthyomyzon concolor</i> Kirkland.												
<i>Polyodon spathula</i> Walbaum. Spoon-bill Cat ..								†				
<i>Scaphirhynchus platyrhynchus</i> Raf. Shovel-nosed Sturgeon												
<i>Acipenser rubicundus</i> Le Sueur. Lake Sturgeon.												
<i>Lepisosteus osseus</i> L. Common Gar Pike		†			†			†				
<i>Lepisosteus platystomus</i> Rafinesque. Short-nosed Gar-pike			†									
<i>Lepisosteus tristichus</i> Bloch and Schneider. Alligator Gar												
<i>Amia calva</i> L. Bow-fin, Mud-fish, Dog-fish	†	†	†	†				†				
<i>Ictalurus furcatus</i> Le Sueur. Chuckle-headed Cat												
<i>Ictalurus punctatus</i> Rafinesque. Channel Cat ...												
<i>Ameiurus lacustris</i> Walbaum. Great Cat-fish ...												
<i>Ameiurus natalis</i> Le Sueur. Yellow Cat	†		†			†	†	†	†	†		
<i>Ameiurus nebulosus</i> Le Sueur. Common Bull-head, Horned Pont.									†			
<i>Ameiurus melas</i> Rafinesque												
<i>Leptops olivaris</i> Rafinesque. Mud Cat												
<i>Noturus flavus</i> Rafinesque.							†					
<i>Schilbeodes exilis</i> Nelson												
<i>Schilbeodes minus</i> Jordan												
<i>Schilbeodes elutherus</i> Jordan												
<i>Schilbeodes gyrenus</i> Mitchell	†		†	†		†						
<i>Schilbeodes nocturnus</i> Jordan and Gilbert												
<i>Ictiobus cyprinella</i> Cuv. and Val. Common Buffalo Fish												
<i>Ictiobus urus</i> Agassiz. Razor-backed Buffalo ..												
<i>Ictiobus bubalus</i> Rafinesque. Sucker-mouthed Buffalo.												
<i>Carpionides carpio</i> Rafinesque.												
<i>Carpionides difformis</i> Cope												
<i>Carpionides velifer</i> Rafinesque. Quill-back												
<i>Cybeleptus elongatus</i> Le Sueur. Black Horse												
<i>Catostomus catostomus</i> Foster. Northern Sucker ..												
<i>Catostomus commersoni</i> Lacépède. Common Sucker, White Sucker		†					†					

	ST. LAWRENCE BASIN.					MISSISSIPPI BASIN.						
	String Lake.	Turkey Creek (Upper).	Turkey Lake.	Channel.	Syracuse Lake.	Turkey Creek (Below Dam).	Webster Lake.	Webster Lake (Below Dam).	Tippecanoe Lake.	Tippecanoe River (Above Dam).	Tippecanoe River (Below Dam).	Shoe Lake.
<i>Hybopsis watauga</i> Jordan and Evermann.....												
<i>Hybopsis kentuckiensis</i> Rafinesque. Horny Head, River Chub, Jerker.....		†				†		†		†		
<i>Hybopsis hyostom</i> Gilbert.....												
<i>Semotilus atromaculatus</i> Mitchill. Horned Dace, Creek Chub.....		†				†		†				
<i>Phoxinus elongatus</i> Kirtland.....												
<i>Opsopodus emilia</i> Hay.....												
<i>Notemigonus chrysoleucus</i> Mitchill.....		†	†				††	†	†			
<i>Hiodon alosoides</i> Rafinesque.....												
<i>Hiodon tergisus</i> Le Sueur. Moon-eye.....												
<i>Clupea chrysochloris</i> Rafinesque. Skip-jack.....												
<i>Dorosoma cepedianum</i> Le Sueur. Gizzard Shad..												
<i>Coregonus quadrilateralis</i> Richardson.....												
<i>Coregonus clupeiformis</i> Mitchill.....												
