A PARTIAL CATALOGUE OF THE FISHES OF ILLINOIS.

By E. W. NELSON.

Owing to the slight attention the ichthyology of the region herein treated has received, the present catalogue must necessarily be very incomplete.

With the exception of Mr. R. Kennicott's list of fishes of Cook county, (Ill. Agl. Report) in which only thirty species are mentioned, and occasional descriptions of new species or the mention of the receipt of specimens from within our limits in the papers of various writers, nothing has been definitely known regarding the ichthyic fauna of the state. During the last three or four years, considerable collections of fishes have been made in various parts of the state, under the auspices of the Illinois Museum of Natural History.

The present paper is based mainly upon this material, which, through the generosity of the management of the above-named institution, I have been enabled to study. I am also greatly indebted to Prof. S. A. Forbes, Curator of the Museum, for notes upon the distribution and peculiarities of structure in many of the species. To Dr. D. S. Jordan, of Irvington, Indiana, I am under obligations for the loan of specimens, for invaluable aid in verifying doubtful identifications, and for notes on the distribution of many of the species, especially in the Wabash valley.

The collections in the Museum have been made principally by Prof. Forbes, in the following localities: Illinois river from La Salle to Pekin; the Vermilion river in La Salle county; Mackinaw creek in McLean county; Rock river at Oregon; Pecatonica river at Freeport; the Ohio and Mississippi rivers at Cairo; the outlet of Big Lake, in Jackson county; Callahan and Drury creeks, in Union county; Lake Michigan at Chicago, and some of the smaller tributaries of the above-named streams. In addition to these, small collections have been made by myself, from the Calumet river and its tributaries, in Cook county: Lake Michigan, at Chicago; small tributaries of the lake at Waukegan, and the Fox river at Geneva. Where species are included upon the authority of others, due credit is given. As will be seen by the list of localities, the streams from which collections have been made are nearly all tributaries, directly or through the Illinois, to the Mississippi, thus leaving the Wabash and Ohio with their tributaries comparatively unexplored, except portions of the Wabash valley, where collections have been made for Prof. Jordan; and so little work

has been done in the entire southern third of the state, that but slight idea can be formed of the exact distribution or of the number of species which exist there. The synonyms mentioned are only intended to connect the names here given with those used in Prof. Jordan's Manual of the Vertebrate Animals of the Northern United States.

FAMILY PERCIDAE.

Genus Microperca, Putnam.

1. *M. punctulata, Putnam.* Least Darter. Not uncommon in Fox river, at Geneva, and in clear tributaries to Lake Michigan at Waukegan. Not common in the Wabash valley.

2. *P. flabellatus, (Raf.) Cope.* Fan-tailed Darter. Common in clear brooks in Wabash valley.

3. *P. lineolatus, (Ag.) Jord.* Striped Darter. Found in clear streams in Northern Illinois, where it replaces the preceding.

4. *P. niger, (Raf.) Jord.* Trout Darter. Very rare in the Wabash valley.

*Genus Poecilichthys, Ag.**

5. *P. caeruleus, (Stor.) Ag.* Blue Darter. Common through Southern Illinois, and especially abundant in the Wabash valley.

6. *P. spectabilis, Ag.* Striped Blue Darter. Not so generally distributed as the preceding; is confined to the northern part of the state. In distribution this and the preceding species bear the same relations as *P. lineolatus* and *flabellatus.*

Genus Boleichthys, Grd.

7. *B. exilis, Grd.* Red-sided Darters. The only specimens I have seen from the state were taken in a clear brook flowing into Lake Michigan at Waukegan, where it was rather common.

8. *B. eos, Jordan, Mss.* Common in small clear streams in Northern Illinois and Southern Wisconsin.

For the following synopsis of the species of this genus I am indebted to Prof. Jordan: The characters ascribed to *B. fusiformis, B. erochrous* and *B. barratti* are from Cope (Proc. Phil. A. N. S., 1864, 233); those of *B. warreni* from Girard (Proc. Phil., A. N. S., 1859, 104).

*Lateral line distinct about to middle of first dorsal, on about 12 scales; 52 transverse rows; head 3¼ in length; D. VIII—9. Mass. *fusiformis (Grd.)*

** Lateral line distinct to middle of first dorsal, on 12 to 18 scales; head 4 in length. D. IX or X—10.

†Scales in 42 to 44 transverse rows; eye as long as snout, 5 in head; sides with dark band and reddish punctulations. New Jersey. *erochrous (Cope)*

††Scales in 45 to 50 transverse rows; eye 3 to 3½ in head, longer than snout; sides with a row of round crimson spots (in life); form slender. Illinois to Montana. *exilis (Grd.)*

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* Includes *Catonotus, Notonotus* and *Poecilichthys. Jord. Man. Vert.*

***Lateral line on 20 to 30 scales.

‡ Head 3¾ in length: lateral line not to end of first dorsal; scales smallest, 60 in lat. l.: D. IX or X—9 or 10. Body fusiform, elongated, caudal peduncle notably much elongated; size large, life coloration brilliant. Northern Illinois and Wisconsin, *eos* (*Jordan*), *Mss.*

‡‡Head 3⅔ in length; lateral line variously incomplete; scales rather large, in 45 to 50 transverse series, D. IX or X—12 to 14. caudal peduncle not elongate; body very short and chubby: size small; colors dull. Georgia to Texas. *elegans* (*Grd.*)

‡‡‡ Head 4 in length; lateral line extends to origin of second dorsal; 56 transverse series of scales: D. X or XI—10 or 11. South Carolina. *barratti* (*Holbr.*)

**** Lateral line unknown: body compact: head shorter than in *B. exilis*; scales smaller: first dorsal with a band of vertically elongated black spots: D IX—11, A II, 9. Cannon Ball R. *warreni* (*Grd.*).

Genus Pleurolepis, Ay.

9. *P. pellucidis, Ay.* Sand Darter. Found sparingly in clear sandy tributaries of the Wabash and Ohio. (*Jordan.*)

Genus Boleosoma, DeK.

10. *B. olmstedi,* (*Stor.*) *Ag.* Tessellated Darter. Specimens are in the collection from various localities, and Prof. Forbes informs me that he has found it common in all clear streams. Some specimens from Fox River in Wisconsin show characters exactly intermediate between this and the *atromaculata* of Girard. Other specimens from the Fox River at Geneva, Ill., agree with the description of *atromaculata*, and others from the same locality answer perfectly to *olmstedi.*

11. *B. brevipinne, Cope.* Slim Darter. Apparently everywhere common in clear streams throughout the state.

Genus Etheostoma, Raf.

12. *E. blennioides, Kirt.* Black-sided Darter. Rather common in the Wabash valley.

