## 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 extented 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.

	8	т.	Lav Bas	W RI SIN	ENC	E	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).	Shoo Lake		
Ammocates branchialis L. Brook Lamprev						†								
Ichthyomyzon concolor Kirkland														
Polyodon spathula Walbaum. Spoon-bill Cat Scaphichynchus platyrhynchus Rat. Shovel-nosed									Ť					
Sturgeon			• •											
Lepisosteus osseus L. Common Gar Pike			+		†				+					
Lepisosteus platystomus Rafinesque. Short-nosed Gar-pike			+											
Lepisosteus tristachus Bloch and Schneider. Al-														
ligator Gar		†	†	†	+				Ť					
Letalurus furcatus Le Sueur. Chuckle-headed Cat														
Ictalurus punctatus Rafinesque. Channel Cat														
Ameinrus lacustris Walbaum. Great Cat-fish														
Ameiurus natalis Le Sueur. Yellow Cat Ameiurus nebulosus Le Sueur. Common Bull-	†		†			†	+	†	†	†	†	١.		
head, Horned Pont									T					
Ameinrus metas Rafinesque				٠.	٠.				٠.					
Noturus flarus Rafinesque						+						ľ		
Schilbeodes exilis Nelson														
Schilbeodes minrus Jordan												1		
Schilbeodes eleutherus Jordan												l		
Schildeodes gyrinus Mitchill	T	٠.	†	†	1	T	1					l		
Schilbrodes nocturnus Jordan and Gilbert														
Ictiobus urus Agassiz. Razor-backed Buffalo														
Tetiobus bubalus Rafinesque. Sucker-mouthed Buffalo														
Carpiodes carpio Rafinesque								١				1		
Carpiodes difformis Cope		٠.										1		
Carpiodes velifer Rafinesque. Quill-back									٠.		٠.	1		
Cycleptus clongatus Le Sueur. Black Horse												-		
Catostomus catostomus Foster. Northern Sucker Catostomus commersoni Lacépède. Common Sucker,														
White Sucker		+				+						1		

	5	т.	La <sup>1</sup> Ba			E	Mississippi Basin.						
	String Lake Creek.	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.	
Catostomus nigricans Le Sueur. Hog Sucker			٠,٠			+							
Erimyzon sucetta oblongus Mitchill. Ch		+	†	†		+	+	Ť	Ť	Ť	†		
Minytrema melanops Rafinesque. Striped Sucker. Moxostoma anisurum Rafinesque. White-nose			٠.			†				• •	• •	٠.	
Sucker							١	l					
Moxostoma aureolum Le Sueur													
Lagochila lacera Jordan and Brayton. Hare-lip											• •		
Compostoma anomalum Rafinesque. Stone Roller.						†							
Chrosomus erythrogaster Rafinesque. Red-bellied													
Hybognathus nuchalis Agassiz										٠.			
Pimephales notatus Rafinesque			†			1.		+	+			+	
Cliola vigilax Baird and Girard. Bull-head						ľ							
Minnow													
Notropis anogenus Forbes			+										
Notropis bifrenatus Cope			†	†		†	+						
Notropis heterodon Cope		٠.	+	1			'	1	1				
Notropis cayuga Meek													
Notropis boops Gilbert													
Notropis hudsonius Clinton, Spawn-eater									+				
Notropis whipplei Girard. Silver-Fin		١٠,٠	٠,٠					٠,٠		٠,٠			
Notropis megalops Rafinesque. Common Shiner .		†	Ť			+	T	T	Τ,	Ŧ	T		
Notropis jejunus Forbes		٠.		٠.									
Notropis ardens Cope. Red-fin													
Notropis atherinoides Rafinesque													
Notropis arge Cope													
Notropis dilectus Girard				٠.									
Notropis rubrifrons Cope	٠.		٠.	٠.		• •			٠.				
Ericymba buccata Cope								1					
Hybopsis dissimilis Kirtland													
Hybopsis amblops Rafinesque													
Hybopsis storerianus Kirtland				-			1						