<i>Coregonus labradoricus</i> Richardson.....												
<i>Coregonus hoyi</i> Gill.....												
<i>Coregonus artedi</i> Le Sueur.....												
<i>Coregonus artedi sisco</i> Jordan.....									†			
<i>Salvelinus namaycush</i> Walbaum. Trout.....												
<i>Percopsis guttatus</i> Agassiz. Trout Perch.....												
<i>Amblyopsis spelæus</i> De Kay. Blind Fish.....												
<i>Typhlichthys subterraneus</i> Girard.....												
<i>Fundulus diaphanus menona</i> Jordan and Cope- land.....		†										
<i>Zygonectes notatus</i> Rafinesque. Top Minnow.....		†				†					†	
<i>Zygonectes dispar</i> Agassiz.....								†	†		†	
<i>Gambusia patruelis</i> Baird and Girard. Top Min- now.....												
<i>Umbra limi</i> Kirtland. Mud-minnow, Dog-fish.....	†							†	†		†	
<i>Lucius vermiculatus</i> Le Sueur. Little Pickerel..	†	†	†	†	†	†		†	†	†	†	†
<i>Lucius lucius</i> L. Pike, Northern Pickerel.....												
<i>Lucius masquinongy</i> Mitchill. Muskallunge.....												
<i>Anguilla anguilla rostrata</i> Le Sueur. Eel.....												
<i>Pugosteus pungitius</i> L. Nine-spined Stickle- back.....												
<i>Eucalia inconstans</i> Kirtland. Brook Stickleback..												
<i>Labidesthes sicculus</i> Cope. Brook Silver-side.....		†	†	†	†				†			
<i>Aphredoderus sayanus</i> Gilliams. Pirate Perch.....	†					†						

	ST. LAWRENCE BASIN.					MISSISSIPPI BASIN.						
	String Lake.	Turkey Creek (Upper.)	Turkey Lake.	Channel.	Syracuse Lake.	Turkey Creek (Below Dam).	Webster Lake.	Webster Lake (Below Dam).	Tippecanoe Lake.	Tippecanoe River (Above Dam).	Tippecanoe River (Below Dam).	Shoe Lake.
<i>Etheostoma zonale</i> Cope
<i>Etheostoma caeruleum</i> Cope
<i>Etheostoma maculatum</i> Kirtland
<i>Etheostoma flabellare</i> Rafinesque	†
<i>Etheostoma squamiceps</i> Jordan
<i>Etheostoma tippecanoe</i> Jordan and Evermann
<i>Etheostoma iowe</i> Jordan and Meek	†	†	†	†	†	†
<i>Etheostoma caeruleum</i> Storer. Rainbow Darter	†
<i>Etheostoma caeruleum spectabile</i> Agassiz
<i>Etheostoma jessie</i> Jordan and Brayton
<i>Etheostoma fusiforme</i> Girard
<i>Etheostoma eos</i> Jordan and Copeland
<i>Etheostoma microperca</i> Jordan and Gilbert	†	†	†	..
<i>Perca flavescens</i> Mitchill. Yellow Perch	..	†	†	†	†	†	†	†	†	†	†	†
<i>Stizostedion vitreum</i> Mitchill. Wall-eye
<i>Stizostedion canadense</i> C. H. Smith. Sauger, Sand Pike
<i>Roccus lineatus</i> Bloch. Striped Bass
<i>Roccus chrysops</i> Rafinesque. White Bass	†
<i>Morone interrupta</i> Gill. Yellow Bass
<i>Aplodinotus grunniens</i> Rafinesque. Fresh Water Drum
<i>Cottus richi</i> Nelson
<i>Cottus bairdi</i> Girard. Miller's Thumb	†
<i>Cottus pollicaris</i> J. and G
<i>Cottus hoyi</i> Putnam
<i>Lota lota maculosa</i> Le Sueur. Burbot