13. *E. phoxocephalum, sp. nov.* This species replaces the preceding in the western part of the state, and from the number of specimens in the collection and the localities represented, appears to be rather common in the Illinois and its tributaries.

Sp. Char. Head about 4 times in total length: depth 6½: eye=snout, 4½ in head: D. XIII—12. A. II, 8. Lat. l. 76. Inter-orbital space more than 6 in head. Cheeks naked; opercles scaly; breast naked. Middle line of belly with line of larger scales or a naked strip. Pectorals shorter than head. Fins mottled: sides with a lateral band of small quarish spots usually connected by a narrow black line. A black spot at base of caudal and one at base of lateral line.

Back mottled and tesselated with dark on a light ground. A black line from eye forward and another downward. This species bears a superficial likeness to *E. blennioides*, but may be distinguished at once by the

shape of the spots on the sides, by the much more slender form and very narrow, pointed, eel-like head, the depth of which is less than half its length, and its width two-fifths its length.

14. *E. evides. Jord., Mss.* Barred Darter. Rare. Occurs in the lower Wabash and Ohio valleys. (*Jordan.*)

Genus Percina, Hald.

15. *P. caprodes (Raf.), Grd.* Log Perch. A few specimens from the Calumet and Vermilion rivers. Becomes quite numerous in the Wabash valley.

Genus Perca, Linn.

16. *P. flavescens, (Mit.) Cuv.* Common Perch. Very abundant in Lake Michigan and its tributaries; also occurs, but in smaller numbers, in the Illinois and tributaries. Rare in the Ohio (*Jordan*). Specimens from the clear waters of Lake Michigan are usually a light color—almost white. Often the dark bars, generally so characteristic of the species, are so obsolete that the fish appears to be a clear, yellowish white, with the faintest trace of dark mottling, and the lake perch are rarely as decidedly barred as specimens taken in streams. The river perch may be at once distinguished by the heavy dark bars, and the dark greenish yellow color on the sides. So different are the two that I have several times heard persons speak of them as distinct species.

The aversion of the river form to the lake water and *vice versa*, I have often seen strikingly illustrated. The river bed of the Calumet is so slightly above the lake that during a hard north or northeast storm the lake water gradually forces back the water in the river,—often for a number of miles—and, as the cold lake water fills the channel, the river perch retreat, and their places are supplied by the lake form. As the storm subsides the current of the river forces the lake water back, driving before it the lake perch, and the river perch are again found in their usual haunts.

Genus Stizostedium, Raf.

17. *S. americanum, (Val.) Gill.* Pike Perch. Very common in Lake Michigan and the larger streams throughout the state.

18. *S. griseum, (DeK.) Milner.* Gray Pike Perch. Very abundant in the larger streams. Whether it occurs in Lake Michigan or not I am uncertain.

19. *S. salmoneum, (Raf.).* Salmon Perch. Ohio river and large tributaries. (*Jordan.*)

Genus Roccus, Mitch.

20. *R. chrysops, (Raf.) Gill.* White Bass. Exceedingly abundant in Lake Michigan. Common throughout the state.

Genus Morone, Mitch.

21. *M. interrupta, Gill.* Short-striped Bass. A number of specimens in the collection from Mackinaw creek and the Illinois river.

Genus Micropterus, Lac.

22. *M. nigricans, (Cuv.) Gill.* Large-mouthed Black Bass. Found in

great abundance throughout the state, as far as I can learn. The young are found in myriads in the ditches draining the marshes along the Calumet river.

23. *M. salmoides*, (*Lac.*) *Gill.* Small-mouthed Black Bass. Like the preceding, found in all parts of the state, and in nearly equal numbers.

Genus Centrarchus, Cuv.

24. *C. irideus*, (*Bosc.*) *C. & V.* Shining Bass. A single specimen, about three inches in length, is in the collection from a small stream flowing into the Mississippi, near Fountain Bluff, Southern Illinois.

Genus Pomoxys, Raf.

25. *P. hexacanthus*, (*C. & V.*) *Ag.* Calico Bass. Very abundant in the streams and small lakes in Northern Illinois, where it almost, if not entirely, replaces the following. Much less numerous farther south.

26. *P. annularis, Raf.* Croppie. Very abundant in all the streams through Central and Southern Illinois.

Genus Ambloplites, Raf.

27. *A. rupestris*, (*Raf.*) *Gill.* Rock Bass. Very abundant everywhere collections have been made.

Genus Chaenobryttus, Gill. (=*Glossopolites, Jord.*)

28. *C. gulosus*, (*C. & V.*) *Cope.* (=*G. melanops*, (*Gir.*) *Jord.*) Black Sun Fish. Prof. Forbes has found this species very common in the Illinois and tributaries through Central Illinois. Specimens have also been taken in Lake Michigan by Prof. Jordan.

Genus Telipomis, Raf. (=*Chaenobryttus, Grd.*)

29. *T. cyanellus, Raf.* Blue Sun Fish. Very abundant throughout the state in both large and small streams.

30. *T. microps*, (*Grd.*) *Nelson.* Common in the Calumet river in northeastern, and tributaries of the Illinois in central and western parts of the state.

31. *T. nephelus*, (*Cope*) *Nelson.* Occurs rather uncommonly in the Wabash valley; very hardy and voracious. (*Jordan.*)

Genus Ichthelis, Raf.

32. *I. incisor*, (*C. & V.*) *Holbr.* Blue Sun Fish. Abundant in all waters throughout the state.

33. *I. speciosus*, (*Grd.*) *Jord.* Rather common in the western part of the state in tributaries of the Illinois and Mississippi. Also a few specimens are in the collection of the author from the Calumet river. Although this species approaches closely to *incisor*, yet certain tangible distinctions, sufficient to distinguish the two at sight, are always present as far as my observations have extended.

34. *I. aquiliensis*, (*Grd.*) *Nelson.* A fine adult specimen is in the state collection from the Illinois, and a second less mature from the Fox river at Geneva is in my collection.