	8	òт.	LAV Bas			Е	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).	Shoot to be		
Hybopsis watauga Jordan and Evermann											٠.			
Hybopsis kentuckiensis Rafinesque. Horny Head River Chub, Jerker		+				+		+		+				
Hybopsis hyostom Gilbert														
Semotilus atromaculatus Mitchill. Horned Dace,														
Creek Chub		†				+		†						
Phoxinus elongatus Kirtland					٠.	٠.					٠.			
Opsopwodus emiliw Hay			+	+			++	+	+		• •			
Hiodon alosoides Rafinesque							+							
Hiodon tergisus Le Sueur. Moon-eye														
Clupea chrysochloris Rafinesque. Skip-jack														
Dorosoma cepedianum Le Suenr. Gizzard Shad				٠.		٠.					٠.			
Coregonus quadrilateralis Richardson		٠.												
Coregonus labradoricus Richardson														
Coregonus hoyi Gill												i		
Coregonus artedi Le Sueur														
Coregonus artedi sisco Jordan						٠.			†	-				
Salvelinus namayeush Walbaum. Trout				٠.	٠.				• • •	• •	٠.			
Percopsis guttatus Agassiz. Trout Perch Amblyopsis spelæus De Kay. Blind Fish				• •				٠.	٠.	٠ .				
Typhlichthys subterraneus Girard														
Fundulus diaphanus menona Jordan and Cope-												ľ		
land			†											
Zygonectes notatus Rafinesque. Top Minnow		†				†					†			
Zygonectes dispar Agassiz						• •			,		+			
Umbra limi Kirtland. Mud-minnow, Dog-fish	+			٠.			+	+		+		٠		
Lucius vermiculatus Le Sueur. Little Pickerel		+	+	+	+	+	+	+	+	+	+	0		
Lucius lucius L. Pike, Northern Pickerel														
Lucius masquinongy Mitchill. Muskallunge														
Anguilla anguilla rostrata Le Sueur, Eel Pygosteus pungitrus L. Nine-spined Stickle														
back Proof Stielleheelt			٠.		٠.			٠.						
Eucalia inconstans Kirtland. Brook Stickleback Labidesthes sicculus Cope. Brook Silverside			+	+	+	†			+					
Aphredoderus sayanus Gilliams. Pirate Perch	1													

	2	Зт.		WRE		Е	Mississippi Basin.							
	String Lake.	Turkey Creek (Upper).	Turkey Lake.	Channel.	Syracuse Lake.	Turkey Creek (Below Dam).	Webster Lake.	Webster Lake (Below Dam).	Tippeeanoe River.	Tippecanoe River (Above Dam).	Tippecanoe River (Below Dam).	Shoe Lake,		
Centrarchus macropterus Lacépède			†											
Red Eye Chomobryttus galosus Cuv. and Val. War Mouth Lepomis cyanellus Rafinesque. Green Sunfish Lepomis macrochirus Rafinesque.			† †	† †		†	†	†	†	+		†		
Lepomis hamilis Girard Lepomis pallidus Mitchill. Blue Sunfish Lepomis megalotis Rafinesque Lepomis garmani Forbes			†					†	†	†	†	†		
Lepomis caryorus McKay				· · · · · · · · · · · · · · · · · · ·				+		+				
Micropterus dolomieu Lacépède. Small-mouthed Black Bass. Micropterus salmoides Lacépède. Large-mouthed Black Bass.		 	†			†			+ +	†		†		
Etheostoma pellucidum Baird. Sand Darter Etheostoma asprellus Jordan Etheostoma nigrum Rafinesque. "Johnny" Etheostoma chlorosoma Hay			†			   †		+	· · · · · · · · · · · · · · · · · · ·	†		†		
Etheostoma bleunioides Rafinesque. Green-sided Darter  Etheostoma coplandi Jordan  Etheostoma histrio Jordan and Gilbert.														
Etheostoma shumardi Girard Etheostoma uranidea Jordan and Gilbert Etheostoma caprodes Rafinesque. Log Perch, Hog-fish			†			†	†	†	†					
Etheostoma macrocephalum Cope.  Etheostoma onachita Jordan and Gilbert  Etheostoma aspro Cope and Jordan  Etheostoma phosocephalum Nelson						†		+	 †					
Etheostoma scierum Swain Etheostoma erides Jordan and Copeland Etheostoma variatum Kirtland					. ,									

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	String Lake.	Turkey Creek (Upper.)	Turkey Luke.	Channel.	Syracuse Lake.	Turkey Creek (Below Dam).	Webster Lake.	Webster Lake (Below Dam).	Tippecanoe Lake.	Tippecanoe River (Above Dam).	Tippeeanoe River (Below Dam).	Shoe Lake.			
Etheostoma iorce Jordan and Meek. Etheostoma caruleum Storer. Rainbow Darter. Etheostoma caruleum spectabile Agassiz. Etheostoma jessice Jordan and Brayton Etheostoma jessice Jordan and Brayton Etheostoma jusiforme Girard Etheostoma microperca Jordan and Gilbert. Perca flavescens Mitchill. Yellow Perch Stizostedion ritreum Mitchill. Wall-eye Stizostedion canadense C. H. Smith. Sauger, Sand Pike. Roccus lineatus Bloch. Striped Bass Roccus chrysops Rafinesque. White Bass Morone interrupta Gill. Yellow Bass Aplodinotus grunniens Rafinesque. Fresh Water Drum. Cottus ricri Nelson Cottus bairdi Girard. Miller's Thumb		+	· · · · · · · · · · · · · · · · · · ·	†	†	· · · · · · · · · · · · · · · · · · ·	+	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	†	· · · · · · · · · · · · · · · · · · ·	†			