The following description is made from the adult specimen, seven inches long. Head, with flap, $2\frac{3}{5}$ in length; depth 2 1-6. Eye=snout, $4\frac{1}{2}$ in head. The eye is large but smaller than the opercular spot, and not quite equal to inter-orbital space. D. I, 12; A. III, 10; dorsal spines rather short and stout, as long as from snout to middle of orbit. Second anal spine stout, third as long as dorsal spines. Pectorals and ventrals long, about reaching anal, the ventrals being the longer. Ventral spine longer than dorsal spines. Body elongated, much elevated in front, heavy. General form and proportions of *I. obscurus*, (*Ag.*) *Jord.* Mouth wide for *Ichthelis;* maxillaries reaching to line from middle of orbit; fins high, spines rather low but very stout. Occipital region very prominent and narrow in adult. The caudal peduncle about as long as wide in front. Color in alcohol, dusky, mottled with orange and blue; cheeks with wide blue bands obscurely defined; dusky dorsal and anal spot. Belly and lower fins with orange and yellow shades, in life apparently coppery yellow; each scale on sides and back with a blackish, longitudinal oblong spot resembling the markings of *I. inscriptus.* Lower jaw and lower parts of cheeks a dull leaden blue, probably brilliant in life; blue line in front of and yellowish band around eye; opercular spot large, flap very broad and black, with a very broad pale edge entirely surrounding the black; the posterior width of edge more than half that of pupil; scales very large and crowded. Lat. l. 46; longitudinal rows 5-14: the lateral line very high; opercular scales large, those on cheeks moderate and six-rowed. Top of head flat and short, forming an angle with abruptly descending profile; rim of orbit slightly elevated. Coloration resembling that of *I. obscurus* and *Pomotis auritus.* Its nearest relative is the former, from which it differs in the presence of blue lines on the cheeks, wider snout and widely margined opercular flap. The smaller specimen bears considerable resemblance to *P. auritus*, being less gibbous and having the opercular flap smaller; it may be distinguished at once, however, by the large mouth and pointed pharyngeals.

35. *I. macrochira*, *Raf.* Gilded Sun Fish. A few specimens have been examined from tributaries of the Illinois and the Wabash valley.

36. *I. anagallinus*, (*Cope.*) *Bliss.* Red-spotted Sun Fish. One specimen in the collection from the Fox river.

I. inscriptus probably occurs in the southern part of the state, but I have seen no specimen.

37. *I. megalotis*, *Raf.* Long-eared Sun Fish. Rather common in the southern part of the state.

38. *I. sanguinolentis*, (*Ag.*) *Bliss.* Blue and Orange Sun Fish. Very abundant through the state, especially in northern part.

Genus Pomotis, Raf.

39. *P. auritus* (*L.*) *Gunth.* Common Sun Fish. Very abundant in the northern part of the state. Prof. Jordan informs me that it does not occur in the Wabash valley.

FAMILY APHREDODERIDAE.

In the present article I have the pleasure of adding a second genus to

this unique family; and, in consequence of certain characters present in the newly discovered form, the family characters of this group must now read as follows:

Fam. Char. Vent jugular or thoracic, either in front of or between the ventrals. Dorsal fin single, with three or four spines. Ventrals thoracic, without spines and with more than five soft rays. Some bones of head spinous; teeth on jaws and palate; scales ctenoid; branchiostegals six; coecal appendages about twelve; air bladder simple.

The following table shows the characters of the two genera of this family as they now stand:

Aphredoderus.	*Sternotremia, Gen. Nov.*
Vent jugular, in advance of ventral fins. Dorsal nearly equidistant between snout and caudal. Last anal spine short and rather slender.	Vent thoracic, between bases of ventral fins. Dorsal nearer snout than base of caudal. Last anal spine long and slender.

Below is a comparison of the specific characters of the two forms. I may here express my thanks to Mr. F. W. Putnam for the specimen of *A. sayanus* from which the following description is made:

A. sayanus, (*Gilliams*) *DeK.* Habitat, brooks near the coast from New York to Louisiana.

Vent nearer lower jaw than to ventrals, and less than twice the diameter of the eye from the junction of the gill membranes. Pectorals 1 3-5 in head. Ventrals the same. Longest dorsal ray the same. Longest dorsal spine 2½ in head. Longest anal ray, 1¾. Longest anal spine, 2¾. Caudal fin, 1 1-5. Diameter of caudal peduncle twice in head. Ventrals well separated, slightly decurrent. Vent opposite middle of opercle.

Longest anal spine less than from snout to middle of orbit. Scales considerably larger anteriorly, larger on opercle than on cheek. Lower posterior angle of cheeks about a right angle. Eye=snout, and also inter-orbital space. Ventrals considerably in front of dorsals. Distance from snout to anterior ray of dorsal 2½ times base of dorsal. Scales on cheeks and opercles large and loose.

S. isolepis, *sp. nov.* Habitat, small, weedy tributary to the Calumet river near Chicago, and small streams in South Illinois.

Vent more than twice as far from lower jaw as from ventrals; also more than three times the diameter of the eye from the junction of the gill membranes.

Pectorals, 1 3-5 in head. Ventrals 1¾. Longest dorsal ray, 1⅔. Longest dorsal spine, 2¼. Longest anal ray, 1¾. Longest anal spine 2, and as long as from snout to posterior border of orbit. Caudal fin 1¼ in head. Each scale with an edge of dark punctations, forming fine longitudinal streaks or lines. Vent behind end of opercle, and between bases of ventrals.

Diameter of caudal peduncle 1¾ in head.

Scales on body nearly equal, being, if anything, a trifle larger on the caudal peduncle. Scales on opercle slightly larger than on cheeks, the latter being scattered and imbedded. Angle of cheeks rounded and more than a right angle.

The distance from snout to anterior ray of dorsal less than twice the base of dorsal. Eye 1½ times in inter-orbital space, and more than once in snout.

Color of living specimen a clear greenish olive, lighter below; becoming yellowish or orange on abdomen.

Branchiostegals, 6.
Head in length, 2¾.
Depth, 3 1-10.
Eye in head, 4.
Dorsal IV, 10.
Anal, III, 6.
Ventrals, 7.
Pectorals, 10.
Lat. l., 44.
Longitudinal rows, 8–10.
The specimen of *Aphredodereus* measures 3 inches.

Branchiostegals, 6.
Head in length, 3.
Depth, 3 1-10.
Eye in head, 4⅔.
Dorsal, III, 11.
Anal, III, 6.
Ventrals, 7.
Pectoral, 10.
Lat. l., 48.
Longitudinal rows, 10-11.
The largest specimen of *Sternotremia* from the dozen or more examined, is 2½ inches; the average is about 2 inches.

FAMILY SCIAENIDAE.

Genus Haploidonotus, Raf.

40. *H. gruuniens, Raf.* Sheepshead. Common in Lake Michigan and all the larger rivers.

FAMILY COTTIDAE.

Genus Cottopsis, Grd.

41. *C. ricei, sp. nov..* Rice's Cottus. Through my friend Mr. F. L. Rice, of Evanston, I am enabled to make the present interesting addition to the lake fauna. The only specimen seen is the type, which was picked up on the shore of Lake Michigan near Evanston, and placed in my hands for identification by Mr. Rice.

Description: Head, 3 3-5; depth, 5 1-3; eye 4½, 1½ in inter-orbital space and equals snout; first dorsal 8, second dorsal and anal destroyed. Ventral I, 4; pectoral 15; palatine teeth present; body short and stout, head much depressed; back almost terete. Body abruptly contracted opposite base of anal; tail very small, sub-terete. Outline tadpole-like. Jaws about equal; mouth rather narrow; jaws contracted and somewhat produced; head very broad and flat, broader than body, breadth greater than length; depth half length. Eyes on upper surface, near together. Preopercular spine extremely large; three times as large as in any other fresh water cottoid known; as long as eye; hooked backward and upward, giving a buffalo-like appearance. Three spines hooked downward below the large spine; the lower concealed. A strong spine hooked forward at base of opercles. Branchiostegals 6. Isthmus as wide as from snout to middle of orbit. Base of pectorals crescentic, their tips just short of anal. Rays all simple. Ventrals under pectorals, decurrent.

Ventrals reaching ⅔ of the distance to vent. Profile rising rapidly to dorsal, which runs along a sort of carina. Dorsal beginning a trifle behind ventrals, just behind the head, about midway between snout and anal. Vent midway between snout and base of caudal.

Depth at first ray of anal less than half length of head; thickens at same point over ½.

Least depth ¼ of head. Caudal peduncle extremely slender and subterete, suggesting a stickleback. Head smooth. Space above lateral line

behind head covered with small stiff prickles hooked backwards, readily visible as small black specks when skin is dry.

Length, 2 5-6. Color pale brown, irregularly spotted and mottled with darker brown, somewhat as in *Lota*. Pectorals mottled ; belly white ; spines spirally curved, forming half a spiral. The most peculiar characters are the strong spines of the preopercle and the smaller ones below, the carinated back and abruptly contracted body, forming the sub-terete caudal peduncle The prickles of the skin seem to be more developed than in the other described species.

Genus Uranidea, DeK.

U. hoyi, (*Put.*) *Mss.* Hoy's Bull-Head. For the privilege of including this and the following species and descriptions I am indebted to the kindness of Dr. P. R. Hoy of Racine, Wisconsin :

Description of an adult female taken twelve miles off Racine in forty-two fathoms of water, June 4, 1875, from a very accurate drawing by Mr. A. L. Kumlien : D. VI, 15 ; A. 11 ; V. I, 3; P. 13; C. 12 : length 2 1-6 in , head 3¼ ; depth 4¼. Width of head equals its length. Eye 3½ ; body short, stout, broad and thick in front, very abruptly compressed behind. Fins all low. P. with lower rays rapidly shortening, reaching just to anal and beyond second dorsal. First dorsal low and small, ¾ as long as soft part and connected by membrane at base. Lower jaw unusually projecting.

43. *U. kumlieni*, (*Hoy*) *Mss.* Kumlien's Bull Head. Deep water in Lake Michigan.

D. VI, 17 ; A. 12.: P. 14 ; V. I, 3; head 3½ ; depth 6. Body slender as in *boleoides*. Head large and long, its width a little over half its length, depth a little less.

Eye large, equal to snout and 3½ in head, more than two times in interorbital space. Pectoral base crescentic, the fin as long as head ; the lower rays rapidly shortening, reaching second or third dorsal ray and falling just short of anal ; fourth and fifth rays largest. No palatine teeth. Preopercular spine not much hooked, directed upwards and backwards. Vent midway between front of eye and base of caudal. Mouth wide, oblique ; maxillary to middle of eye. Lower jaw projecting. First dorsal high, 5-6 second. Second spine longest, almost filamentous ; membrane connecting the dorsals. Caudal peduncle long and slender. Caudal narrow, ¾ he. d. Lat. l. disappears under middle of second dorsal. Dorsal and anal high, their rays projecting. Length three inches. The above description is from one of Dr. Hoy's types.

Genus Pegedichthys, Raf.

44. *P. alvordi*, *Grd.* Common in the Rock river and probably in other streams.

Genus Triglopsis, Grd.

45. *T. thompsoni*, *Grd.* Deep-water Sculpin. Deep water in Lake Michigan.

FAMILY GADIDAE.

Genus Lota, Cuv.

46. *L. lacustris*, (*Mitch.*) *Gill.* Eel-pout. Very abundant in Lake Michigan; rare in the Ohio (*Jordan*), and in the Illinois (*Forbes*).

FAMILY GASTEROSTEIDAE.

Genus Eucalia, Jord.

47. *E. inconstans*, (*Kirt.*) *Jordan.* Stickleback. Has been found rather common in small tributaries to Lake Michigan, and in Rock river, by Prof. Jordan.

48. *E. pygmaea*, (*Ag.*) *Jord.* Occurs in Lake Michigan. (*Jordan.*)

Genus Pygosteus, Brev.

49. *P. nebulosus*, (*Ag.*) *Jord.* Many-spined Stickleback. Lake Michigan. (*Jordan.*)

FAMILY ATHERINIDAE.

Genus Labidesthes, Cope.

50. *L. sicculus*, *Cope.* Silverside. This beautiful little species exists in the greatest abundance in the rivers and small streams tributary to the Illinois, in the western and central parts of the state. As far as I have learned, it does not occur in Lake Michigan or its tributaries. Neither does it occur in Rock river. Its centre of abundance seems to be the streams in the more strictly prairie region of the state.

FAMILY CYPRINODONTIDAE.

Genus Fundulus, Lac.

51. *F. diaphanus*, (*LeS.*) *Ag.* Barred Minnow. Very abundant about the sandy mouths of tributaries to Lake Michigan, keeping in "schools" in the shallow water near the edge. Occurs in smaller numbers throughout the state, specimens having been taken in nearly all the large streams.

Genus Zygonectes, Ag.

52. *Z. notatus*, (*Raf.*) *Jord.* (=*Z. olivaceus*, *Stor.*) Top Minnow. Common in the Illinois and smaller tributaries, and in most streams through the state, except in the tributaries of Lake Michigan.

53. *Z. dispar*, *Ag.* Striped Minnow. A number of specimens are in the state collection from the Illinois river at Pekin, and others from several small tributaries. The following is the description of an average specimen from the Illinois river at Pekin:

Adult about 1½ inches long. Head in length 3⅔; dorsal 7. Depth in length 4½; anal 9. Lateral line 32 to 34; longitudinal rows 9. Eye longer than snout, 3 in head. Dorsal commencing slightly behind anal; back flattened and plane with the top of the head, sloping from the dorsal to the end of the snout. Caudal peduncle broad, width ½ head. Colors (in alcohol) above and on sides olive; vertebral line and top of head darker; also a crescentic patch of dark brownish extending downward and obliquely backward from the lower posterior part of orbit. Entire head scaly, scales

on the top larger than those on the body. Sides of the scales on the body with longitudinal brown spots, forming very distinct, but rather narrow, brown, longitudinal lines Along the center of each scale is a row of very fine brown dots, forming minute lines between the heavier ones along the borders of the scales. Beneath, in front of the anal fin, orange yellow.

FAMILY UMBRIDAE.

Genus Melanura, Linn.

54. *M. limi, (Kirt.) Ag.* Mud Minnow. Exceedingly numerous in prairie sloughs and sluggish streams in the northeastern part of the state. It is also of very rare occurrence in the streams through the state tributary to the Ohio, where it is occasionally taken.

FAMILY ESOCIDAE.

Genus Esox, Linn.

55. *E. nobilior, Thomp.* Muskellunge. Rather common in Lake Michigan, and reported to occur in some of the small lakes in the northern part of the state.

56. *E. lucius, var. estor, (LeS.)* Lake Pike. Very abundant throughout the northern part of the state.

57. *?? E. boreus, Ag.* Several specimens, about seven inches long, are in the collection of the writer, from the Fox river at Geneva.

58. *E. salmoneus, Raf.* Little Pickerel. Abundant throughout the state.

59. *E. cypho, Cope.* A single specimen, in good condition, from the Fox river at Geneva, agrees in every way with Prof. Cope's description of this species (Proc. A. N. S., Phil., 1865, p. 78), with the exception that the bars and dots are obsolete in my specimen. Although Prof. Cope has referred this to a previously described species, yet so marked are its characteristics, that several who have examined my specimen have at once referred it to this species.

60. *E. umbrosus, Kirt.* Four specimens from the Fox river at Geneva, —Prof. Cope's Var. A. of this species. (Trans. A., Ph. Soc., 1866.) This species approaches closely to *salmoneus*, and may eventually be reduced to a variety of that species.

FAMILY PERCOPSIDAE.

Genus Percopsis, Ag.

61. *P. guttatus, Ag.* Trout Perch. Numerous in Lake Michigan, and of rare occurrence in the larger rivers.

FAMILY SALMONIDAE.

Genus Salmo, Linn.

62. *S. salar,* L.* Great Sea Salmon. Fox river at Aurora and near Elgin.

63. *S. quinnat,* Rich.* California Salmon. Fox river at Aurora and near Elgin.

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* As this paper is passing through the press, I learn from Dr. W. A. Pratt, of Elgin, that he has taken these two species this summer, at the localities given. I therefore take the liberty of inserting them in this list.—S. A. Forbes.

64. *S. namaycush, Penn.* Lake Trout. Abundant in Lake Michigan.

Genus Argyrosomus, Ag.

65. *A. clupeiformis, (Mitch.) Ag.* Lake Herring. Very abundant in Lake Michigan. The sisco (*A. sisco, Jord.*) undoubtedly occurs in the deep sandy lakes in the northeastern part of the state.

66. *A. nigripinnis, Gill.* Black-fin. Common in deep water in Lake Michigan.

67. *A. hoyi, Gill.* Lake Michigan Sisco. Found in deep water in Lake Michigan.

Genus Coregonus, Linn.

68 *C. albus, LeS.* White-fish. Very abundant in Lake Michigan.

FAMILY HYODONTIDAE.

Genus Hyodon, LeS.

69. *H. tergisus, LeS.* Moon-eye. Common in Lake Michigan and in all the large streams throughout the state.

FAMILY CLUPEIDAE.

Genus Alosa, Cuv.

70. *A. sapidissima, (Wils.) Stor.* Common Shad. Has been introduced into one or two streams in the northern part of the state; but whether it thrives or not, has not been proven.

Genus Pomolobus, Raf.

71. *P. chrysochrous, Raf.* Ohio Shad Found in the Ohio and Mississippi rivers, and sometimes ascends the Illinois. It is also accredited to Lake Michigan by Mr. J. N. Milner.

Genus Dorosoma, Raf.

72. *D. notatum, Raf.* Gizzard Shad. Very common in the rivers in the southern and central parts of the state, and, since the opening of the canal connecting the Chicago river with the Illinois, has found its way, with the preceding, into Lake Michigan.

For some time previous to this date, (December 2nd), the young, from three to four inches long, have been frequenting, in considerable numbers, a "slip" extending from the Chicago river to one of the City Water Works buildings. The attraction to the fishes appears to be the hot water which runs into the "slip" from the Water Works engines. As the fishes swim about in this warm water, they strike the hot stream as it flows in, and many are killed. The opening of the above mentioned canal will have considerable influence upon the distribution of the lake and river fishes, and numerous species will in all probability take advantage of the communication between the Mississippi and the great lakes.

This undoubtedly accounts for the occurrence of *Chaenobryttus gulosus* in Lake Michigan, as well as of the two preceding species.

FAMILY CYPRINIDAE.

Genus Campostoma, Ag.

73. *C. anomalum, (Raf.) Ag.* Stone Roller. Occurs in the greatest abundance throughout the state, although perhaps more rarely in the vicinity

of Lake Michigan. This species, as defined by Prof. Jordan (Man. Vert. An., p. 275), exhibits a great amount of variation, and may eventually be separated into two.

Genus Pimephales, Raf.

74. *P. promelas, Raf.* Black-head. Apparently rare. I have examined but three specimens from Illinois: two in the state collection, from Bailey's creek, in Central Illinois, and one in the collection of my friend, Mr. E. L. Rice, obtained near Evanston, in a ditch.

75. *P. milesii, Cope.* Approaches very closely to the preceding species, and one of the central Illinois specimens possesses characters almost intermediate between the two forms.

Genus Hyborhynchus, Ag.

76. *H. notatus, (Raf.) Ag.* Blunt-nosed Minnow. Very numerous throughout the state.

Genus Hybognathus, Ag.

77. *H. nuchalis, Ag.* Blunt-jawed Minnow. Apparently rather uncommon; a few specimens in the state collection from central Illinois

78. *H. argyritis, Grd.* Silvery Minnow. Much more numerous than the preceding. Specimens are in state collection, from central Illinois; and Prof. Jordan informs me that it is common in the larger streams in the Wabash and Ohio valleys.

Genus Ericymba, Cope.

79. *E. buccata, Cope.* Silver-mouthed Dace. Very abundant in the Wabash valley; but no specimens are in the state collection from the western streams tributary to the Mississippi.

Genus Semotilus, Raf.

80. *S. corporalis, (Mitch.) Put.* Horned Dace. Abundant throughout the state.

Genus Ceratichthys, Bd.

81. *C. biguttatus, (Kirt.) Bd.* (=*C. melanotus, Raf.*) Horned Chub. Abundant everywhere.

82. *C. dissimilis, (Kirt.) Cope.* Spotted Shiner. Common in tributaries of the Wabash and Illinois.

Genus Rhinichthys, Ag.

83. *R. nasutus, (Ayres) Ag.* Long-nosed Dace Occurs in tributaries to Lake Michigan. (Jordan.)

84. *R. maxillosus, Cope.* Sharp-nosed Dace. Two specimens in the state collection, from Lake Michigan at Chicago, and another, in my collection, from a small tributary of the lake at Waukegan. This species is at once distinguished from its relatives, by its long slender form, narrow-pointed head and peculiarly shaped head and snout. The body is more nearly cylindrical than usual in this genus.

85. *R. atronasus, (Mitch.) Ag.* Black-nosed Dace. Specimens in the state collection, from tributaries of the Illinois; and others from clear tributaries of Lake Michigan, are in the collection of the author.

86. *R. lunatus, Cope.* Fork-tailed Dace. Specimens from Rock river are in Prof. Jordan's collection.

87. *R. meleagris, Ag.* A very large number of specimens of this species are in the state collection, from Bailey's creek, McLean county, where Prof. Forbes found them in abundance. Agassiz's description is so incomplete that I insert the following from one of the Illinois specimens. The species is well marked, and may be easily recognized. A few specimens were taken in the Vermilion river:

Head 2 2-5 in length; depth 4¼. Eye small, 5 in head. D. I, 7; A. I, 6. The barbels are long and distinct. The snout projects considerably, overlapping the lower jaw. Dorsal much nearer tail than tip of snout. Upper half of body dark, sharply outlined by the light of the under parts. The dark mottlings are not so profuse as in most of the species. The body is stout, deeper and thicker than in most members of the genus.

Genus Phenacobius, Cope.

88. *P. teretulus, Cope, var. liosternus, Nelson.* A number of specimens of this form are in the state collection, from small streams in McLean county, where it appears not to be uncommon. The following is the description of the adult:

Head 4⅖ in length; depth 4¾. Eye 4⅖ in head. D. I, 7; A. I, 7; ventrals 8. Lateral line 43 to 45; longitudinal rows 5-4; scales in front of dorsal, 16; length 3 inches. Dorsal in front of ventrals, much nearer snout than caudal. Scales in front of dorsal small. Intestine short, peritoneum pale. Head long; mouth inferior, lateral line first decurved, then straight. Pectorals do not extend to ventrals, ventrals reach vent. Teeth 4-4, hooked. Color olive above, sides bright silvery overlying a plumbeous shade; a small but distinct caudal spot. Thoracic region entirely naked. Lips fleshy, as in the *Catostomidae.*

Genus Hybopsis, Ag.

89. *H. storerianus, (Kirt.) Ag.* Storer's Minnow. Two specimens in my collection, from Lake Michigan at Chicago. The following is the description of one of the specimens:

Head in length 4¾; depth 4¾; eye in head 3 times, and longer than snout; very large and white. D. I, 8; A. I, 7. Lat. l. 40. Dorsal over ventrals, nearer snout than to caudal; 20 large scales in front of dorsal; lateral line nearly straight; pale above, sides bright silvery; intestine short; peritoneum white. This species presents much the appearance of *amarus, Grd.*

90. *H. hudsonius, (Clint.) Put.* Spawn-eater. Occurs in Lake Michigan. (Jordan.)

91. *H. tuditanus, Cope.* Described from Lake Michigan. I have seen no specimens.

92. *H. stramineus, Cope.* Very common in creeks through central Illinois, and probably occurs elsewhere, but no specimens have been taken.

93. *H. volucellus, Cope.* Specimens have been received from the Rock and Pecatonica rivers, by Prof. H. E. Copeland.

94. *H. fraetensis, Cope.* Specimens in state collection, from Ogle and McLean counties, where it appears to be common.

95. *H. haematurus, Cope.* Tributaries to Lake Michigan. (Jordan.)

Genus Hemitremia, Cope.

96. *H. heterodon, Cope.* Northern Hemitremia. Exceedingly numerous in Lake Michigan and the Calumet river. It also occurs in the Fox river at Geneva.

Genus Chrosomus, Raf.

97. *C. erythrogaster, Raf* Red-bellied Minnow. Everywhere common in clear streams. Specimens have been examined from all parts of the state.

Genus Phoxinus, Raf.

98. *P. neogaeus, Cope.* New World Minnow. A single specimen obtained in the Fox river at Geneva.

Genus Gila, B. & G.

99. *G. elongata, (Kirt.) Jord.* Red-sided Minnow. Found rather sparingly through the state.

Genus Lythrurus, Jord.

100. *L. diplaemius, (Raf.) Jord.* Red-fin. Rather common through central and southern Illinois, but I have seen no specimens from the northern part, although it may occur.

101. *L. cyanocephalus, Copeland, Mss.* The type specimens were received from the Rock river by Prof. Copeland.

Genus Luxilus, Raf.

102. *L. cornutus, (Mitch.) Jord.* Shiner. Everywhere abundant.

Genus Cyprinella, Grd. (=Plargyrus, Raf.)

103. *C. galacturus, Cope.* Slender Silver-fin. Abundant in Rock-river and tributaries of the Illinois, and south.

Genus Photogenis, Cope.

104. *P. scabriceps, Cope.* Rough-headed Shiner. Tributaries of the Wabash and Ohio. (Jordan.)

Genus Minnilus, Raf.

105. *M. rubrifrons, (Cope) Jord.* Rosy-faced Minnow. Specimens are in the state collection from the Illinois and several of its tributaries, and it also occurs in the Wabash valley.

106. *M. dilectus, (Grd.) Jord.* Delectable Minnow. This species does not seem to be numerous at any place. A few specimens are in the state collection from Lake Michigan, and others from tributaries of the Illinois in McLean county.

107. *M. amabilis, (Grd.) Nelson.* Four specimens of this species are in the state collection from Pine Creek, Ogle county. The following is a description of one of the above specimens—all being alike:

Head 4 in length; depth $4\frac{2}{3}$; eye equals snout, $3\frac{1}{3}$ in head. Dorsal I, 7. Lat. l. 39 or 40. Anal I, 10. Olive above, sides bright silvery over-

laying a well defined plumbeous band, along the lower border of which is the lateral line. Body considerably compressed; color usually dark; a dark dorsal stripe; five or six rows of scales above lateral line; traces of a blackish spot at base of caudal; eye moderate. *M. megalops*, (*Grd.*) *Jord.* is the nearest relative, from which *amabilis* differs by its smaller eye and more pointed head, besides minor characters. *Megalops* is abundant in the rivers of Georgia, Prof. Jordan informs me.

108. *M. rubellus*, (*Ag.*) *Jord.* Rosy Minnow. Exceedingly abundant in Lake Michigan and all the larger streams through the state.

109. *M. dinemus*, *Raf.* Emerald Minnow. Very common in the Fox river at Geneva, and occurs in most of the larger streams through the state.

Genus Notemigonus, *Raf.*

110. *N. americanus*, (*L.*) *Jord.* Shiner. Abundant everywhere.

Genus Carassius, *Nil.*

111. *C. auratus*, (*L.*) *Bleeker.* Gold Fish. This species has become naturalized in several of our rivers.

FAMILY CATOSTOMIDAE.

Genus Catostomus, *LeS.*

112. *C. teres*, (*Mit.*) *LeS.* Common Sucker. Common everywhere throughout the state. A form with a shorter head, and presenting other slight peculiarities occurs in Lake Michigan. This will probably form a variety, but a lack of a sufficient series of specimens has prevented any satisfactory conclusion being reached.

113. *C. hudsonius*, *LeS.* Northern Sucker. A single specimen of this species is in the state collection from Rock river, at Oregon. In this specimen the head is 4 in length; the lat. l. 100; D. 11; A. 7; thus answering closely to Agassiz's *C. aurora*.*

Genus Hypentelium, *Raf.*

114. *H. nigricans*, (*LeS.*) *Jord.* Hammer-head. Abundant everywhere throughout the state.

Genus Erimyzon, *Jord.*

115. *E. oblongus*, (*Mit.*) *Jord.* Chub Sucker. Common in Lake Michigan and most of the rivers throughout the state. The young of this species have the fins tinged with red, and possess a jet-black lateral band.

116. *E. melanops*, (*Raf.*) *Jord.* Striped Sucker. Common throughout the state. One of the main characters upon which this genus is based proves to be very uncertain, *i. e.*, the absence of the lateral line. In the state collection are specimens of this species which are entirely without a trace of the lateral line: others possess it upon one side only, and others have it upon both sides—generally more or less interrupted, however. Other characters are present which will sustain the separation of this group from related genera, unless new points of connection should be observed.

*Lake Superior, p. 360, pl. II.

Genus Teretulus, Raf. (=*Moxostoma, Raf.*)

117. *T. duquesnii*, (*LeS.*) *Cope.* Red-horse. Common throughout the state.

118. *T. aureolum*, (*LeS.*) *Raf.* Golden Mullet. Abundant in Lake Michigan and the Calumet river.

119. *T. anisurus*, (*Raf.*) *Nelson.* Carp Mullet. Specimens are in the state collection from the Illinois river.

120. *T. macrolepidotum*, (*LeS.*) *Nelson.* Apparently not very common. Specimens in the state collection, from the Illinois and Wabash rivers. (Jordan.)

121. *T. carpio*, (*Val.*) *Nelson.* Silvery Mullet. Lake Michigan and the larger rivers. Not common.

122. *T. velatum*, (*Cope*) *Nelson.* Common in all the larger tributaries of the Illinois and Mississippi.

Genus Placopharynx, Cope.

123. *P. carinatus, Cope.* Cope's Sucker. Common in the Wabash river. (Jordan.)

Genus Ichthyobus, Raf.

There can be no doubt of the propriety of uniting the two genera *Ichthyobus* and *Carpiodes*, since a series of specimens will form so complete a junction between the characters assigned to each that it is impossible to distinguish the dividing line. They have already been united by Prof. Cope, but as *Ichthyobus* has priority over *Carpiodes*, it must stand instead of the latter. The following is the relation in which they were first issued:

Ictiobus, Raf. Ich. Oh., 1820, p. 55, n. subg., type *Amblodon bubalus*, Raf., 1818. *Carpiodes*, Raf. Ich. Oh., 1820, p. 56, n. subg., type *Catost. cyprinus*, LeS., 1818.

124. *I. velifer*, (*Raf.*) *Nelson.* Sail Fish. Not uncommon in the Ohio and Mississippi rivers. Specimens in the state collection.

125. *I. difformis*, (*Cope.*) *Nelson.* Found in Lake Michigan and the large rivers through the state.

126. *I. bison*, (*Ag.*) *Nelson.* Buffalo Carp. Found in the large rivers.

127. *I. thompsoni*, (*Ag.*) *Nelson.* Lake Carp. Common in Lake Michigan.

128. *I. carpio*, (*Raf.*) *Nelson.* Olive Carp Sucker. A single specimen seen from the Ohio river at Cairo.

129. *I. bubalus*, (*Raf.*) *Ag.* Brown Buffalo. Common in all the large rivers through the state.

130. *I. cyanellus*, sp. nov. Blue Buffalo. A number of specimens of this species are in the state collection, from the Illinois river, and in Prof. Jordan's collection, from the Mississippi at St. Louis. The following is the description, taken from several specimens, measuring from 8 to 9¼ inches in length:

Head about 3⅓ in length. Depth 2⅔ to 2 5-6. Eye 4⅓ to 5½ in head. Dorsal I, 30 and I, 8. Ventrals 10. Lat. l. 38. Longitudinal rows 7-5 to 7-6. Body compressed, high. Anteriorly broad, compressed be-

hind. Longest ray reaching 18th ray. Pectorals shorter than ventrals, both shorter than head. Anal scarcely reaching caudal; head very short, high and thick; its thickness $\frac{2}{3}$ length, depth 1 1-5 in length. Mouth quite small, oblique, and overlapped by a slightly projecting snout. Mandible short, 4 in head. Opercle becoming wrinkled with age. Head small, short and thick; muzzle obtuse, conic, not twice the length of eye. Anterior ray of dorsal, in type from Illinois river, slightly nearer snout than base of caudal. In specimens from St. Louis the dorsal is about equi-distant. Color above light steel blue in adults, becoming lighter below. Young lighter with distinct stripes along the rows of scales. Although the species is described from specimens but nine inches long, when fully grown it undoubtedly reaches similar dimensions to its congeners.

Genus Bubalichthys, Ag.

131. *B. niger*, (*Raf.*) *Ay.* Buffalo Fish. Rather common in the large rivers throughout the state.

Genus Cycleptus, Raf.

132. *C. elongatus*, (LeS.) Ag. Black-horse. Occurs in the large rivers throughout the state.

FAMILY SILURIDAE.

Genus Ictalurus, Raf.

133. *I. punctatus*, (*Raf.*) *Jord.* Channel Cat. Occurs more or less commonly throughout the state.

134. *I. furcatus*, (*LeS.*) *Gill.* Great Fork-tailed Cat. Occurs in the large rivers in the western and southern parts.

Genus Amiurus, Raf.

135. *A. confinis*, (*Grd.*) *Gill.* Several specimens are in the state collection from the Illinois and tributaries, where it is rather common.

136. *A. pullus*, (*DeK.*) *Gill.* Black Bull-head. Several specimens in the state collection from the Illinois and tributaries. Not uncommon.

137. *A. atrarius*, (*DeK.*) *Gill.* Northern Bull-head. Common in Lake Michigan and rivers in the northern part of the state.

138. *A. albidus*, (*LeS.*) *Gill.* Brown Cat Fish. Our commonest species; abundant throughout the state.

139. *A. vulgaris*, (*Thomp.*) *Nelson.* (=*A. dekayi*, *Gir.* and *A. aelurus*, *Gir.*) A few specimens have been taken in tributaries of the Illinois in the central part of the state.

140. *A. cupreus*, (*Raf.*) *Gill.* Yellow Cat. Common in the Illinois and tributaries, and south.

Genus Hopladelus, Raf.

141. *H. olivaris*, (*Raf.*) *Gill.* Mud Cat. Not uncommon in the Ohio and Mississippi rivers.

Genus Noturus, Raf.

142. *N. flavus*, *Raf.* Very common throughout the state.

143. *N. marginatus*, *Baird.* Margined Cat. Common in the Wabash valley and south. (Jordan.)

144. *N. exilis*, sp. nov. Slender Cat. Rare. Three specimens were obtained in McLean county by Prof. Forbes, the only ones seen. These specimens present the following characteristics:

Head in length 4¼; depth 6½ in length. Eye 4¾ in head. Dorsal I, 6; Anal 1, 5. Ventrals 8 or 9. Inter-orbital space 3¼ in length of head. Dorsal a trifle nearer snout than anal. From snout to dorsal 3½ in total length. Dorsal as high as long, and 1¾ in head. Dorsal spine small, 3¼ in head. Pectoral spine 2½ in head. Width of head 1⅔ in length; depth 2⅛ in length of head. Base of anal 1½ in head.

FAMILY ANGUILLIDAE.

Genus Anguilla, Thunb.

145. *A. vulgaris, var. rostrata, (LeS.) Nelson.* Common Eel. Occurs in Lake Michigan and most of the larger streams through the state, but is far from common anywhere.

FAMILY AMIIDAE.

Genus Amia, Linn.

146. *A. calva, L.* Dog Fish. Abundant throughout the state.

FAMILY LEPIDOSTEIDAE.

Genus Lepidosteus, Lac.

147. *L. osseus, (L.) Ag.* Gar Pike. This is far the most common species in Lake Michigan and the Calumet river, where it is very abundant. It also occurs throughout the state.

148. *L. platystomus, Raf.* Short-nosed Gar. Occurs throughout the state, but is much more abundant in Illinois and south.

Genus Litholepis, Raf.

149. *L. adamanteus, Raf.* Alligator Gar. Common in the Ohio and Mississippi rivers, occasionally straying up smaller rivers into the interior of the state.

FAMILY POLYODONTIDAE.

Genus Polyodon, Lac.

150. *P. folium, Lac.* Duck-billed Cat. Common in central and southern Illinois in the larger streams. Rare in the northern part of the state.

FAMILY ACIPENSERIDAE.

Genus Acipenser, Linn.

151. *A. maculosus, LeS.* Sturgeon. Very abundant in Lake Michigan and the larger rivers throughout the state.

152. *A. rubicundus, LeS.* Lake Sturgeon Very common in Lake Michigan, ascending Calumet river in winter.

Genus Scaphirhynchops, Gill.

153. *S. platyrhynchus, (Raf.) Gill.* Shovel-nosed Sturgeon. Common in the southern part of the state in the Ohio and Mississippi rivers.

FAMILY PETROMYZONTIDAE.

Genus Petromyzon, Linn.

154. *P. niger, Raf.* Small Black Lamprey. Very common in many localities through northern Illinois, ascending small streams in spring from Lake Michigan and the rivers.

Genus Ichthyomyzon, Gir.

155. *I. argenteus, (Kirt.) Grd.* Silvery Lamprey. Lake Michigan and large rivers throughout the state.

156. *I. hirudo, Grd.* A single specimen in the state collection from the Ohio at Cairo.

ERRATA.

BULLETIN No. 1.

Page 33, line 5, after Report, read 1853 and '4.

Page 34, insert *Genus Poecilichthys*, *Ag.* between numbers 1 and 2.

Page 38, second line, for 2 1-6 read $2\frac{1}{6}$. Wherever, in this paper, two figures are separated by a hyphen, they should be written in the form of a common fraction.

Page 40, line 11, for *Aphredodereus* read *Aphredoderus*; under No. 40, for *gruuniens* read *grunniens*.

Page 44, No. 71, for *chrysochrous* read *chrysochloris;* for J. N. read J. W.

Page 45, No. 74, for E. L. read F. L.

Page 47, after 103 insert the following:—$103\frac{1}{2}$. *C. analostona*, *Grd.*, Silver-fin. Everywhere abundant through Central Illinois. Occurs less commonly further north.

Page 52, Note 2, for der read den; for Archiev. read Archiv.
Note 3, for des read der; for Wein read Wien.

Page 53, 8th line, for M. Bary read DeBary.
Note 7, for der (Brandpilze) read die.

Page 54, for *Peronosporiæ* read *Peronosporeæ*.

Page 55, 8th line, for *hauptoria* read *haustoria*.
14th line, insert (12) after six, and add one to each of the three reference numerals following.
5th line from bottom, omit (15).
2d line from bottom, insert (16) after Common.

Page 56, 10th line, 2d paragraph, instead of '75–6 read '74–5.
15th line from bottom, for pappillate read papillate.
11th line from bottom, for *Poltactis* read *Polyactis*.

Page 57, 7th line, for *Peronosporiæ* read *Peronosporeæ*.
21st line from bottom, insert European before vine.

Page 58, 8th line, for *Peronosporiæ Peronosporeæ*.
2d line, 2d paragraph, for 3 read 5.
7th and 8th lines, 2d paragraph, for one to three read twelve to fifteen.
4th line from bottom, for *bignouioides* read *bignonioides*.

Page 68, No. 40, reduce Acridium differentiale, etc., to a synonym, and insert above it C. differentialis, Thos.

Page 72, Plate II, fig. 1, for *Melanispora* read *Melampsora*.

Page 73, Plate III, fig. 3, for 3 read 5.
Plate III, fig. 5, for 5 read 3.
Plate III, fig. 7, for Plycinidia read Pycnidia.
Plate IV, fig. 12, for *fresii* read *friesii*.